Non-Competition Covenants in Acquisition Deals*

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Abstract

We study the changes in the consumers' and producers' surplus associated with acquisition deals where there is a non-competition covenant that forbids the *seller* from re-entering the market over a given time period. We find that these acquisition deals can lead to significant negative (positive) changes in the producers' (consumers') surplus, which decrease significantly with the time period of the covenant. We also show that the effect of the time period of the covenant on the welfare change can be positive or negative. It depends largely on the market conditions, such as the profit uncertainty and growth rate.

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1 Introduction

Firms often consider the use of non-competition agreements in business acquisitions in order to protect the acquired business from future competition from the seller. A non-competition agreement is a covenant associated with the acquisition which restricts the seller from competing with the buyer within a specific geographic area over a given time period. The covenant also benefits the seller since it gives the buyer more confidence that the anticipated earnings from the acquisition will materialize, enhancing the acquisition price.

Non-competition covenants are also considered in employment agreements to protect firms' confidential information from their former employees whose departure raises the threat of unfair competition, being the law literature on non-competition covenants in employment agreements very extensive (see, e.g., Kräkel and Sliwka (2009), Bishara and Orozco (2012)). The use these covenants can also play an important role in economic development. For instance, Gilson (1999) and Hyde (2003) suggest that one of the main reasons for the success of the high technology industrial district in Silicon Valley and the failure of the one in Massachusetts' Route 128 was the differential enforcement of covenants not to compete - the different legal environments led to higher employee turnover and, therefore, more firms in California (see, e.g., Bishara and Orozco (2012), Buente (2012)).

The non-competition covenants used in acquisitions deals should, however, be tailored considering the specificities of the business that is being acquired and the scope of the business that is going to be protected by the covenant, and firms should be aware that courts may limit, for instance, the time span for which restraints could be justified (Gaby Hardwicke Solicitors 2011).[1]

In this paper, we study the effect of competition and the use of non-competition covenants in acquisition deals on the producers' and the consumers' surplus. We also perform an aggregate welfare analysis where we show the effect of the time period of the covenant on the welfare changes. More specifically, we show that acquisition deals where there is a finite-lived non-competition covenant always lead to positive changes in the consumers' surplus and negative changes in the producers' surplus, and that the time period of the covenant affects significantly the changes in the aggregate welfare and the producers' and the consumers' surplus. Furthermore, we show that acquisition deals where there is a non-competition covenant have a significant effect on the aggregate welfare change, which can be negative or positive, depending on the time period of the covenant,

[1] Most courts in the U.S. inquire whether these contracts are "reasonable" and because there is not yet a consensual theoretical framework to objectively identify and assess the "legitimacy" of the competing interests between firms, trial courts decisions are often not fully predictable (see Bitė (2011)).

and the market conditions, such as the expected profit volatility and growth rate.

The rest of the paper is organized as follows. Sections 2 presents the model setting and provided the illustrative results. Section 3 concludes.

2 The model

2.1 The producer's perspective

Consider a monopolistic firm which optimizes production using the following linear inverse demand and cost functions, respectively:

$$P = a - bQ \tag{1}$$

$$C = cQ \tag{2}$$

where P represents the output price, Q the output quantity, $a > 0$, $b > 0$, and $c > 0$ is the cost per output unit.

The maximization of the instantaneous profit (π) leads to:

$$\pi = \frac{(a-c)^2}{4b} \tag{3}$$

We assume that profits evolve randomly, being affected by a multiplicative exogenous shock (x) which follows a geometric Brownian motion (gBm) process given by:[2]

$$dx = \alpha x dt + \sigma x dz \tag{4}$$

where α is the risk neutral growth rate (drift), and σ is the instantaneous profit volatility, and dz is the standard increment of a Wiener process. We assume that risk neutrality holds and there is a constant risk-free interest rate, $r > \alpha$.

For a monopolistic, the present value of the expected future profit flow is given by:

$$V(x) = \int_0^\infty \pi x e^{-(r-\alpha)} dt = \int_0^\infty \frac{(a-c)^2}{4b} x e^{-(r-\alpha)} dt = \frac{(a-c)^2 x}{4b(r-\alpha)} \tag{5}$$

Now consider an acquisition deal between two firms, the above monopolistic firm, which is the *seller* (S), and another firm, which is the *buyer* (B), where the former agrees to sell the business (whose value is given by Eq. (5)) to the latter and leave the market afterwards. Suppose, however, that the *buyer* is afraid that the *seller* may want to re-enter the market after the acquisition. Therefore, it negotiates a non-competition agreement which forbids the *seller* from re-entering the market during a given time period, T.

[2]Similarly, we would obtain the same outcomes by setting the inverse demand function as $P = a - \frac{b}{x}Q$.

If the *seller* re-enters the market, the ex-post (symmetric) duopolistic profit flow for each firm, obtained *a la* Cournot, is given by:

$$\pi_B = \pi_S = \frac{(a-c)^2}{9b} \tag{6}$$

and the value of each firm is:

$$V_B(x) = V_S(x) = \frac{(a-c)^2 x}{9b(r-\alpha)} \tag{7}$$

Following standard real options analytical procedures (Dixit and Pindyck 1994) it can be easily shown that, without the non-competition covenant, the optimal time for the *seller* to re-enter the market is given by:

$$x_S = \frac{\beta}{\beta - 1} \frac{9b(r-\alpha)}{(a-c)^2} K \tag{8}$$

where x_S is the *seller*'s re-entry trigger, K is the investment sunk cost, and β is the positive root of the characteristic quadratic function of the ordinary differential equation that describes the value of the *seller* after being acquired by the *buyer* (but before its re-entry trigger has been reached), given by:

$$\beta = \frac{1}{2} - \frac{\alpha}{\sigma^2} + \sqrt{\left(-\frac{1}{2} + \frac{\alpha}{\sigma^2}\right)^2 + \frac{2r}{\sigma^2}} \tag{9}$$

Note that, at the time of the acquisition, and in the absence of the non-competition covenant (i.e., if the embargo period is $T = 0$), the *buyer* should not value the *seller*'s assets according to Eq. (5) because the *seller* has the option to re-enter the market after the acquisition if x hits x_S, being thereafter two firms in a duopoly. Consequently, the value received by the *buyer*, if $x < x_S$ at the time of the acquisition, is given by:

$$F(x,0) = V(x) - (V(x_S) - V_B(x_S)) \left(\frac{x}{x_S}\right)^{\beta_1}, \text{ for } x < x_S \tag{10}$$

where the second term of the right-hand side of Eq. (10) represents the value loss due to the *seller*'s option to re-enter the market after the acquisition. The existence of this option reduces the value of the acquisition for the *buyer*.

If a non-competition covenant is agreed, the *seller* is not allowed to re-enter the market over a given time period, $T > 0$. Therefore, compared with the case above, where the covenant is absent, the value of the *seller* is lower because it cannot re-enter the market when $x \geqslant x_S$, but when $x \geqslant x_S \wedge t \geqslant T$. These more demanding re-entry conditions increase the value of the acquisition for the *buyer*.

On the other hand, an appropriate valuation for the *buyer* should consider that, with

the non-competition covenant, it receives only a certain-lived monopoly market, whose value when compared with that of a permanent monopoly is significantly reduced, given that the *seller* can re-enter the market as a follower after the time period of the covenant has expired. The solution for this acquisition investment problem is given by:[3]

$$\begin{aligned} F_B(x,T) = V(x) - (V(x) - V_B(x))\, e^{-(r-\alpha)T} N\left(d_1(x,T)\right) \\ - (V(x_S) - V_B(x_S)) \left(\frac{x}{x_S}\right)^{\beta} N\left(-d_3(x,T)\right) \end{aligned} \tag{11}$$

where $N(.)$ is the cumulative normal integral, and

$$d_1(x,T) = \frac{\ln\left(\frac{x}{x_S}\right) + \left(\alpha + \frac{1}{2}\sigma^2\right)T}{\sigma\sqrt{T}} \tag{12}$$

$$d_3(x,T) = d_1(x,T) + (\beta - 1)\,\sigma\sqrt{T} \tag{13}$$

In the right-hand side of Eq. (11), the first term represents the value of the *buyer* if the *seller* cannot re-enter the market (Eq. (5)). The last two terms represent the loss in value for the *buyer* due to the fact that the *seller* might re-enter the market after the covenant has expired if a given profit threshold is reached ($x(T) \geqslant x_S$) − the second term represents the loss in value for the *buyer* if the *seller* re-enters the market at the time where the covenant expires, and the last term represents the loss in value for the *buyer* if, at the time where the covenant expires, the *seller*'s re-entry threshold has not yet been reached (if $x(T) < x_S$).

Therefore, at the time where the acquisition deal is agreed, the *seller* receives the price of the acquisition plus a *forward start option* with maturity T, whose value function is given by:

$$\begin{aligned} F_S(x,T) = V_S(x)e^{-(r-\alpha)T} N\left(d_1(x,T)\right) - Ke^{-rT} N\left(d_2(x,T)\right) + \\ + (V_S(x_S) - K) \left(\frac{x}{x_S}\right)^{\beta} N\left(-d_3(x,T)\right) \end{aligned} \tag{14}$$

where

$$d_2(x,T) = d_1(x,T) - \sigma\sqrt{T} \tag{15}$$

and $d_1(x,T)$ and $d_3(x,T)$ are defined in Eq. (12) and (13).

In the right-hand side of Eq. (14), the first two terms represent the value of the follower if its re-entry trigger (x_S) has been reached before the covenant has expired - which is equivalent to the value of an European option on a dividend paying asset with maturity T which is exercised at T if $x(T) \geqslant x_S$. The last term captures the option value after T

[3]Derivations in similar settings can be found in Shackleton and Wojakowski (2007) and Pereira and Rodrigues (2014). Notice that Eq. (11) reduces to Eq. (10) for $T = 0$ and $x < x_S$.

if, at T, $x(T)$ has not yet reached x_S.

The acquisition leads, therefore, to the following value change for the *buyer* and the *seller*, respectively:

$$\Delta W_B(x,T) = F_B(x,T) - P \tag{16}$$

$$\Delta W_S(x,T) = F_S(x,T) + P - V(x) \tag{17}$$

where $F_B(x,T)$ and $F_S(x,T)$ are the values of the *buyer* and the *seller* after the acquisition, respectively, P is the acquisition price, and $V(x)$ is the value of the *seller* before the acquisition.

Using the above value functions for the two firms we determine the producers' global surplus. More specifically, we find that:

Proposition 1. *The acquisition deal causes a negative change in the producers' surplus, given by:*

$$\begin{aligned}\Delta W_P(x,T) &= \Delta W_B(x,T) + \Delta W_S(x,T) \\ &= (V_B(x) + V_S(x) - V(x))e^{-(r-\alpha)T} N\left(d_1(x,T)\right) - Ke^{-rT} N\left(d_2(x,T)\right) + \\ &+ (V_B(x_S) + V_S(x_S) - V(x_S) - K)\left(\frac{x}{x_S}\right)^{\beta} N\left(-d_3(x,T)\right) \leqslant 0\end{aligned} \tag{18}$$

Proposition 1 shows that acquisitions deals where there is a finite-lived non-competition covenant, lead to producers' wealth destruction (notice that $V_B(.)+V_S(.)-V(.) < 0$). This happens because, ex-ante, the *seller* is in a monopoly, whereas, ex-post, after the non-competition covenant has expired, the *buyer* will face competition from the *seller*, and the effect of this expected competition reduces the (ex-ante) value of the *seller*. Additionally, the producers' surplus is also negatively influenced by the investment cost needed for the *seller* to re-enter in the market.

It is important to highlight that acquisition deals of this nature can only be economically justified if they generate some type of synergy that offsets the above loss in wealth. If firms are myopic, and ignore the above negative wealth change, they will overvalue the benefits from the acquisition and will destroy wealth.

However, we find that when the time period of the covenant is infinite ($T \to \infty$), there is not wealth destruction:

Corollary 1. *In the limiting case, where $T \to \infty$, $\Delta W_P(x,T) \to 0$.*

Proof. It can shown that: $e^{-rT}N(d_1(x,T)) \to 0$, $e^{-rT}N(d_2(x,T)) \to 0$ and $N(-d_3(x,T)) \to 0$ as $T \to \infty$. □

For the other extreme scenario, as $T \to 0$, we can easily show that the producers' wealth destruction reches a maximum, and depends on x being below or above the re-entry trigger x_S.

Corollary 2. *If there is not a non-competition covenant, the producer's wealth change due to the acquisition is given by:*

$$\Delta W_P(x,T) \to \begin{cases} (V_B(x_S) + V_S(x_S) - V(x_S) - K)\left(\dfrac{x}{x_S}\right)^{\beta} < 0, & \text{for } x < x_S \\ V_B(x) + V_S(x) - V(x) - K < 0, & \text{for } x \geqslant x_S \end{cases} \tag{19}$$

Proof. Using the results of Eq. (18), we can easily see that, if $x < x_S$, $N(d_1(x,T)) \to 0$, $N(d_2(x,T)) \to 0$, and $N(-d_3(x,T)) \to 1$ as $T \to 0$ and, if $x \geqslant x_S$, $N(d_1(x,T)) \to 1$, $N(d_2(x,T)) \to 1$, and $N(-d_3(x,T)) \to 0$ as $T \to 0$. □

Figure 1 illustrates the effect of the time period of the non-competition covenant on the producer's surplus, where we can see that the surplus changes due to the acquisition, $\Delta W_P(x,T)$, are always negative and decrease significantly with the time period of the covenant.

Please insert Figure 1 about here

2.2 The consumers' perspective

Let us now analyze the acquisition deal from the perspective of the consumers, where for a perpetual monopoly the consumers' surplus is given by:

$$W_C(x,\infty) = S_1(x) = \frac{(a-c)^2 x}{8b(r-\alpha)} \tag{20}$$

For a finite-lived monopoly, where the *buyer* is protected by a non-competition covenant over a given time period T, the consumers' surplus are expressed by:

$$\begin{aligned} W_C(x,T) = S_1(x) &+ (S_2(x) - S_1(x))e^{-(r-\alpha)T}N(d_1(x,T)) \\ &+ (S_2(x_S) - S_1(x_S))\left(\frac{x}{x_S}\right)^{\beta} N(-d_3(x,T)) \end{aligned} \tag{21}$$

where $S_2(x) = \dfrac{2(a-c)^2 x}{9b} > S_1(x)$.

Proposition 2. *The acquisition deal causes a positive change in the consumers' surplus, given by:*

$$\begin{aligned} \Delta W_C(x,T) &= W_C(x,T) - W_C(x,\infty) \\ &= (S_2(x) - S_1(x))e^{-(r-\alpha)T}N(d_1(x,T)) \\ &+ (S_2(x_S) - S_1(x_S))\left(\frac{x}{x_S}\right)^{\beta} N(-d_3(x,T)) \geqslant 0 \end{aligned} \tag{22}$$

The gains in the consumers' surplus are due to the competition factor, $(S_2(.) - S_1(.) > 0)$, and contingent on both the termination of the time period of the covenant and the *seller*'s re-entrance in the market as a follower. In the right-hand side of Eq. (22), the first term represents the value associated with the scenario where the *seller*'s re-entry trigger is reached before (or at) T, and so the *seller* re-enters the market as soon as the covenant time period terminates (if these market conditions hold), and the second term represents the value associated with the scenario where at T the *seller*'s re-entry trigger has not yet been reached.

It also holds that:

Corollary 3. *In the limiting case, where* $T \to \infty$, $\Delta W_C(x,T) \to 0$.

Proof. It can easily be shown that: as $T \to \infty$, $e^{-rT}N(d_1(x,T)) \to 0$ and $N(-d_3(x,T)) \to 0$. □

Corollary 4. *In the limiting case, where* $T \to 0$,

$$\Delta W_C(x,T) \to \begin{cases} (S_2(x_S) - S_1(x_S)) \left(\dfrac{x}{x_S}\right)^{\beta} > 0, & \text{for } x < x_S \\ S_2(x) - S_1(x) > 0, & \text{for } x \geqslant x_S \end{cases} \tag{23}$$

Proof. We can show that for $x < x_S$, $N(d_1(x,T)) \to 0$ and $N(-d_3(x,T)) \to 1$, as $T \to 0$; and for $x \geqslant x_S$, $N(d_1(x,T)) \to 1$ and $N(-d_3(x,T)) \to 0$, as $T \to 0$. □

The consumers' surplus gains are, therefore, reduced by the existence of the covenant, and vary from a maximum which occurs when there is competition but the covenant is not in effect (contingent on x reaching x_S), and zero when there is competition and the time period of the covenant is infinite.

Figure 2 illustrates the effect of the time period of the covenant on the consumer's surplus changes due to the acquisition deal.

Please insert Figure 2 about here

2.3 A welfare analysis

In this section we perform an aggregate welfare analysis which combines the results from the above sections for the producers' and the consumers' surplus. We conclude that:

Proposition 3. *An acquisition deal with a non-competition covenant causes an aggregate*

welfare change whose sign can either be positive or negative, and given by:

$$\begin{aligned}\Delta W(x,T) &= \Delta W_C(x,T) + \Delta W_P(x,T) \\ &= \frac{5(a-c)^2 x}{72b(r-\alpha)} e^{-(r-\alpha)T} N(d_1(x,T)) - K e^{-rT} N(d_2(x,T)) + \\ &+ \left(\frac{5(a-c)^2 x_S}{72b(r-\alpha)} - K\right)\left(\frac{x}{x_S}\right)^{\beta} N(-d_3(x,T)) \gtreqless 0 \end{aligned} \tag{24}$$

Corollary 5. *In the limiting case, where $T \to \infty$, $\Delta W(x,T) \to 0$.*

Proof. See proofs of Corollaries 1 and 3. □

Note that when $T \to 0$, the producers' wealth destruction reaches a maximum, although this also depends on whether the state variable x is below or above the re-entry trigger x_S.

Corollary 6. *In absence of the non-competition covenant:*

$$\Delta W(x,T) \to \begin{cases} \left(\dfrac{5(a-c)^2 x_S}{72b(r-\alpha)} - K\right)\left(\dfrac{x}{x_S}\right)^{\beta} & \text{for } x < x_S \\ \dfrac{5(a-c)^2 x}{72b(r-\alpha)} - K & \text{for } x \geqslant x_S \end{cases} \tag{25}$$

Proof. See proofs of Corollaries 2 and 4. □

Figures 3a and 3b show the evolution of changes in welfare as a function of the time period of the covenant, for two different sets of model parameters. In the former figure, we use $\sigma = 0.3$ and $\alpha = 0.01$, whereas in the latter we use $\sigma = 0.15$ and $\alpha = -0.01$, being the remaining parameters the same for both figures. Our results are interesting because they show that the effect of the time period of the covenant on the welfare change depends largely on the market conditions. For instance, in Figure 3a, the welfare change associated with the acquisition varies significantly with the time period of the covenant (T), but is always positive, whereas in Figure 3b, the welfare change varies significantly with T but can be positive or negative, depending on the time period of the covenant that is being considered. This suggests that there is a minimum duration required for the covenant to produce a welfare gain.

Please insert Figures 3a and 3b about here

Figure 4 shows the effect of profit uncertainty on the welfare surplus. For low levels of uncertainty the effect can be negative, as the option-like flexibility gains are not sufficient to compensate the *seller*'s investment cost to re-enter the market. Higher uncertainty reduces the minimum duration of the covenant that leads to welfare gains.

Please insert Figure 4 about here

An interesting result is that, for some market conditions, there is an optimal time period of the covenant which maximizes the welfare gain. This finding can be relevant, for instance, for assessing and developing competition policies, and for the judgment of litigation cases in courts related to the use of non-competition covenants.

3 Conclusions

Our results show that acquisition deals where the *seller* can re-enter the market after the acquisition lead always to negative changes in the producers' surplus. This type of acquisition is, therefore, only economically justified if it generates enough synergies to offset the surplus loss. Myopic firms overvalue, therefore, the benefits from the acquisition.

For the producers, the negative effect on the surplus is caused by the existence of ex-post competition between the the two firms and the *seller*'s investment cost to re-enter the market. We also find that this negative effect can be mitigated by the use of a non-competition covenant that forbids the *seller* from re-entering the market during a given time period, and that the producers' surplus losses decrease significantly with the time period of the covenant. Regarding the consumers' surplus, we conclude that acquisitions deals with non-competition covenants lead always to positive changes, which decrease significantly with the time period of the covenant. Furthermore, we show that the effect of the time period of the covenant on the welfare changes can be positive or negative. It depends largely on the market conditions, such as the profit uncertainty and growth rate.

Our results can have relevant implications on business acquisition agreements and competition policies.

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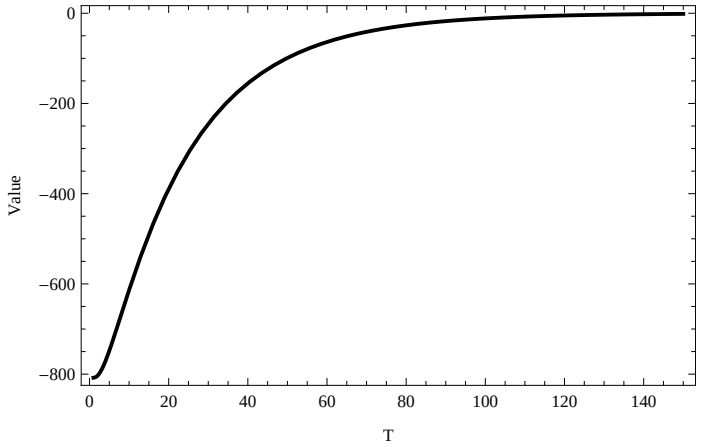
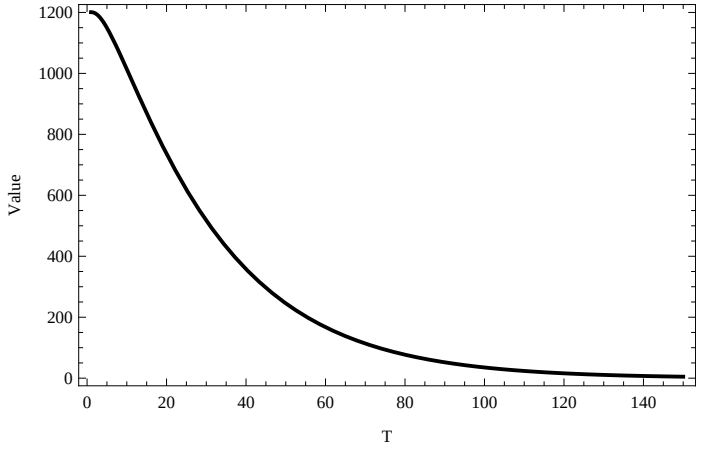
Appendix



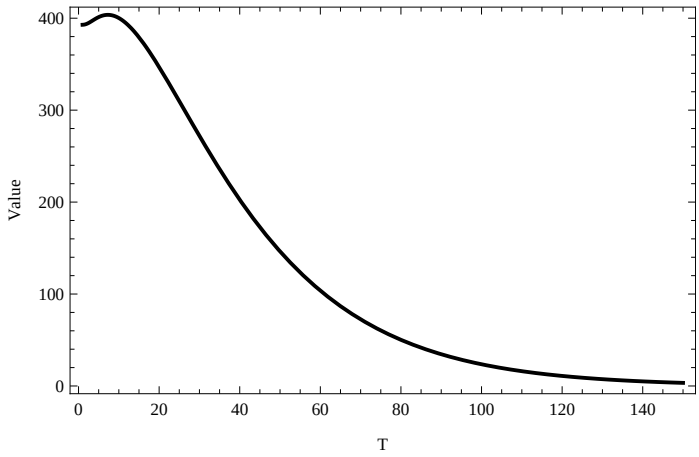
$x = 1$, $\sigma = 0.3$, $r = 0.05$, $\alpha = 0.01$, $K = 2000$, $a = 10$, $b = 0.1$, $c = 1$, with $x_S = 2.62$.

Figure 1: Producers' surplus change associated with the duration of the non-competition covenant.



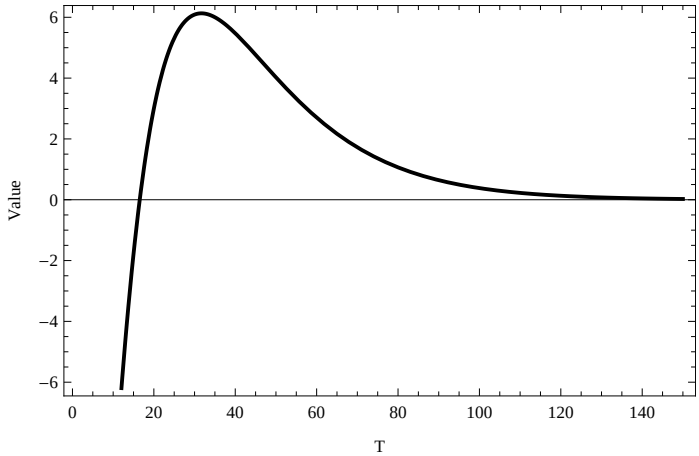
$x = 1$, $\sigma = 0.3$, $r = 0.05$, $\alpha = 0.01$, $K = 2000$, $a = 10$, $b = 0.1$, $c = 1$, with $x_S = 2.62$.

Figure 2: Consumers' surplus change associated with the duration of the non-competition covenant.



$x = 1$, $\sigma = 0.3$, $r = 0.05$, $\alpha = 0.01$, $K = 2000$, $a = 10$, $b = 0.1$, $c = 1$, with $x_S = 2.62$.

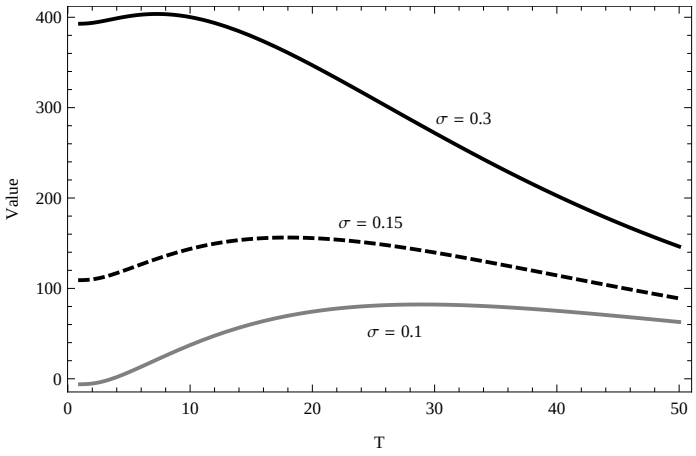
(a)



$x = 1$, $\sigma = 0.15$, $r = 0.05$, $\alpha = -0.01$, $K = 2000$, $a = 10$, $b = 0.1$, $c = 1$, with $x_S = 1.92$.

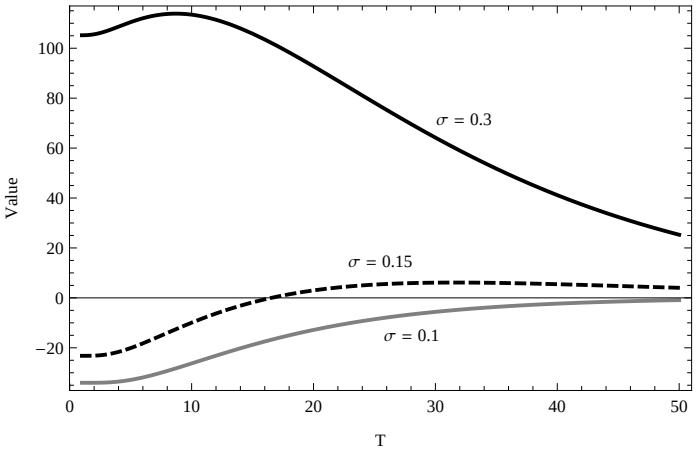
(b)

Figure 3: Welfare change as a function of the time period of the non-competition covenant.



$x = 1$, $r = 0.05$, $\alpha = 0.01$, $K = 2000$, $a = 10$, $b = 0.1$, $c = 1$.

(a)



$x = 1$, $r = 0.05$, $\alpha = -0.01$, $K = 2000$, $a = 10$, $b = 0.1$, $c = 1$.

(b)

Figure 4: Effect of uncertainty on welfare.