The Effect of Cancellation Rights on the Value of Contracts

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Commercial contracts are frequently being negotiated in a way, which gives one or both parties the right to back out, either unilaterally or under particular conditions. Such a right may be stipulated explicitly through a covenant, it may ensue from pertaining legislation, or it may arise implicitly due to deficient enforcement. All of these cases bring forth the issue of contract valuation under cancellation rights, with various applications, ranging from negotiating the terms of particular transactions, to assessing their fair value from a supervisory point of view. Appropriate quantitative valuation methods thus provide vital tools for the development of business strategy, as well as for the decision-making support of auditors, appraisers, tax authorities and policy-makers.

This paper strives to develop a range of simple models, helping understand the value drivers and establish valuation benchmarks for various types of contracts, which, in principle, are always but sets of rights. It partially takes up a more technical paper by Vlachý (forthcoming), which is a pioneering study on cancellation rights valuation as far as Czech literature is concerned; however, we are more explicit and focused as concerns the tools and recommendations for practical assessments.

Using Option-Based Models as Valuation Tools

Financial economics describes any right, including the right or opportunity to abandon a commitment, as an option. In contrast to financial options, which are typically conceived as negotiable securities, embedded options constitute indivisible components of financial or real

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contracts (Moore, 2001). These defining attributes notwithstanding, they may materially impact such contracts' value and in some cases, this difference, i.e. option value, can be observed empirically.

In this context, Myers (1977) points out to the case of bonds issued with call provisions, which should be traded at a discount to otherwise comparable securities without this feature, the difference making up the fair value of a call option. Mitchell (1991), as well as Bliss and Ronn (1998) have carried out extensive research using market data and essentially confirming the hypothesis.

The original modern option-valuation methodology, as pioneered by Merton (1970) and Black and Scholes (1973), has been based on a portfolio replication argument, which, strictly speaking, requires the existence of complete markets, allowing an unconstrained purchase and sale of marginal units of every asset. This is not always a realistic assumption, in particular where real assets are concerned. However, Rubinstein (1976) has shown, using a general market equilibrium model that their results hold even under much less strict assumptions, which has contributed to a sense of robustness for the closed-form analytical models favored by many practitioners.

Beside the developments in financial derivative valuation, we have witnessed a boom in real-option methodology and applications, whose essential theoretical developments have been epitomized in the monograph by Dixit and Pindyck (1994). The valuation of real options typically faces the daunting challenge of incomplete as well as inefficient markets. Accordingly, their analyses require a much more qualified approach focusing on sensitivities and value drivers rather than normative price setting. None the less, real options have by now become mainstream tools for the valuation of diverse classes of assets, as the compilation by Reuter and Tong (2007) clearly shows. It is evident that options embedded in most types of non-securitized contract feature broadly similar characteristics. Furthermore, Merton (1998) stresses in his Nobel lecture that financial, embedded and real options are just various forms of the same economic phenomenon.

To summarize, it seems an undisputed fact that options are suitable tools for the valuation of contractual rights, and that option-based analysis can offer much insight wherever contracts are designed or assessed.

Cancellation Right Valuation

A particular deviation setting embedded options apart from most financial options stems from the fact that it is highly unusual for their holders to make up-front payments to the issuers in the form of option premiums. This does not mean, as we shall demonstrate later, that these options have no value, but rather that compensation has to take place through different means.

It is interesting to note that in the historical past, some exchange-traded option contracts used to be issued with no upfront payment and were structured so that a fee was only paid contingent upon their exercise[1]. In the present, phenomenally developed derivatives markets, this practice has been generally discontinued.

However, similar financial instruments are nowadays sometimes being offered over-the-counter, primarily for corporate tax-optimization purposes or to facilitate tailor-made risk management schemes, as explained by Edwardes (2000, Chapter 7). Generally, they fall into the category of Contingent Premium Options, analyzed by Kat (1994), and they are marketed under various proprietary brands of the respective investment banks. The familiar names include Cancellable Forward (Goldman Sachs), Break Forward (Midland Bank), Boston Option (Bank of Boston), Forward with Optional Exit – FOX (Hambros Bank), just to quote the ones listed by Rawls and Smithson (1989).

Real contracts sometimes take a similar structure in that they offer one party the exclusive right to revoke their obligation, subject to a fee or penalty. The following chapter will take up their valuation, followed with some more general structures.

Unilaterally Cancellable Contracts

We shall now introduce a model for the valuation of cancellable forward contracts, which corresponds to the simplest case of an embedded default option. The model is commensurate with a financial strategy,

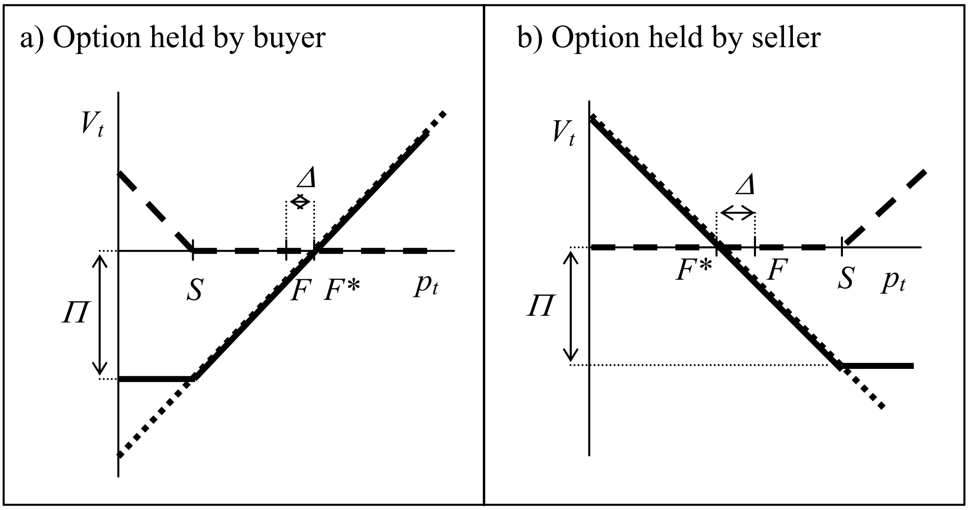
[1] For example, according to Paulat (1928), the pre-WWII Prague Stock Exchange used to trade a contingent premium type of option, called “dont”, alongside contracts denominated “premium”, which essentially corresponded to modern-type options.

combining a forward contract with a European option, expiring on the date of forward settlement.

To meet the zero-cost condition, the terms of these two instruments have to be arranged so that their values exactly match. Since any unexpired option has a positive time value, assuming the existence of market risk, the forward price has to be biased in favor of the issuer of the embedded option.

In case the option to cancel is being held by the buyer, the contractual selling price of the underlying asset F^* thus always has to be higher than its equilibrium value in the forward market F, resulting in a positive difference $\Delta = F^* - F$, as illustrated under Fig. 1a. The dotted line represents the settlement value of the forward contract, which is in the money from the point of view of the seller. The broken line represents the intrinsic value of the put option held by the buyer, featuring an exercise price S. The full line adds up the two values, which jointly make up the cancellable forward contract. Accordingly, the agreed-upon purchase price $F^* > F$, but the buyer is entitled to default, subject only to a fee or penalty $\Pi = F^* - S$.

Fig. 1: The intrinsic value of unilaterally cancellable contracts



Source: Authors

A reverse situation arises with the seller as option holder (Fig. 1b). This person will commit to sell at a below-market price $F^* < F$, but due to a call option on the underlying asset may default against the payment of $\Pi = S - F^*$.

In a formal description of the future value of the contracts, the unknown future market price of the underlying asset p_t represents a stochastic variable, determining the payoff functions for buyers' (1) and sellers' (2) unilaterally cancellable contracts, respectively.

$$V_B = S - F^* + \max\{0; p_t - S\} \tag{1}$$

$$V_S = F^* - S + \max\{0; S - p_t\} \tag{2}$$

The zero-cost condition further stipulates that in an efficient market, the expected present value of either contract has to equal zero. Assuming that the future prices of the underlying asset behave stochastically according to a Wiener process[2], and using the valuation method proposed by Rubinstein (1976), this leads to closed-form functions, deriving $F^* = f(S, F, \sigma, t)$ as (3) or (4).

$$F_B^* = F\,\mathrm{N}(d_1) + S\,\mathrm{N}(-d_2) \tag{3}$$

$$F_S^* = F\,\mathrm{N}(-d_1) + S\,\mathrm{N}(d_2) \tag{4}$$

The function N(.) denotes the standard normal cumulative distribution for the variables $d_1 = [\ln(F/S)+\sigma^2 t/2] / (\sigma\sqrt{t})$; $d_2 = [\ln(F/S)- \sigma^2 t/2] / (\sigma\sqrt{t})$.

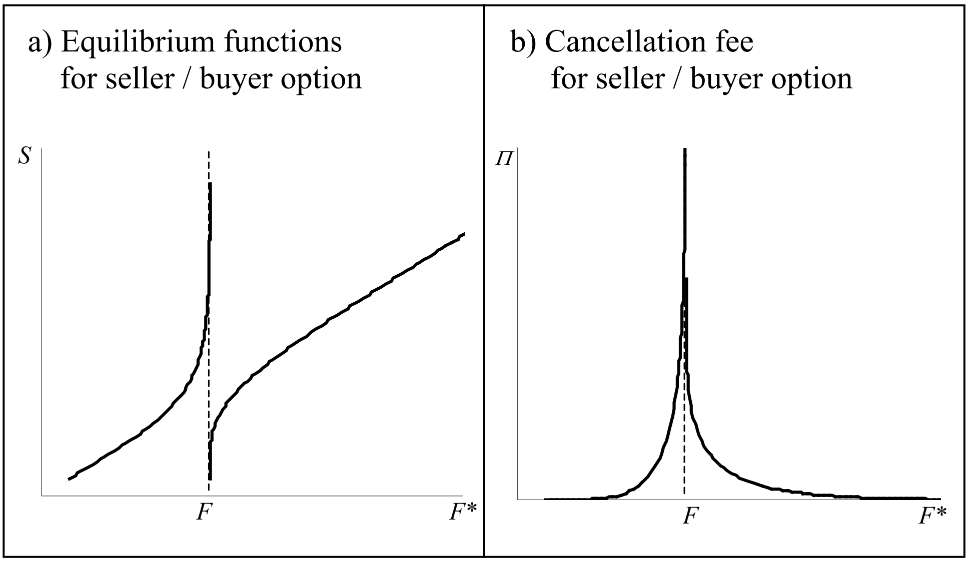
Vlachý (forthcoming) may be referred to as regards the relationship between these formulas and the expressions of more familiar option-pricing models, such as that proposed by Black and Scholes (1973), as well as more precise stipulations of the model pre-requisites.

Note that the valuation of a cancellable forward does not require any prior knowledge of the spot market price of the underlying asset, nor its trend estimate. The model inputs comprise just the fixed-delivery forward price F settled at time t, and a market volatility estimate σ. The assessor then searches for eligible combinations of F^* and S, meeting the terms of (3) or (4).

2 This is normally a reasonable assumption in case there is a price-setting market for the asset with fixed delivery terms. Øksendal (2003) discusses stochastic processes in more detail.

Strictly speaking, there are an infinite number of such eligible combinations, as illustrated under Fig. 2a.

Fig. 2: The terms of equilibrium for cancellable forward contracts



Source: Authors' simulation

The problem can obviously be solved by arbitrarily choosing any positive *S*, and, using either (3) or (4), depending on whether the option is held by the buyer or the seller, calculating a pair of fair transaction terms F^* and $\Pi = |F^* - S|$.

For practical means, this may bring unintended results, however[3]. In particular, a choice needs to be made between relatively high default penalties and relatively high premiums or discounts against prevailing market prices, as illustrated under Fig. 2b. It may thus be more appropriate to choose either $F_B^* > F$, or $F_S^* < F$, depending on the type of contract, and then search for the corresponding *S*, using numerical iteration.

3 Note, for instance, that for $S \rightarrow 0$ the resulting F_S^* converges towards *F*, while the cancellation fee Π also converges towards *F*. This leads to contractual terms, which might be perceived grotesque ("A party will sell the asset at fair market value, but has an option to default, subject to paying a penalty amounting to the asset's initial price.").

Numerical Solution

Using the aforesaid model, we shall now demonstrate the impacts a unilateral cancellation right should theoretically have on the terms of a contract. Tab. 1 and 2 show the adjusted/market price coefficients F^* / F for a range of underlying asset volatilities σ and cancellation fee ratios Π / F^* under the assumption of a buyer's and seller's unilateral cancellation right, respectively.

Tab. 1: Price adjustments F^*/F for a buyer's cancellation option

$\sigma \setminus (\Pi / F^*)$	1%	2%	5%	10%	15%	20%	30%	50%
20%	128.2%	120.8%	111.5%	105.5%	102.8%	101.4%	100.3%	100.0%
40%	179.2%	160.3%	137.3%	121.9%	114.2%	109.4%	104.1%	100.5%
60%	252.6%	215.6%	172.5%	144.9%	131.0%	122.2%	111.8%	102.8%
80%	354.1%	289.1%	217.3%	173.4%	151.8%	138.3%	122.1%	106.9%
100%	490.2%	383.9%	272.3%	207.2%	176.2%	157.0%	134.1%	112.3%
120%	668.0%	502.9%	337.8%	246.1%	203.6%	178.0%	147.6%	118.5%

Source: Authors' calculation

Tab. 2: Price adjustments F^*/F for a seller's cancellation option

$\sigma \setminus (\Pi / \Phi^*)$	1%	2%	5%	10%	15%	20%	30%	50%
20%	76.0%	80.9%	87.9%	93.1%	95.7%	97.3%	98.9%	99.8%
40%	50.0%	56.3%	66.5%	75.5%	81.1%	84.9%	90.0%	95.2%
60%	30.6%	36.4%	46.6%	56.7%	63.4%	68.6%	75.9%	84.7%
80%	17.7%	22.2%	30.8%	40.0%	46.7%	52.0%	60.2%	71.1%
100%	9.7%	12.9%	19.3%	26.8%	32.6%	37.5%	45.4%	56.6%
120%	5.1%	7.1%	11.5%	17.1%	21.7%	25.7%	32.5%	43.0%

Source: Authors' calculation

The results can be interpreted as in the following example: A transaction is being assessed whereby a good would change hands in one year's time. Its volatility is estimated at 40% and the buyer has a unilateral right to revoke the contract. The usual market price of the good under commensurate delivery F = USD 1 000. There are many different sets of terms the parties can agree to, and which would be considered fair. For instance, referring to data in Tab. 1, the purchase can be stipulated at the price $F^* = 179.2\% \cdot F =$ USD 1 792, with a cancellation fee $\Pi = 1\% \cdot F^* =$ = USD 17.92. It would be just as appropriate, however, to set the price $F^* = 100.5\% \cdot F =$ USD 1 005, combined with a penalty $\Pi = 50\% \cdot F^* =$ = USD 500.25.

If, on the other hand, the right to revoke is being held by the seller, fair terms of the transaction (see Tab. 2) include the combinations $F^* = 50.0\% \cdot F =$ USD 500, $\Pi = 1\% \cdot F^* =$ USD 5.00, as well as $F^* = 95.2\% \cdot F =$ USD 952, $\Pi = 50\% \cdot F^* =$ USD 476.00[4].

Note that we are investigating relationships that are functions of the underlying asset volatility, as well as time to settlement, i.e. $F^* / F = f(\Pi / F^*; \sigma, t)$. However, there is a simple way to estimate the results for different contract maturities by means of using adjusted volatilities. Assuming that the expected price change variance σ^2 is homogeneous in time, its growth function will be linear, and volatility σ will thus be a square root function of time, as described by (5).

$$\sigma(t_2)/\sigma(t_1) = \sqrt{\left({}^{t_2}\!\!\diagup_{t_1}\right)} \tag{5}$$

The results of the example above thus hold for annual contracts with a volatility[5] of 40%, just as for quarterly contracts assuming an annual volatility of $40\% \cdot \sqrt{4} = 80\%$, or four-year contracts assuming an annual volatility $40\% / \sqrt{4} = 20\%$.

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4 It is evident that under a log-normal stochastic process assumption (corresponding to the fact that market prices of assets cannot possibly become negative), the option-issuer's risk will generally be higher in case of a seller's cancellation right, and so will be the counterparty's total compensation.

5 This paper does not strive to go into more depth on the techniques of volatility estimations (a concise summary is given e.g. by Scholleová 2007, Chapt. 6). Anyway, we may note that on-going empirical research by students at the Institute of Finance and Administration (verified by other sources) indicates levels of annual volatilities for freely floating foreign exchange of ca 10%, diversified equity and real-estate indices of ca 20%, and various commodities of ca 30% to 40%. Individual stocks and investment projects containing specific risk can feature volatilities in a broad range from 20% to well over 100%, which depends on a number of factors, such as industry, region, size, market share, etc. For more references, see Vlachý (2008, Section 2.1 and Footnote 10).

It is evident, with higher volatilities and relatively long settlement durations in particular, that default penalties are due to be rather high, or else contracts have to be arranged at prices with substantial deviations from customary market prices. This is in contrast to what most members of the general public tend to consider as adequate. Frequently, situations arise where tax authorities, for instance, decline to embrace particular contractual terms, quoting that they are contrary to good practice. Under the following paragraphs, we shall investigate some ways to address such externalities.

Further optimization

Let us assume that the standpoint of a legislator or tax authority effectively prohibits arrangements that may be perfectly appropriate from the theoretical point of view, but exceed some arbitrary criteria of "adequacy".

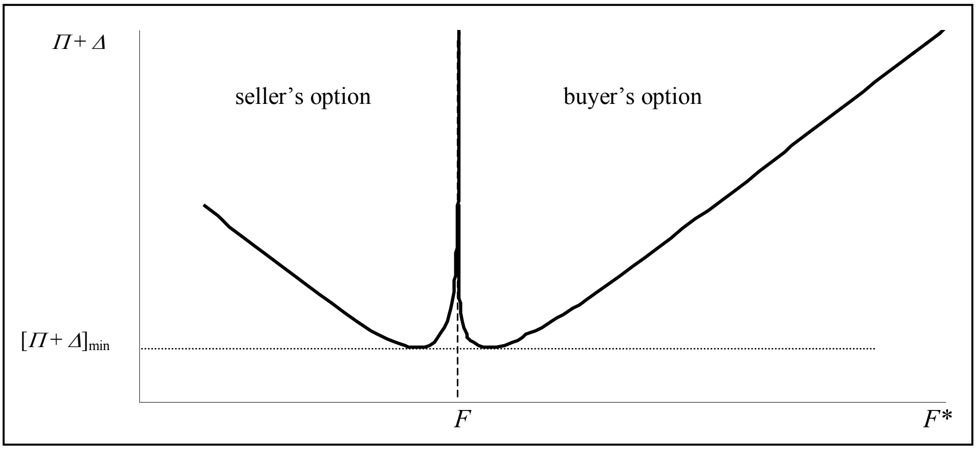
In the simplest case, there would be a firmly set limit, which would constrain either the penalty, or the price deviation. The buyer and seller would then prefer such sets of terms, which retain the full tax shield or minimize the risk of the contract being declared void. Unfortunately, pertaining regulations tend to retain a degree of arbitrary judgment, which obliges parties to try to satisfy them in best faith.

One possible approach addressing this issue would aim at minimizing the overall potential compensation due to the option issuer. This would mean that the equilibrium functions (3) and (4), respectively, would be supplemented with an optimizing criteria function (6).

$$\text{minimize}\, z = \Pi + \Delta \tag{6}$$

A brief investigation of $z = f(F^*)$ for $t > 0$, $\sigma > 0$ shows that the function has two minimums, one for a buyer's option, the other for a seller's option, which is illustrated under Fig. 3.

Fig. 3: Total Compensation for a Cancellation Right



Source: Authors' simulation

Interestingly enough, the minimal potential compensation $[\Pi + \Delta]_{\min}$ is equal for both the buyer's option and the seller's option, and a closed-form solution can be used for its assessment. A brief derivation follows based on a buyer's option.

Defining $\Pi = F^* - S$ and $\Delta = F^* - F$, we are searching for $[\Pi + \Delta]_{\min} = [2\,F^* - S - F]_{\min}$. Substituting (3) for F^*, one minimizes the function $[\Pi + \Delta] = F[1 - 2\,N(-d_1)] - S\,[1 - 2\,N(-d_2)]$. The function is purely convex, and its global minimum thus exists at the point where $\partial[\Pi + \Delta] / \partial S = 0$. Because $\partial[\Pi + \Delta] / \partial S = 2\,N(-d_2) - 1$, we are searching for the point where $N(-d_2) = 0.5$. This represents the mean of the normalized normal distribution, which, by definition, has to equal zero. Given that $d_2 = [\ln(F/S) - \sigma^2\, t / 2] / (\sigma\sqrt{t}\,)$, the minimum is reached at the strike price S^* established by (7).

$$S^* = Fe^{-\sigma^2 t/2} \tag{7}$$

Solving for $\Pi = F^* - S$ and $\Delta = F^* - F$, and substituting (4), it is possible to conclude that (7) holds true for a seller's option as well.

Assessing S^* is critical for setting up the terms of an optimized contract. Using the parameters of an earlier example, i.e. $t = 1$, $\sigma = 40\%$ and F = USD 1 000, one calculates S^* = USD 923. Substituting S^* for S in (3) gives F_B^* = USD 1 117, which is the purchase price in case of a buyer's option, whose cancellation fee will amount to $\Pi_B = F_B^* - S^* =$ = USD 194. For the seller's option, F_S^* = USD 806, Π_B = USD 117. The reader is encouraged to verify that $\Pi_B + \Delta_B = \Pi_S + \Delta_S$ = USD 311.

Mutually Cancellable Contracts

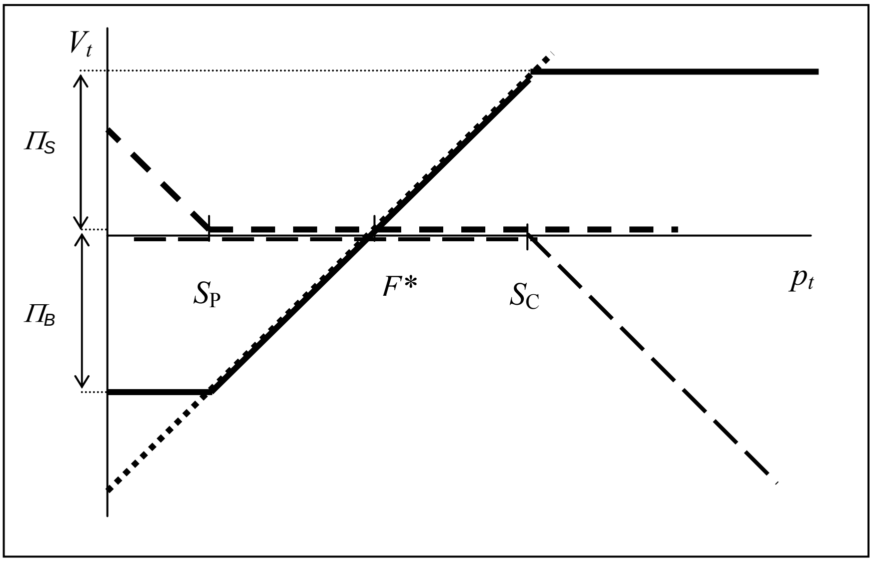
In practice, most contracts cannot be assessed according to the previous model. This has two fundamental reasons. One is that most contracts effectively contain the option for both parties to default on delivery, even though that possibility can be highly asymmetric. The other one concerns market inefficiencies, including transaction costs[6]. These facts can explain the existence of particular cancellable contracts, which, for instance, do not stipulate any cancellation fees.

One generalized case entails the existence of cancellation rights for both parties of a contract. These can be either symmetric or asymmetric.

Two options and one forward contract suffice to describe this situation. Labeling the contractual forward price F^*, the buyer holds a put option at the strike price S_P and the seller holds a call option at the strike price S_C. The buyer's position at settlement can then be illustrated as under Fig. 4. In financial markets, such a strategy is usually called Range Forward or Cylinder Option (Rawls and Smithson, 1989).

[6] Vlachý (forthcoming) offers a separate model comprising transaction costs. Also, certain commercial contracts can effectively contain an up-front option premium in some form, and thus do not necessarily have to meet the zero-cost condition.

Fig. 4: The intrinsic value of mutually cancellable contracts



Source: Authors

At a particular price F^*, the buyer is entitled to default subject to a penalty $\Pi_B = F^* - S_P$, the seller's cancellation fee is $\Pi_S = S_C - F^*$. Assuming the contract is zero-cost, the value of the call option must match that of the sum of the put option and the forward contract. This leads (Vlachý, forthcoming) to (8).

$$-F\,\mathrm{N}(-d_{P1}) + S_P\,\mathrm{N}(-d_{P2}) + F - F^* - F\,\mathrm{N}(d_{C1}) + S_C\,\mathrm{N}(d_{C2}) = 0 \qquad (8)$$

Due to the fact that there are two options with different strike prices, there are four distinct parameters

$d_{C1} = [\ln(F/S_C)+\sigma^2 t/2] \,/\, (\sigma\sqrt{t})$; $d_{C2} = [\ln(F/S_C)-\sigma^2 t/2] \,/\, (\sigma\sqrt{t})$;
$d_{P1} = [\ln(F/S_P)+\sigma^2 t/2] \,/\, (\sigma\sqrt{t})$; $d_{P2} = [\ln(F/S_P)-\sigma^2 t/2] \,/\, (\sigma\sqrt{t})$.

In contrast to unilaterally cancellable contracts, a bilaterally cancellable contract can be price-neutral, i.e. its contractual price needn't necessarily differ from the usual market price. Its terms have to meet the criterion (9).

$$-F\,\mathrm{N}(-d_{P1}) + S_p\,\mathrm{N}(-d_{P2}) = F\,\mathrm{N}(d_{C1}) - S_C\,\mathrm{N}(d_{C2}) \qquad (9)$$

However, it is generally not possible for such a transaction to be price-neutral as well as symmetrical[7].

These models, requiring discrete numerical-analysis solutions, can help explain numerous situations where the rights are asymmetric, either explicitly, or implicitly, perhaps due to particular legislation[8]. The problem can then be grasped from two alternative points of view, as we shall endeavor to show.

Assessing Terms under the Requirement of Price-Neutrality

Under some circumstances, the contract may need to be price-neutral (there may be e.g. tax or other regulatory reasons for this requirement) and fair bilateral terms of cancellation have to be negotiated. This represents a fairly trivial numerical search for combinations of strike prices $\{S_P; S_C\}$, meeting the terms of (9).

Tab. 3 shows the seller's cancellation fee ratios Π_B / F as a function of the buyer's cancellation fee ratios Π_B / F for a range of underlying asset volatilities σ.

Tab. 3: Seller's cancellation fee ratios assuming price neutrality

$\sigma \backslash (\Pi_B / F)$	5%	10%	15%	20%	30%	50%
20%	6.1%	12.7%	19.9%	27.9%	47.0%	104.4%
40%	7.2%	15.0%	23.5%	32.9%	55.3%	124.7%
80%	10.0%	21.0%	33.2%	46.8%	79.8%	183.9%
120%	14.0%	29.9%	47.8%	68.3%	119.2%	290.0%

Source: Authors' calculation

As suggested earlier, the risk of a seller's option is always higher than that of a buyer's option, which translates into relatively higher penalties under equilibrium.

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7 There is a trivial exception with $S_C = S_P = F$. Accordingly, both parties could breach the contract at no cost, which would make the contract worthless, regardless of p_t. Of course, it makes no practical sense to enter into such a contract, because it contains no enforceable right whatsoever.

8 Such legislation may apply to tenancy, labour or consumer contracts, for instance.

To illustrate the usage of Tab. 3, we are using the market price F = USD 1 000, once again, and we estimate the expected volatility of the underlying asset σ = 40%. Let us further consider that the buyer is willing to commit to a cancellation fee Π_B / F = 15%. It will be easily established that the seller's cancellation fee has to be Π_B / F = 23.5%, and a penalty of Π_B = USD 235 will thus be charged in case of his default.

Assessing the Price Bias Due to Asymmetric Terms of Cancellation

On the other hand, both parties may initially fix the terms, relating to the costs of breach of contract. The analysis then focuses on an estimation of the implicit net costs, due to an adjustment of the equilibrium price. This may be a useful tool for business negotiations, but it is also tempting to use such a model for econometric applications.

The iterative numerical solution of this problem is somewhat more complex, requiring simultaneous optimization of non-linear functions[9]. The resulting price-adjustment ratios for selected combinations of buyer's cancellation penalties (columns) and seller's penalties (rows) are illustrated under Tab. 4 and 5 for underlying asset volatilities of 40% and 120%, respectively.

Tab. 4: Price adjustments *F / *F* for pairs of cancellation options (σ = 40%)**

(ΠΣ / Φ) \ (ΠΒ / Φ*)*	10%	20%	40%	60%
10%	97.5%	93.5%	90.1%	89.7%
20%	102.2%	96.7%	92.7%	91.9%
40%	109.4%	101.5%	96.2%	95.2%
60%	114.9%	104.8%	98.4%	97.2%

Source: Authors' calculation

[9] Whereas the previous numerical analyses are feasible under spreadsheet-based applications, this one requires some programming using specialized software such as Mathematics as well as a careful selection of optimization functions to ensure convergence.

Tab. 5: Price adjustments *F* / F* for pairs of cancellation options (σ = 120%)

(ΠΣ / Φ) \ (ΠΒ / Φ*)*	10%	20%	40%	60%
10%	94.5%	87.9%	79.3%	74.2%
20%	97.3%	90.1%	80.8%	75.5%
40%	102.8%	94.4%	83.9%	78.0%
60%	108.1%	98.4%	86.6%	83.9%

Source: Authors' calculation

To illustrate a case, suppose that new legislation is being established, imposing mandatory costs on the seller Π_S / F^* = 10%, and on the buyer Π_B / F^* = 40%, provided the respective parties choose to disengage from their obligations. Prior to this measure, under contractual freedom, there has been an equilibrium price F, and we estimate the expected volatility of the underlying asset σ = 40%. Using Tab. 4, one readily obtains the result F^* / F = 90.1%, which means that the advantage for the seller will be offset by a drop in the price of the asset of ca 10%.

Indirectly, the model shows, once again, that sellers should be charged higher relative penalties (approximately double that of buyers) if there is to be little price deviation from the market. Contrary to lay perception, it is thus simply not correct to conclude agreements at prevailing market prices where both the buyer and seller would face equal penalties upon default, provided meaningful market risk is at stake[10].

On the other hand, the really substantive price sensitivity arises in case buyers bear disproportionate flexibility costs on their parts of contracts (focus on the top right corners of the tables). Under such conditions, asymmetries can result in really considerable shifts of equilibrium prices[11].

[10] Model simulations show that this factor becomes immaterial at volatilities approaching 10% (tabulations in the form of Tab. 4 and Tab. 5 then start suggesting monotonous diagonals and diagonal symmetry). In practice, this would primarily concern short-term contracts (remember that from the point of view of an one-month settlement horizon, 40% annual volatility translates into $\sigma = 40\% / \sqrt{12} = 11.5\%$).

[11] Incidentally, this problem tends to arise with numerous governmental regulations. With labor contracts, for instance, mandatory legal stipulations impose disproportionately higher withdrawal costs (lengthy notice periods, severance pay) on

Conclusions

Using relatively simple option-based models, we have pointed out the key factors influencing the commercial terms of cancellable contracts. We have also shown that cancellation rights may be extremely valuable, under circumstances. They are of special relevance under volatile environments and long contract durations. This has to be taken into account by any serious assessor.

In particular, rights that are unilateral or strongly biased will tend to distort market prices. Perfectly fair cancellation fees or penalties can also exceed levels that are generally considered customary practice. Last but not least, a nominal fairness in terms does not necessarily mean that contracts are mutually favorable.

Even though we have stressed regulatory and tax issues as major externalities to economic theory, we are well aware that other considerations may lead to cancellable contracts being negotiated in a particular manner. These can include cash flow stability, for instance, or information asymmetries. However, we believe that it is as important for public policy makers to seriously consider various policy implications, as it is for businesspersons to enter into rational contracts, and for external assessors to have a solid understanding of important business-value drivers.

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buyers (i.e. entrepreneurs) than on sellers (i.e. employees). This is likely to result in a material depression of the value of labor, which is ultimately not in the best interest of the employees who may prefer higher wages to stronger job protection.

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The Effect of Cancellation Rights on the Value of Contracts

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ABSTRACT

Option-based models have the potential to become useful tools for the analysis and economic assessment of contracts. In fact, these can generally be perceived as particular sets of embedded options. This paper focuses on two distinct cases and their pertaining models, with either one or both counterparties having the right to revoke their obligations under clearly stipulated conditions.

We show that, in an efficient market, a zero-cost contract featuring a unilateral right to cancel has to charge a fee for a cancellation, and at the same time it is due to bias the market price in favour of the option-issuer. The realm of mutually cancellable contracts is much more diverse, however. Under circumstances, such transactions may either be price-neutral, or they may combine various terms of asymmetric treatment of the counterparties.

Both analytical and numerical solutions are presented and discussed, providing useful insight into the economic workings behind this essential feature of various commercial transactions. This can help in their rational design as well as in their assessment by auditors, regulators and tax authorities. Brief mention is also made of the models' potential use for econometric analysis, which can assist various policy decisions.

Key words: Cancellable contracts; Valuation; Embedded options.

JEL classification: D58, D81, G13.