

# Non-Competition Covenants in Acquisition Deals\*

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## **Abstract**

We study the aggregate wealth changes associated with an acquisition deal where there is a non-competition covenant forbidding the *seller* from re-entering the market over a given time period. We find that, from a central planner's perspective, these acquisitions can lead to significant aggregate wealth destruction, which decreases with the time to maturity of the covenant and are mitigated if the *buyer*, before acquiring the *seller*, enters the market as a follower.

**Keywords:** Non-Competition Covenants; Acquisitions; Real Options.

**JEL codes:** G34, D81.

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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. The law literature on non-competition covenants in employee contracts is very extensive (Kräkel and Sliwka (2009), Bishara and Orozco (2012)). The use of non-competition covenants in employment contracts can 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)).

Restrictive covenants in acquisition deals should be tailored according to the specificities of the business that is going to be acquired and the scope of the business that is going to be protected by the covenant. In addition, firms should be aware that courts may limit the time span for which restraints could be justified (Gaby Hardwicke Solicitors 2011).<sup>1</sup>

We study the strict aggregate wealth creation associated with business acquisitions where the *seller* can re-enter the market after the acquisition. We examine two scenarios: (i) where, ex-ante, the *seller* is active in a monopoly and the *buyer* is idle contemplating the acquisition of the *seller*, and (ii) where, ex-ante, the *seller* is active in a duopoly with the *buyer*, being the latter yet idle and contemplating entering the market either through the acquisition of the *seller*, or by investing as a follower.

Our findings show that, from a central planner's perspective, scenario (i) leads to aggregate wealth destruction, which increases with the profit flow and decreases with the time to maturity of the non-competition covenant, and scenario (ii) can lead to aggregate wealth destruction, if the *buyer* enters the market through the acquisition, or aggregate

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<sup>1</sup>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 Bitè (2011)).

wealth creation, if the *buyer* enters the market as a follower before the acquisition.

We also conclude that lower profits uncertainty enhances both the aggregate wealth creation, if the *buyer* enters the market as a follower, and the aggregate wealth destruction, if the *buyer* enters the market through the acquisition. If, before the acquisition, the *buyer* enters the market as a follower, the aggregate wealth creation increases with its market share.

The rest of the paper is organized as follows. Sections 2 and 3, present the model settings for the monopoly and the duopoly markets, respectively. Section 4 shows a sensitivity analysis. Section 5 concludes.

## 2 Monopoly Market

Consider an acquisition deal at time  $t$  and where, ex-ante, there are two firms,  $i \in S, B$ , where  $S$  stands for the *seller* and  $B$  for the *buyer*. The *seller* has been active in a monopoly market, enjoying a profit flow stream ( $x$ ) that follows a geometric Brownian motion (gBm) process given by Equation (1), and the *buyer* is idle and contemplating the acquisition of the *seller*.

$$dx = \alpha x dt + \sigma x dz \quad (1)$$

where  $\alpha$  is the risk neutral profit growth rate (drift), and  $\sigma$  is the instantaneous profit volatility, and  $dz$  is the standard increment of a Wiener process. Throughout the text we assume risk neutrality and a constant risk-free interest rate,  $r$ .

The *buyer* is, however, afraid that the *seller* may re-enter the market after the acquisition and makes a non-competition agreement that forbids the *seller* from re-entering the market over a given time period,  $\Delta t = T$ .

At time  $t = 0$  the value of the *seller* corresponds to the present value of its expected future cash flows, given by:

$$V(x) = \int_0^\infty x e^{-(r-\alpha)t} dt = \frac{x}{r-\alpha} \quad (2)$$

where  $r$  and  $\alpha$  are the risk-free and the profit growth rates, respectively.

Following standard real options analytical procedures (Dixit and Pindyck 1994) we can show that, without the non-competition covenant, the optimal time for the *seller* to re-enter the market as a follower is given by:

$$x_S = \frac{\beta}{\beta-1} \frac{r-\alpha}{\phi_S} K \quad (3)$$

where  $x_S$  is the *seller's* re-entry trigger,  $K$  is the investment sunk cost,  $\phi_S \in (0, 1]$  is the market share of the *seller* after re-entering the market as a follower, and  $\beta$  is the positive root of the characteristic quadratic function of the ordinary differential equation

that describes the value of the *seller* after being acquired and before its re-entry trigger had been reached.

$$\beta = \frac{1}{2} - \frac{\alpha}{\sigma^2} + \sqrt{\left(-\frac{1}{2} + \frac{\alpha}{\sigma^2}\right)^2 + \frac{2r}{\sigma^2}} \quad (4)$$

For the above conditions, the *buyer* should not value the *seller*'s assets at  $V(x)$  because, after the acquisition, for  $t \geq T$ , the *seller* can re-enter the market. An appropriate valuation should consider the effect of competition from the *seller*, over the time period where there is not a non-competition agreement, on the *buyer*'s value. This scenario is equivalent to that of a certain-lived monopolist, whose value is reduced by the possibility of a follower entering the market at  $t \geq T$ .

The solution for this investment problem is proposed by Pereira and Rodrigues (2014):

$$V_B(x) = V(x) - \frac{x\phi_S}{r - \alpha} e^{-(r-\alpha)T} N(d_1(x)) - \frac{\beta}{\beta - 1} K \left(\frac{x}{x_S}\right)^\beta N(-d_3(x)) \quad (5)$$

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

$$d_1(x) = \frac{\ln\left(\frac{x}{x_S}\right) + \left(\alpha + \frac{1}{2}\sigma^2\right)T}{\sigma\sqrt{T}} \quad (6)$$

$$d_3(x) = d_1(x) + (\beta - 1)\sigma\sqrt{T} \quad (7)$$

In the right-hand side of Equation (5), the first term represents the value of the *seller* if it cannot re-enter the market (Equation (2)). The last two terms represent the loss in value for the *buyer* due to the fact that the *seller* can re-enter the market any time after the covenant has expired if its profit threshold to invest as a follower is reached - the second term, represents the loss in value for the *buyer* if the *seller* re-enters at the time where the covenant expires ( $T$ ) 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 (i.e., if  $t \geq T$  and  $x(t) < x_S$ ).

Therefore, the *seller* receives the price of the acquisition plus a *forward start option* with maturity ( $T$ ). Its value function is provided by (Shackleton and Wojakowski (2007) and Pereira and Rodrigues (2014)):

$$V_S(x) = \frac{x\phi_S}{r - \alpha} e^{-(r-\alpha)T} N(d_1(x)) - K e^{-rT} N(d_2(x)) + \frac{K}{\beta - 1} \left(\frac{x}{x_F}\right)^\beta N(-d_3(x)) \quad (8)$$

where

$$d_2(x) = d_1(x) - \sigma\sqrt{T} \quad (9)$$

and  $N(\cdot)$  is the cumulative normal integral and  $d_1(x)$  and  $d_3(x)$  are defined in Equations

(6) and (7).

In the right-hand side of Equation (8), the first two terms represent the value of the follower if its trigger ( $x_S$ ) has been reached before the covenant has expired, which is equivalent to an European option value on a dividend paying asset with maturity  $T$  that is exercised at  $T$  if  $x(T) \geq x_S$ . The last term captures the option value after  $T$  if, at  $T$ ,  $x(T)$  has not yet been reached  $x_S$ .

Consequently, the acquisition leads to the following value change for the *buyer*,  $\Delta W_B$ :

$$\Delta W_B = V_B(x) - P \quad (10)$$

where  $V_B(x)$  is the value of the *buyer* after the acquisition and  $P$  is the acquisition price, and the following value change for the *seller*,  $\Delta W_S$ :

$$\Delta W_S = V_S(x) + P - V(x) \quad (11)$$

where  $V_S(x)$  is the value of the *seller* after the acquisition, and  $V(x)$  is the value of the *seller* before the acquisition.

**Proposition 1.** *From a central planner's perspective, the strict aggregate wealth change due to the acquisition,  $\Delta W$ , is given by:*

$$\begin{aligned} \Delta W &= \Delta W_B + \Delta W_S = V_B(x) + V_S(x) - V(x) \\ &= -K \left[ e^{-rT} N(d2(x)) + N(-d3(x)) \left( \frac{x}{x_S} \right)^\beta \right] \leq 0 \end{aligned} \quad (12)$$

Proposition 1 shows (through Equation (12)) that business acquisitions with finite-lived non-competition agreements lead to aggregate wealth destruction. This happens because, ex-ante, the *seller* is in a monopoly, whereas, ex-post, after the non-competition agreement has expired, the *buyer* faces competition from the *seller*, and the effect of the expected competition reduces the (ex-ante) value of the *seller*.<sup>2</sup>

There are, however, two extreme scenarios where there is not aggregate wealth destruction: (i) the non-competition covenant is perpetual ( $T \rightarrow \infty$ ), and (ii) after re-entering, the *seller* is unable to capture any market share ( $\phi_S \rightarrow 0$ ).

**Corollary 1.** *In the limiting cases, where  $T \rightarrow \infty$  or  $\phi_S \rightarrow 0$ ,  $\Delta W \rightarrow 0$ .*

*Proof.* For analyzing the effect of  $T$  notice that  $e^{-rT} N(d2(x)) \rightarrow 0$  and  $N(-d3(x)) \rightarrow 0$  as  $T \rightarrow \infty$ . Additionally, as  $\phi_S \rightarrow 0$  and  $x_S \rightarrow 0$ ,  $N(d2(x)) \rightarrow 0$  and  $\left( \frac{x}{x_S} \right)^\beta \rightarrow 0$ .  $\square$

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<sup>2</sup>Note that aggregate wealth creation could be possible if we consider that the *buyer* is in a better position than the *seller* to run the (new) business. Throughout the paper we assume that the two firms are symmetric on this regard.

The above cases represent scenarios where either the *seller* is not allowed to re-enter the market or it is never optimal for the *seller* to re-enter the market.

### 3 Duopoly Market

In this section we assume that both the *buyer* and the *seller* are in a duopoly market. The *buyer* is idle and can enter the market either through the acquisition of the *seller* or by investing as a follower. For the latter case, if in the market as a follower, the *buyer* can then acquire the *seller* and making a non-competition agreement with the *seller*. If the acquisition takes place at time  $t$ , with  $x(t) < x_F$ , there is the following wealth change for the *buyer*,  $\Delta W_B^D$ :<sup>3</sup>

$$\Delta W_B^D = V_B(x) - F(x) - P \quad (13)$$

where  $V_B(x)$  is value of the *buyer* after the acquisition,  $P$  is the acquisition price, and  $F(x)$  is the *seller*'s option value to re-enter the market as a follower (Smets 1993, Dixit and Pindyck 1994):

$$F(x) = \begin{cases} \frac{K}{\beta - 1} \left( \frac{x}{x_F} \right)^\beta & \text{for } x < x_F \\ \frac{\phi x}{r - \alpha} - K & \text{for } x \geq x_F \end{cases} \quad (14)$$

where

$$x_F = \frac{\beta}{\beta - 1} \frac{r - \alpha}{\phi} K \quad (15)$$

$x_F$  is the *buyer*'s threshold to enter the market as a follower, and  $\phi \in (0, 1]$  is the market share of the *buyer* once in the duopoly market as a follower.

The wealth change for the *seller*,  $\Delta W_S^D$ , is:

$$\Delta W_S^D = P + V_S(x) - L(x) \quad (16)$$

where  $P$  is the acquisition price,  $V(x)$  is the value of the *seller* before  $x_F$  has been reached, and  $L(x)$  is the incumbent's loss in value due to the threat of competition from the *buyer* (follower) (Smets 1993, Dixit and Pindyck 1994):

$$L(x) = \begin{cases} \frac{x}{r - \alpha} - \frac{\beta}{\beta - 1} K \left( \frac{x}{x_F} \right)^\beta & \text{for } x < x_F \\ \frac{(1 - \phi)x}{r - \alpha} & \text{for } x \geq x_F \end{cases} \quad (17)$$

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<sup>3</sup>Note that the *buyer* invests  $K$  to enter the market as a follower if its profit threshold ( $x_F$ ) is reached before the acquisition deal has been closed.

**Proposition 2.** *From a central planner's perspective, the strict aggregate wealth change,  $\Delta W^D$ , is given by:*

$$\begin{aligned} \Delta W^D &= \Delta W_B^D + \Delta W_S^D = V_B(x) + V_S(x) - (L(x) + F(x)) \\ &= \begin{cases} -K \left[ e^{-rT} N(d_2(x)) + \left(\frac{x}{x_F}\right)^\beta N(-d_3(x)) - \left(\frac{x}{x_F}\right)^\beta \right] \geq 0 & \text{for } x < x_F \\ -K \left[ e^{-rT} N(d_2(x)) + N(-d_3(x)) \left(\frac{x}{x_S}\right)^\beta \right] \leq 0 & \text{for } x \geq x_F \end{cases} \end{aligned} \quad (18)$$

Therefore, contrary to the monopoly case, the use of non-competition covenants in an acquisition in duopoly can lead to aggregate wealth creation.

**Corollary 2.** *The difference between the aggregate wealth creation associated with an acquisition in a duopoly market and an acquisition in a monopoly market is given by:*

$$\Delta W^D - \Delta W = V(x) - (L(x) + F(x)) = K \left(\frac{x}{x_F}\right)^\beta \geq 0 \quad (19)$$

*Proof.* See Pereira and Rodrigues (2014). □

## 4 Sensitivity Analysis

In this section we present our sensitivity analyses.

PLEASE INSERT FIGURE 1 ABOUT HERE

Figure 1 shows the effect on the aggregate wealth creation of both the the profit flow and the time to maturity of the non-competition covenant. We find that, if the *buyer* is idle in a duopoly market (i.e.,  $x < x_F$ ), the aggregate wealth creation,  $\Delta W^D$ , increases with both the time to maturity of the covenant and the profit flow. If the *buyer* is idle in a monopoly market, the aggregate wealth destruction,  $\Delta W$ , decreases with the time to maturity of the covenant and increases with the profit flow. Furthermore, we find that, at the time where the *seller's* threshold to re-enter the market as a follower is reached,  $\Delta W^D$  drops to  $\Delta W$ .

PLEASE INSERT FIGURE 2 ABOUT HERE

Figure 2 shows the effect on the aggregate wealth creation of changes in the market share of the *buyer*,  $\phi$ , if in a duopoly market and before the acquisition it enters the market as a follower. We find that the investment threshold of the *buyer* to enter the market as a follower decreases with its market share,  $\phi$ , and the aggregate wealth creation,  $\Delta W^D$ , increases with  $\phi$ .

PLEASE INSERT FIGURE 3 ABOUT HERE

Figure 3 shows the effect on the aggregate wealth creation of changes in the profit flow and the *buyer's* market share if in a monopoly market and before the acquisition it enters the market as a follower. As shown in the previous section (*Prop.2*),  $(\Delta W^D)$  can be negative even when, before the acquisition, the *buyer* enters the market as a follower. We also find increases in  $(\phi_S)$  lead to aggregate wealth destruction regardless of market structure.

PLEASE INSERT FIGURE 4 ABOUT HERE

Figure 4 shows the effect of the profit uncertainty on the aggregate wealth change that is associated with the acquisition for the monopoly and the duopoly markets. We find that there is a non-monotonic effect of the profit uncertainty on the aggregate wealth creation for both markets. We note the fact that, for very lower profit levels, the aggregate wealth creation increases with the profit uncertainty, if the *buyer* is in a duopoly, and the aggregate wealth destruction increase with the profit uncertainty, if the *buyer* is in a monopoly, whereas, for higher profit levels, the aggregate wealth creation decreases with the profit uncertainty, if the *buyer* is in a duopoly, and the wealth destruction decreases with the profit uncertainty, if the *buyer* is in a monopoly market.

## 5 Conclusions

Our results reveal that acquisition deals where the *seller* can re-enter the market after the acquisition lead to aggregate wealth destruction. We show that the threat of competition after the acquisition erodes the *seller's* ex-ante value and this erosion in value can be mitigated using a non-competition agreement that forbids the *seller* from re-entering the market over a given time period. We also find that if both firms are in a duopoly and before the acquisition the *buyer* enters the market as a follower, the acquisition can lead to aggregate wealth creation which increases with the market share of the *buyer* while in the market as a follower.

We also find that lower profits uncertainty enhances the aggregate wealth creation, if before the acquisition the *seller* is in a duopoly with the *buyer*, and the wealth destruction, if before the acquisition the *buyer* is idle in a monopoly market. For very low levels of profit flow, there is a non-monotone relationship between the profit uncertainty and the aggregate wealth creation, for both the monopoly and the duopoly markets.

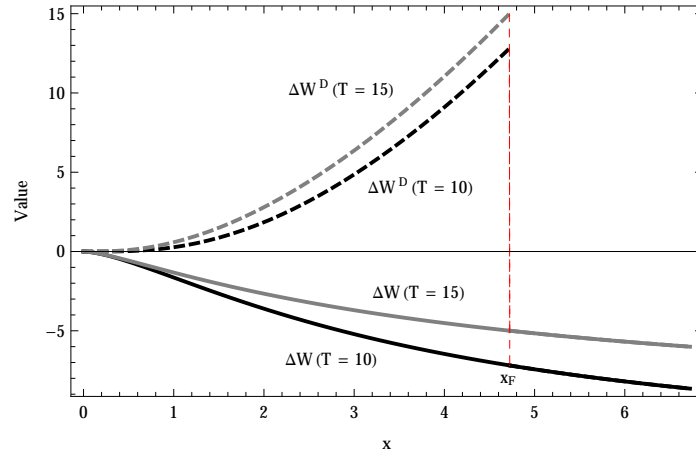
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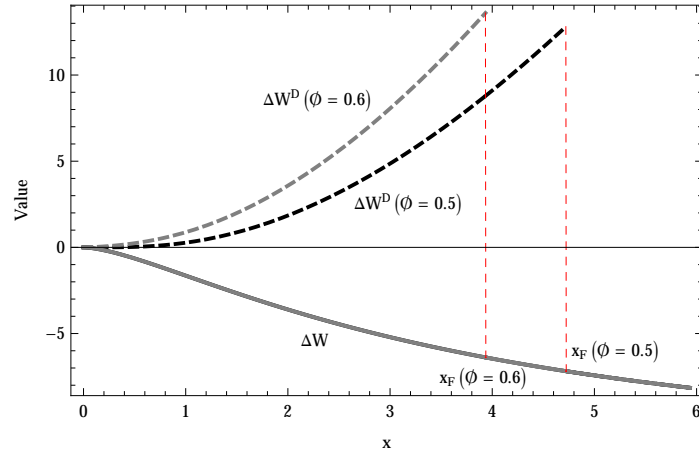
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## Figures



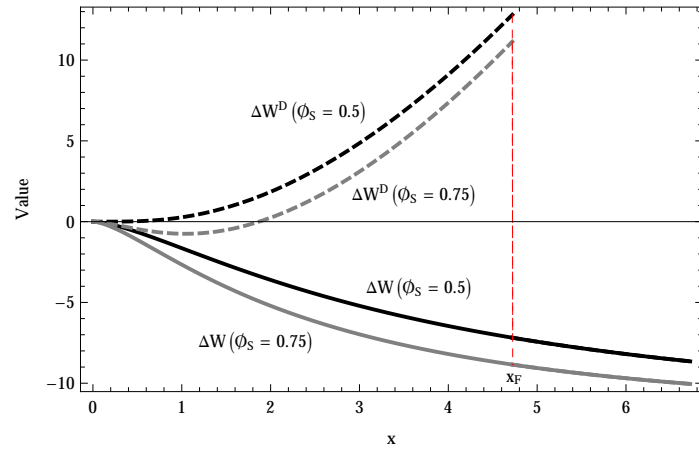
$$\sigma = 0.3, r = 0.05, \alpha = 0.01, K = 20, x = 2, \phi_S = 0.5, \phi = 0.5.$$

**Figure 1:** Aggregate wealth change associated with changes in the profit flow and the time to maturity of the non-competition covenant.



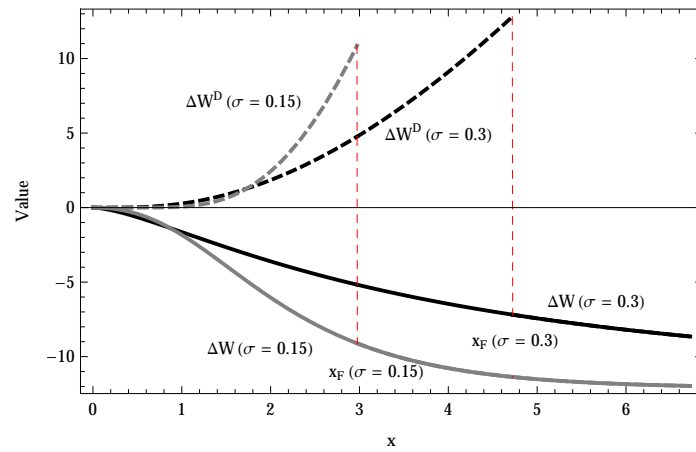
$\sigma = 0.3, r = 0.05, \alpha = 0.01, K = 20, x = 2, \phi_S = 0.5, T = 10.$

**Figure 2:** Aggregate wealth change associated with changes in the profit flow and the *buyer's* market share, if the *seller* is in a duopoly and, before the acquisition, the *buyer* enters the market as a follower.



$\sigma = 0.3, r = 0.05, \alpha = 0.01, K = 20, x = 2, \phi = 0.5, T = 10.$

**Figure 3:** Aggregate wealth change associated with changes in the profit flow and the *buyer's* market share if the *seller* is in a monopoly and, before the acquisition, the *buyer* enters the market as a follower.



$r = 0.05, \alpha = 0.01, K = 20, x = 2, \phi = 0.5, \phi_S = 0.5, T = 10.$

**Figure 4:** Aggregate wealth change associated with changes in the profit flow and the profit uncertainty.