Free Entry with Upstream Corporate Social Responsibility

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Abstract

This study evaluates the desirability of downstream free entry within vertical relationships. We consider a vertical market consisting of an upstream firm with corporate social responsibility (CSR) and downstream firms with free entry. We find that the desirability of entry depends on the degree of upstream CSR. Specifically, when the degree of upstream CSR is sufficiently high, the downstream market faces excess entry, whereas when the degree is low, it faces insufficient entry. When the upstream firm commits to CSR, it lowers the input price, thereby encouraging downstream entry. This study identifies a new factor that justifies the entry regulation policies.

JEL codes: D43, L10, L13.

Keywords: free entry; corporate social responsibility; vertical relationship.

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1 Introduction

In oligopolistic markets, welfare depends critically on the number of firms. Accordingly, the endogenous number of firms has long been an important subject of economic analysis. Mankiw and Whinston (1986) and Suzumura and Kiyono (1987), two seminal papers in this literature, show that the equilibrium number of firms under free entry exceeds the socially optimal level. This finding, widely known as the "excess entry theorem," has provided an important theoretical basis for entry regulation policies.

However, Ghosh and Morita (2007a, b) show that the excess entry theorem may not hold in vertically related markets. They demonstrate that, contrary to the seminal papers, downstream entry is insufficient when considering an upstream sector with market power. This is because downstream firms do not consider that their entry increases input demand and thereby benefits the upstream sector.

Thus, the theoretical implications for market entry may differ depending on whether vertical relationships are taken into account. Our study identifies the factors that determine whether downstream entry is excessive or insufficient in a vertically related market, thereby bridging the gap in the literature. One situation in which downstream entry may become excessive arises when the upstream firm has an incentive to reduce the input price. For example, such an incentive may arise when the upstream firm commits to corporate social responsibility (CSR) and places some weight on consumer surplus. In this case, the upstream firm may lower the input price to increase consumer surplus. The reduction in the input price increases downstream firms' profit margins and induces more firms to enter the market. Thus, the excess entry theorem may reemerge even in vertically related markets.

Our study shows that whether downstream entry is excessive or insufficient depends on three factors: the degree of upstream CSR, the curvature of inverse demand func-

tion, and the entry cost. First, downstream entry becomes excessive when the degree of upstream CSR is sufficiently high. As discussed above, downstream firms do not consider the benefit that their entry provides to the upstream sector through increased input demand, which tends to result in insufficient entry. However, when the upstream firm places weight on consumer surplus through CSR, it sets a lower input price. This increases downstream firms' profit margins and induces more firms to enter the market. Furthermore, the lower input price reduces the upstream benefit from downstream entry, thereby weakening the mechanism underlying insufficient entry. Therefore, when the degree of upstream CSR is sufficiently high, the effect promoting excess entry dominates.

Second, downstream entry is excessive when the inverse demand function is close to linear. When the inverse demand function is highly concave, if a large number of downstream firms enter the market, total output increases, causing the final good price to decline sharply. This effect tends to make downstream entry insufficient. As the inverse demand function approaches linearity, however, this effect becomes weaker, making excess entry more likely.

Finally, downstream entry becomes excessive when the entry cost is low. A lower entry cost reduces the barrier to entry and induces more downstream firms to enter the market. As mentioned above, a higher degree of upstream CSR and a less concave inverse demand function lead to excess entry. A lower entry cost further strengthens the effects of these factors, thereby leading to excess entry.

Our model is particularly relevant to the Japanese electricity industry. In this industry, the upstream sector consists of regional electricity suppliers, whereas the downstream sector comprises electricity retailers. Several regional electricity suppliers engage in CSR activities and express their commitment to supplying electricity at lower prices (e.g., Chubu Electric Power, Hokkaido Electric Power, Hokuriku Electric Power, and Kansai

Electric Power). In the downstream sector, the retail electricity market was fully liberalized in 2016, leading to the entry of a large number of electricity retailers. Thus, the Japanese electricity industry closely reflects the market structure considered in our model, as it is characterized by both upstream CSR and downstream entry.

Our findings yield two policy implications for industries characterized by upstream CSR and downstream entry. First, retail liberalization is not necessarily justified, even in vertical markets. As noted earlier, Ghosh and Morita (2007a, b) suggest that the excess entry theorem may not hold in vertical markets. Because the electricity industry is a typical vertical market, retail liberalization would appear, at first glance, preferable to entry regulation. However, our results show that retail liberalization can lead to excess entry in vertical markets with upstream CSR. When the degree of upstream CSR is sufficiently high, entry regulation is again justified, consistent with the excess entry of Mankiw and Whinston (1986) and Suzumura and Kiyono (1987).

Second, the promotion of CSR is not always socially desirable. CSR has become a mainstream corporate activity in many industries, largely because theoretical studies have consistently shown that it generally benefits consumers and society. In vertical markets, in particular, upstream CSR mitigates the double marginalization problem, an effect that is also observed in our study. For these reasons, firms have increasingly been expected to undertake CSR activities. However, our study cautions against promoting CSR without sufficient consideration of its effect on market entry. Although promoting upstream CSR mitigates double marginalization, it also induces downstream entry beyond the socially optimal level. Thus, CSR promotion carries the risk of inducing excess entry and may therefore be difficult to pursue alongside retail liberalization.

This study contributes to the literature on the social efficiency of entry. The studies most closely related to ours are those that examine entry in vertical markets. Ghosh and

Morita (2007a, b) point out that the excess entry theorem (Mankiw and Whinston 1986; Suzumura and Kiyono 1987) may no longer hold in vertical markets. This suggests that the conclusion of the entry theorem depends on whether vertical markets are considered. Motivated by this difference, several studies have attempted to bridge this gap by further examining the social efficiency of entry. Basak and Mukherjee (2016) demonstrate that the social desirability of downstream entry depends on returns to scale. Cao and Wang (2020) show that whether downstream entry is excessive or insufficient depends on asymmetric marginal costs among competing firms. Similarly, this study seeks to bridge the gap between the entry results obtained in nonvertical and vertical markets. Unlike these studies, however, we focus on the upstream firm's objective and show that a new factor—the degree of CSR—is a key determinant of downstream entry.

This study is also related to a broader literature that identifies factors determining whether market entry is excessive or insufficient outside the context of vertical markets: common ownership (Sato and Matsumura 2020); consumer search (Matsuoka 2023); cost-reducing R&D (Chao et al. 2017; Mukherjee 2012a)[1]; efficient market leader (Mukherjee 2012b); external economies of scale (Mukherjee 2010); technology licensing (Mukherjee and Mukherjee 2008); transportation cost in the circular-market model (Matsumura and Okamura 2006). However, unlike our study, these studies do not consider an upstream sector. Thus, although they also identify factors that determine whether entry is excessive or insufficient, the mechanisms underlying their results differ fundamentally from ours.

Furthermore, our study also contributes to the literature on CSR (Buccella et al. 2024; Fanti and Buccella 2018; Kim et al. 2019; Kopel and Brand 2012; Kopel et al.

[1]Chao et al. (2017) show that R&D spillover and *ex ante* asymmetric costs characterize entry. Mukherjee (2012a) demonstrates that the slope of marginal cost of R&D is a key factor characterizing entry.

2014; Lambertini et al. 2016; Matsumura and Ogawa 2014). In this literature, upstream CSR has recently attracted increasing attention and is known to have the desirable effect of mitigating the double marginalization (Brand and Grothe 2015; Chang et al. 2019; Masuyama and Mizuno 2026). Similarly, our study shows that upstream CSR mitigates the double marginalization problem. However, our results also indicate that an overemphasis on CSR can induce excess entry, thereby revealing a potential adverse effect of CSR.

The remainder of the paper is organized as follows. Section 2 presents the main model, and Section 3 derives the equilibrium and analyzes the social efficiency of downstream entry. Section 4 extends the main model in two directions to examine the robustness of our results. Specifically, Subsection 4.1 considers the case in which the upstream firm's CSR objective is based on total surplus, while Subsection 4.2 introduces differentiated products. Finally, Section 5 concludes the paper.

2 Model

We consider a vertical relationship with one upstream firm, firm U, that takes CSR into account, and a potentially unlimited number of downstream firms considering entry into the downstream market. When a downstream firm enters the market, it must pay a fixed entry cost f. We assume that f is sufficiently small that at least two downstream firms can enter the market. Firm U produces an input with no cost and sells it to downstream firms entering the market at the input price w. Each downstream firm requires one unit of the input to produce one unit of the final good. We assume that downstream firms produce homogeneous goods. The costs of downstream firms consist solely of payments for the input. After n downstream firms enter the downstream market, let q_i denote the

output of downstream firm i, and let $Q = \sum_{j=1}^{n} q_j$ denote total output.

We assume that the downstream firms face an inverse demand function with constant curvature, $p(Q)$. More precisely, we define $z = -p''(Q)Q/p'(Q)$, where $p'(Q) < 0$ and $p''(Q)$ denote the first and second derivatives of $p(Q)$, and assume that z is constant for all $Q \geq 0$. This assumption is equivalent to the following parametric form: $p(Q) = \alpha - \beta Q^{1-z}/(1-z)$. The inverse demand function with constant curvature is used in the literature on industrial organization (Hu et al. 2022; López and Vives 2019). For simplicity, we assume $z \leq 0$, which implies that each inverse demand function is weakly concave.

The profit of upstream firm is $\pi_U = w \sum_{j=1}^{n} q_j$. The profit of downstream firm i is $\pi_{Di} = (p(Q) - w)q_i - f$ if it enters the downstream market, and $\pi_{Di} = 0$ if it does not enter. The consumer and total surpluses are defined as follows.

$$CS = \int_0^Q p(x)dx - p(Q)Q, \quad TS = \int_0^Q p(x)dx - nf.$$

The upstream firm committed to CSR takes into account not only its own profit but also consumer surplus. Following the CSR literature (Brand and Grothe 2015; Buccella et al. 2024; Fanti and Buccella 2018; Kim et al. 2019; Kopel and Brand 2012; Kopel et al. 2014)[2], we assume that the upstream firm's objective function is given by a convex combination of its own profit and consumer surplus:

$$V_U = (1-\theta)\pi_U + \theta CS,$$

where $\theta \in [0, 1/2)$ denotes the degree of upstream CSR.

The timing of the game is as follows. In stage 1, downstream firms decide whether

[2]For other studies that adopt a similar approach, see Buccella et al. (2024).

to enter the market. In stage 2, firm U chooses its input price to maximize V_U. In stage 3, the entering downstream firms engage in quantity competition. We solve the game using backward induction.

3 Results

In stage 3, we have the first-order condition with symmetric output, $q_i = q(w, n)$ for any $i = 1, 2, \ldots, n$.

$$p(Q) + q(w, n)p'(Q) - w = 0. \tag{1}$$

Using the implicit function theorem and the definition of z, we obtain the following result of comparative statics.

Lemma 1 *The output of each downstream firm decreases with the input price and also with the number of downstream firms. More precisely,*

$$\frac{\partial q(w,n)}{\partial w} = \frac{1}{(1+n-z)p'(Q)} < 0, \quad \frac{\partial q(w,n)}{\partial n} = -\frac{q(n-z)}{n(1+n-z)} < 0,$$

where $q(w, n)$ is output of each downstream firm in stage 3.

The intuition behind Lemma 1 is as follows. First, an increase in the input price raises each downstream firm's marginal cost, thereby reducing its output. Second, although an increase in the number of downstream firms raises total output, new entrants take market share away from existing firms. Consequently, each downstream firm's output decreases.

In stage 2, firm U chooses its input price w. Using the result of Lemma 1, we have

the following first-order condition.

$$\frac{n[(1-\theta)w + q(w,n)(n + (1-z)(1-\theta) - 2n\theta)p'(Q)]}{(1+n-z)p'(Q)} = 0. \tag{2}$$

Solving (1) and (2) for q and w, we obtain the subgame outcomes.

$$q(n) = \frac{(1-\theta)p(Q)}{-[n + (2-z)(1-\theta) - 2n\theta]p'(Q)},\ w(n) = \frac{[n + (1-z)(1-\theta) - 2n\theta]p(Q)}{n + (2-z)(1-\theta) - 2n\theta}. \tag{3}$$

Using the implicit function theorem, the results of Lemma 1, and (3), we obtain the following Lemma.

Lemma 2 *(i) If the upstream firm does not engage in CSR, the input price is independent of the number of downstream firms; namely, $w'(n) = 0$ when $\theta = 0$. (ii) If the upstream firm engages in CSR, the input price decreases with the number of entering downstream firms. More precisely,*

$$w'(n) = -\frac{(1-z)(1-\theta)\theta p(Q)}{[n + (2-z)(1-\theta) - 2n\theta][(2-3z+z^2)(1-\theta) + n(2-3\theta - z(1-2\theta))]} \leq 0.$$

The intuition behind Lemma 2 is as follows. The upstream firm engaged in CSR pursues two objectives: profit and consumer surplus. Because downstream entry increases total output, it becomes easier for the upstream firm to increase consumer surplus. The upstream firm therefore focuses on increasing consumer surplus and, consequently, sets a lower input price. This mechanism yields the result in Lemma 2 (ii). By contrast, when the upstream firm does not engage in CSR, consumer surplus is not one of its objectives, and the mechanism is absent in our model, yielding the result in Lemma 2 (i).

Before solving stage 1, in which the number of downstream entrants is determined, we first examine how the number of downstream firms affects downstream profits. Dif-

ferentiating the downstream firm's profit function, $\pi_i(n) = [p(nq(n)) - w(n)]q(n) - f$, with respect to n yields the following lemma.

Lemma 3 *The profit of each downstream firm decreases with the number of downstream firms. More precisely,*

$$\frac{\partial \pi_i(n)}{\partial n} = \frac{(1-\theta)^2[-z(2-z)(1-\theta) + 2n(2-3\theta - z(1-2\theta))]p(Q)^2}{n[n+(2-z)(1-\theta)-2n\theta]^2 \left[\begin{array}{l} (2-3z+z^2)(1-\theta) \\ +n(2-3\theta - z(1-2\theta)) \end{array} \right] p'(Q)} < 0.$$

The intuition behind Lemma 3 is simple. As shown in Lemma 1, an increase in the number of downstream firms reduces each downstream firm's output. While downstream entry lowers the input price, the profit-reducing effect of intensified competition dominates the benefit of the lower input price. Consequently, each downstream firm's profit decreases.

In stage 1, downstream firms decide whether to enter the market. The number of downstream firms is determined by the zero-profit condition: $f = [p(nq(n)) - w(n)]q(n)$.

Let the equilibrium number of downstream firms be expressed as a function of the fixed cost by $n^* = N(f)$. Since downstream profits are decreasing in the number of downstream firms n, the equilibrium number of downstream firms, $N(f)$, is decreasing in f. Moreover, when f is sufficiently large, the lower bound on the number of downstream firms imposed in this paper, namely $N(f) = 2$, can be attained, whereas when f is sufficiently small, n can become arbitrarily large. Therefore, for any $n \in [2, \infty)$, we can choose a corresponding value of f. Hence, without loss of generality, instead of fixing the parameter f, we may treat n as if it were the parameter and consider the situation in which the corresponding fixed cost $f = N^{-1}(n)$ is chosen. Accordingly, the zero-profit

condition can be rewritten as follows.

$$f(n) = [p(nq(n)) - w(n)]q(n). \tag{4}$$

Finally, we analyze whether the number of downstream firms is excessive. Differentiating total surplus, $TS(n) = \int_0^{nq(w(n),n)} p(x)dx - nf$, with respect to n yields the following expression.

$$\frac{\partial TS(n)}{\partial n} = p(nq(w,n)) \left[q(w,n) + n\frac{\partial q(w,n)}{\partial n} + nw'(n)\frac{\partial q(w,n)}{\partial w} \right] - f.$$

Substituting (3), (4), the result of Lemma 1, and the result of Lemma 2 into this partial derivative yields the following expression.

$$\frac{\partial TS(n)}{\partial n} = \frac{p(Q)^2(1-\theta)^2[2-z-(2+n-z)\theta]}{-p'(Q)[n+(2-z)(1-\theta)-2n\theta]^2[(2-3z+z^2)(1-\theta)+n(2-3\theta-z(1-2\theta))]}$$

Since the denominator of this partial derivative is positive, the sign of the entire expression coincides with the sign of the term inside the square brackets in the numerator. Therefore, we obtain the following proposition.

Proposition 1 *Downstream entry is excessive if* $2 - n < z \leq 0$ *and* $\theta_{TS} < \theta < 1/2$, *where* $\theta_{TS} = (2-z)/(2+n-z)$. *Otherwise, downstream entry is insufficient.*

Figure 1 provides a graphical representation of Proposition 1. The two horizontal axes represent n and z, while the vertical axis represents θ. The orange surface represents θ_{TS}. Excess entry occurs in the space above this surface, whereas insufficient entry occurs in the space below it.

First, from Figure 1, we find that excess entry emerges when the degree of upstream CSR, θ, is sufficiently high. Lemma 2 shows that when the upstream firm engages in

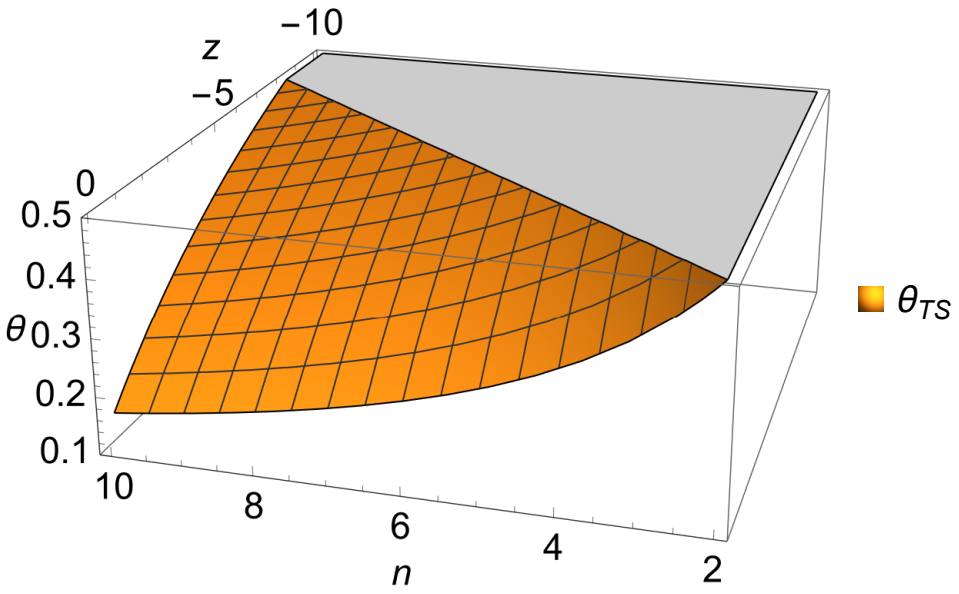

Figure 1: Condition for excess entry.

CSR, it lowers the input price. In addition, the effect becomes more pronounced as the degree of upstream CSR increases. Therefore, a higher degree of upstream CSR induces entry by more downstream firms, resulting in excess entry.

Second, we find that excess entry occurs when the inverse demand function is nearly linear, that is, when z is close to zero. When the inverse demand function is highly concave, that is, when the absolute value of z is large, the increase in total output caused by the entry of more downstream firms leads to a sharp decline in the final good price. This effect makes insufficient entry more likely. When the inverse demand function is nearly linear, the effect disappears, resulting in excess entry.

Finally, Figure 1 shows that the space in which excess entry occurs is also characterized by the number of downstream firms, n. Because the number of firms decreases with the entry cost, f, Figure 1 indicates that excess entry tends to occur when the entry cost

is low. A lower entry cost facilitates downstream entry and thus tends to induce excess entry.

4 Robustness

4.1 Another Indicator: Total Surplus

In Section 3, we consider the case where the upstream firm uses consumer surplus as its CSR indicator. In this subsection, following Matsumura and Ogawa (2014), we instead assume that the upstream firm uses total surplus as its CSR indicator.[3] Accordingly, we redefine the objective function of the upstream firm as follows:

$$V_U = (1-\theta)\pi_U + \theta TS.$$

To simplify the analysis, we assume a linear inverse demand function, $p = 1 - q_i - \sum_{j \neq i} q_j$. Furthermore, to guarantee a positive number of downstream firms, we assume that $f \in (0, 1/4)$. The other setup is the same as in Section 3.

In stage 3, the first-order condition with symmetric output yields the following outcome:

$$q(w,n) = \frac{1-w}{1+n}.$$

In stage 2, from the first-order condition, we obtain the following outcome.

$$w(n) = \frac{1+n-(2+n)\theta}{2+2n-(2+n)\theta}.$$

[3]In the partial privatization literature, a partially privatized firm maximizes an objective function that combines its own profit and total surplus (Kim et al. 2019; Lee et al. 2018; Matsumura 1998; Wu et al. 2016). Accordingly, the analysis in this subsection is related to this literature as well.

In stage 1, the zero-profit condition leads to the equilibrium number of downstream firms as follows:

$$n^S = \frac{1 - 2(1-\theta)\sqrt{f}}{(2-\theta)\sqrt{f}},$$

where the superscript S denotes the case in which the CSR indicator is total surplus.

The equilibrium number of downstream firms is socially excessive under the following condition:

$$\left.\frac{\partial TS}{\partial n}\right|_{n=n^S} = \frac{f[4\sqrt{f} - (3+8\sqrt{f})\theta + 2(1+2\sqrt{f})\theta^2]}{2-\theta} < 0 \quad \text{if} \quad \theta_{TS}^S < \theta < \frac{1}{2},$$

where $\theta_{TS}^S = (3+8\sqrt{f} - \sqrt{9+16\sqrt{f}})/[4(1+2\sqrt{f})]$. Therefore, we obtain Proposition 2.

Proposition 2 *Downstream entry is excessive if* $\theta_{TS}^S < \theta < 1/2$. *Otherwise, downstream entry is insufficient.*

Figure 2 illustrates Proposition 2. The horizontal and vertical axes represent f and θ, respectively, and the orange curve represents θ_{TS}^S. In the region above the curve, downstream entry is excessive, whereas it is insufficient in the region below the curve. Therefore, we find that our main result remains robust when the upstream firm uses total surplus as its CSR indicator.

4.2 Differentiated Products

While we assume homogeneous goods in Section 3, in this subsection, we consider a case with differentiated goods. We employ a linear inverse demand function $p_i = 1 - q_i - \gamma \sum_{j \neq i} q_j$, where $\gamma \in (0,1)$ is the degree of product substitutability. Furthermore, to guarantee a positive number of downstream firms, we assume $f \in (0, 1/16)$. The other settings are the same as in Section 3.

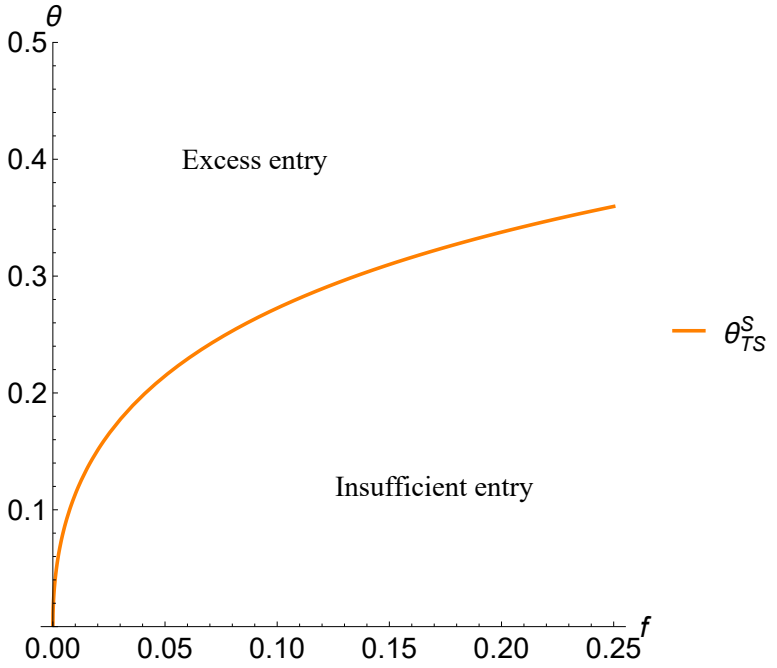

Figure 2: Condition for excess entry with another CSR indicator.

In stage 3, from the first-order condition with symmetric output, we obtain the following outcome.

$$q(w,n) = \frac{1-w}{2-\gamma+n\gamma},$$

In stage 2, the first-order condition yields the following outcome.

$$w(n) = \frac{2-3\theta+(n-1)(1-2\theta)\gamma}{4-5\theta+(n-1)(2-3\theta)\gamma}.$$

In stage 1, from the zero-profit condition, we obtain the number of downstream firms in equilibrium.

$$n^D = \frac{1-\theta-[4-5\theta-(2-3\theta)\gamma]\sqrt{f}}{(2-3\theta)\gamma\sqrt{f}},$$

where the superscript D denotes the case with differentiated goods.

Using numerical calculations, we obtain Figure 3, which illustrates whether the equi-

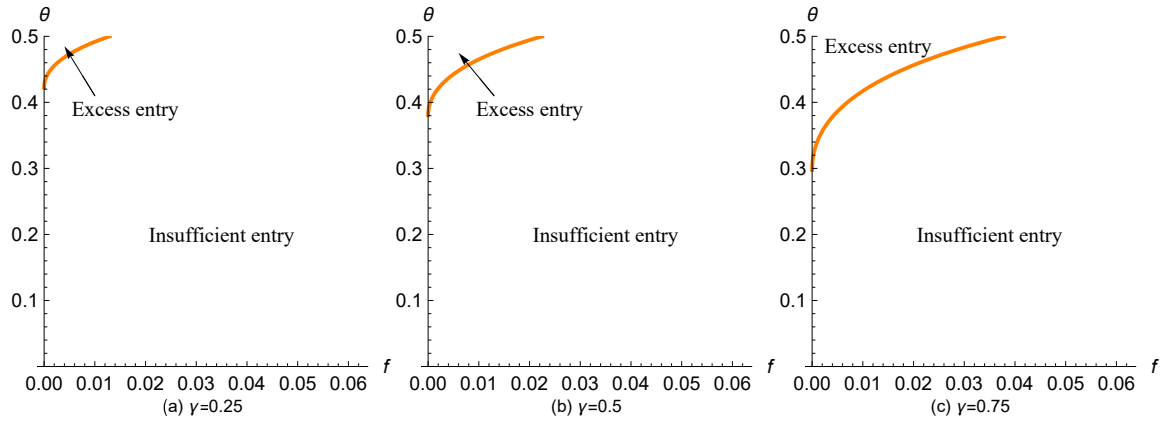

Figure 3: Condition for excess entry with differentiated products.

librium number of downstream firms is socially efficient.[4] In Figure 3, panels (a), (b), and (c) correspond to $\gamma = 0.25$, 0.50, and 0.75, respectively. In each panel, the horizontal axis represents f, and the vertical axis represents θ. The orange curve represents the value of θ for which $\partial TS/\partial n$, evaluated at $n = n^D$, equals zero. In the region above the orange curve, the downstream market faces excess entry, while in the region below the curve, it faces insufficient entry.

Figure 2 shows that the downstream market faces excess entry under a condition similar to that identified in the main model. Therefore, our main result also holds when goods are differentiated. Figure 2 further shows that the region of excess entry shrinks as the degree of substitutability, γ, decreases. The intuition is as follows. When substitutability is low, downstream entry contributes to the creation of new demand. Consequently, a marginal entrant takes relatively little demand away from existing firms, and downstream entry tends to be insufficient.

[4]Although we use numerical calculations for readability, the results can also be demonstrated analytically, as in Section 3 and Subsection 4.1.

5 Conclusions

We consider a model with one upstream firm committed to CSR and downstream firms with free entry. Whether downstream entry is excessive or insufficient depends on the degree of upstream CSR. When the degree of CSR is sufficiently high, downstream entry becomes excessive, in contrast to the conventional result of insufficient entry in vertical markets. By committing to CSR, the upstream firm sets a lower input price, thereby encouraging more downstream firms to enter the market. This effect may result in excess entry. Thus, entry regulation is justified when CSR is promoted to a sufficiently high degree. Otherwise, downstream entry is insufficient, and retail liberalization is socially preferable to entry regulation. Furthermore, although CSR is generally regarded as socially desirable, our analysis reveals a potential downside: an overemphasis on CSR can induce excess entry.

While the main model assumes homogeneous goods, we also consider differentiated goods and show that our main result remains robust. We further examine the case in which the upstream firm uses total surplus as its CSR indicator and confirm the robustness of our main finding. This analysis also suggests that our main result may hold more generally when the upstream firm places weight on an additional objective that increases with output, rather than maximizing profit alone.

References

Basak, D. & Mukherjee, A. (2016) Social efficiency of entry in a vertically related industry. *Economics Letters*, 139, 8–10. https://doi.org/10.1016/j.econlet.2015.12.003

Brand, B. & Grothe, M. (2015) Social responsibility in a bilateral monopoly. *Journal of Economics*, 115(3), 275–289. https://doi.org/10.1007/s00712-014-0412-6

Buccella, D., Fanti, L., Gori, L., & Sodini, M. (2024) Corporate social responsibility and network externalities: a game-theoretic approach. *Annals of Operations Research*, 337(3), 835–871. https://doi.org/10.1007/s10479-023-05601-1

Cao, H. & Wang, L. F. (2020) Social efficiency of entry in a vertically related industry revisited. *Economics Letters*, 192, 109200. https://doi.org/10.1016/j.econlet.2020.109200

Chang, C. W., Li, C. C., & Lin, Y. S. (2019) The strategic incentive of corporate social responsibility in a vertically related market. *International Review of Economics & Finance*, 59, 88–97. https://doi.org/10.1016/j.iref.2018.08.007

Chao, A. C., Lee, J. Y., & Wang, L. F. (2017) Stackelberg competition, innovation and social efficiency of entry. *Manchester School*, 85(1), 1–12. https://doi.org/10.1111/manc.12130

Fanti, L. & Buccella, D. (2018) Corporate social responsibility and the choice of price versus quantities. *Japan and the World Economy*, 48, 71–78. https://doi.org/10.1016/j.japwor.2018.08.004

Ghosh, A. & Morita, H. (2007b) Free entry and social efficiency under vertical oligopoly. *RAND Journal of Economics*, 38(2), 541–554. https://doi.org/10.1111/j.1756-2171.2007.tb00083.x

Ghosh, A. & Morita, H. (2007a) Social desirability of free entry: a bilateral oligopoly analysis. *International Journal of Industrial Organization*, 25(5), 925–934. https://doi.org/10.1016/j.ijindorg.2007.02.002

Hu, Q., Monden, A., & Mizuno, T. (2022) Downstream cross-holdings and upstream R&D. *Journal of Industrial Economics*, 70(3), 775–789. https://doi.org/10.1111/joie.12257

Kim, S. L., Lee, S. H., & Matsumura, T. (2019) Corporate social responsibility and privatization policy in a mixed oligopoly. *Journal of Economics*, 128(1), 67–89. https://doi.org/10.1007/s00712-018-00651-7

Kopel, M. & Brand, B. (2012) Socially responsible firms and endogenous choice of strategic incentives. *Economic Modelling*, 29(3), 982–989. https://doi.org/10.1016/j.econmod.2012.02.008

Kopel, M., Lamantia, F., & Szidarovszky, F. (2014) Evolutionary competition in a mixed market with socially concerned firms. *Journal of Economic Dynamics and Control*, 48, 394–409. https://doi.org/10.1016/j.jedc.2014.06.001

Lambertini, L., Palestini, A., & Tampieri, A. (2016) CSR in an asymmetric duopoly with environmental externality. *Southern Economic Journal*, 83(1), 236-252. https://doi.org/10.1002/soej.12140

Lee, S. H., Matsumura, T., & Sato, S. (2018) An analysis of entry-then-privatization model: welfare and policy implications. *Journal of Economics*, 123(1), 71–88. https://doi.org/10.1007/s00712-017-0559-z

López, Á. L., & Vives, X. (2019) Overlapping ownership, R&D spillovers, and antitrust policy. *Journal of Political Economy*, 127(5), 2394–2437. https://doi.org/10.1086/701811

Mankiw, N. G. & Whinston, M. D. (1986) Free entry and social inefficiency. *RAND Journal of Economics*, 17(1), 48–58. https://www.jstor.org/stable/2555627

Masuyama, R. & Mizuno, T. (2026) Endogenous market structure with upstream corporate social responsibility. *Managerial and Decision Economics*, 47(5), 1133–1144. https://doi.org/10.1002/mde.70092

Matsumura, T. (1998) Partial privatization in mixed duopoly. *Journal of Public Economics*, 70(3), 473–483. https://doi.org/10.1016/S0047-2727(98)00051-6

Matsumura, T. & Ogawa, A. (2014) Corporate social responsibility or payoff asymmetry? A study of an endogenous timing game. *Southern Economic Journal*, 81(2), 457–473. https://doi.org/10.4284/0038-4038-2012.182

Matsumura, T. & Okamura, M. (2006) A note on the excess entry theorem in spatial markets. *International Journal of Industrial Organization*, 24(5), 1071–1076. https://doi.org/10.1016/j.ijindorg.2006.03.005

Matsuoka, T. (2023) Insufficient entry and consumer search. *BE Journal of Theoretical Economics*, 23(1), 245–258. https://doi.org/10.1515/bejte-2020-0087

Mukherjee, A. (2010) External economies of scale and insufficient entry. *Journal of Industry, Competition and Trade*, 10(3-4), 365–371. https://doi.org/10.1007/s10842-010-0069-y

Mukherjee, A. (2012a) Endogenous cost asymmetry and insufficient entry in the absence of scale economies. *Journal of Economics*, 106(1), 75–82. https://doi.org/10.1007/s00712-011-0255-3

Mukherjee, A. (2012b) Social efficiency of entry with market leaders. *Journal of Economics & Management Strategy*, 21(2), 431–444. https://doi.org/10.1111/j.1530-9134.2012.00333.x

Mukherjee, A. & Mukherjee, S. (2008) Excess-entry theorem: The implications of licensing. *Manchester School*, 76(6), 675–689. https://doi.org/10.1111/j.1467-9957.2008.01088.x

Sato, S. & Matsumura, T. (2020) Free entry under common ownership. *Economics Letters*, 195, 109489. https://doi.org/10.1016/j.econlet.2020.109489

Suzumura, K. & Kiyono, K. (1987) Entry barriers and economic welfare. *Review of Economic Studies*, 54(1), 157–167. https://doi.org/10.2307/2297451

Wu, S. J., Chang, Y. M., & Chen, H. Y. (2016) Imported inputs and privatization in downstream mixed oligopoly with foreign ownership. *Canadian Journal of Economics*, 49(3), 1179–1207. https://doi.org/10.1111/caje.12229