Analysing Foreign Market Entry:

The Choice between Greenfield Investment and Acquisitions

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Abstract

This paper formalises the choice a firm has to face when entering a foreign market via FDI as between setting up an entirely new plant (greenfield investment) or acquiring an existing indigenous firm. Our results show that in an asymmetric duopoly situation a new entrant will normally be best off by acquiring an existing indigenous low-technology firm, thus, forming a duopoly with an indigenous high-technology firm. While in welfare terms the entry of the foreign firm damages the country in most cases, there exist some possibilities that welfare, particularly after a greenfield investment by the foreign firm, is higher than before entry, even when there is full profit repatriation.

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1 Introduction

Different approaches towards explaining international production and foreign direct investment (FDI) have been put forward in the literature but still, as Krugman and Obstfeld (1994) conclude: "Economists do not have as fully developed a theory of multinational enterprise as they do of many other issues in international economics" (p. 159). This is due to the fact that FDI is such a complex phenomenon which cannot be fully captured within a limited range of clearly specified models. This paper contributes to the literature on the determinants of FDI in that it focuses explicitly on the choice of market entry by a foreign firm via *greenfield investment* or *acquisitions*.

Such an analysis seems warranted given the different nature of these two investment alternatives. Auerbach and Hassett (1993) and Klein and Rosengren (1994) show, using data from the Bureau of Economic Analysis (BEA) that between 1980 and 1991 more than 60 per cent of overall inward FDI in the US per year were in the form of acquisitions; this share increased particularly in the late 1980s and early 1990s to far more than 80 per cent of the total. There does not, however, appear to be any in-depth analysis in the literature of why a firm would choose one alternative over the other.[1]

There have been a few empirical studies which identify certain firm characteristics and market characteristics that affect the choice of entry strategy, namely by Caves and Mehra (1986) for inward investment in the US, Zejan (1990) for outward investment from Sweden and Hennart and Park (1993) for the entry of Japanese firms into the US. In this paper, we

[1] While Gordon and Bovenberg (1997) distinguish between acquisitions and greenfield investment in their analysis of international capital mobility, they do not examine why a firm would want to prefer the former or the latter. Also, there is a strand of literature that examines the effects of acquisitions on company performance, in particular on firm growth, for example, Ravenscraft and Scherer (1987) and Dickerson *et al.* (1997). These papers, however, do not analyse the differences of acquisitions vs. greenfield investment.

attempt to formalise the choice of market entry strategy for an individual firm.

Recently, Buckley and Casson (1998) analysed the different alternatives of market entry by foreign firms. Their approach is based on internalisation theory examining the question of why firms would choose exporting, franchising, subcontracting, joint-ventures or FDI as a strategy for market entry. The paper discusses the scenario of market-seeking investment only, i.e., foreign firms entering the market in order to gain access to that particular market. They do not examine entry driven by input cost differences, i.e., foreign firms setting up production facilities abroad in order to exploit production cost advantages in the host country compared with the home country.

The Buckley and Casson paper assumes that a foreign firm entering the market has to incur additional costs of market entry. These are (i) marketing costs that the firm has to incur in order to acquire market knowledge, (ii) adaptation costs in order to adapt the product to the preferences in the new market, and (iii) costs of building trust in newly acquired production or distribution facilities in the foreign market.

However, there will also be additional costs of home production, i.e., if the foreign firm chooses to produce in the home country and to export to the new market. These costs include, *inter alia*, transport costs and tariffs. Moreover, the transfer of technology through the external market in the form of licensing or subcontracting arrangements is assumed to incur costs which are higher than the costs for internalisation.

In terms of the impact of market structure on the choice of strategy for the entering firm, Buckley and Casson assume that prior to the entry of the foreign firm there is only one domestic firm which operates as a monopolist

in the market. This domestic firm has higher production costs than the foreign entrant due to inferior technology.

The impact of the various variables leads to a complex analysis and, depending on the magnitude of the different cost components, one strategy may be preferred to other alternatives. Due to the wide variety of variables taken into account, the Buckley and Casson paper should be seen as providing an eclectic framework which warrants the development of more detailed models based on it.

This paper focuses on one particular question, namely a firm's choice between greenfield investment or acquisition as a means of market entry. Under the assumption that firms produce for domestic markets only, our results show that in an asymmetric duopoly situation a new entrant will normally be best off by acquiring an existing indigenous high-technology firm and, thus, forming a duopoly with an indigenous low-technology firm. While in welfare terms the entry of the foreign firm damages the country in most cases, there exist some possibilities that welfare, particularly after a greenfield investment by the foreign firm, is higher than before entry, even when there is full profit repatriation.

The paper is structured as follows. Section 2 develops a simple model for the choice of market entry strategy for the firm. Section 2.1 describes the market structure in the host economy before entry of a foreign firm, Section 2.2 outlines the different market entry strategies for a foreign firm and discusses the effects of market entry on the market structure, while Section 2.3 examines the firm's choice between the alternative market entry strategies. The welfare effects of the entry of the foreign firm for the host economy are analysed in Section 3. Section 4 discusses some of the limitations of our analysis and Section 5 briefly summarises the issues discussed in this paper and provides some concluding comments.

2 Choosing Greenfield Investment or Acquisitions

This paper attempts to build on the approach taken by Buckley and Casson (1998), focusing explicitly on the choice faced by a firm which has decided to enter a market via FDI, as between setting up an entirely new plant or acquiring an existing company in the foreign market. We refer to these strategies of entry as *greenfield investment* and *acquisitions* respectively. While the Buckley and Casson paper sets out a framework within which the different choices of entry can be analysed, the narrower emphasis taken in this paper allows us to focus in more detail on the variables that influence the decision between greenfield investment and acquisitions.

We examine the different entry strategies for a firm that attempts to enter a closed market, i.e., where prices are determined endogenously within the market and relax the assumption made by Buckley and Casson of only one competing firm in the host economy. Also, we allow for different levels of technology to co-exist in the host country before market entry of the foreign firm. Our analysis suggests that the choice of market entry strategy depends on the market structure in the host market before and after the entry of the foreign firm, the differences in technology between the foreign and existing indigenous firms in the economy, and the additional costs that a foreign firm has to incur in the host market.

2.1 Market Structure before Entry of the Foreign Firm

Consider a host economy where there are two firms producing a single non-traded good *Q* with the following linear cost functions $c(q_1) = c_1 q_1$ and $c(q_2) = c_2 q_2$, where *c* represents the marginal (equal to average) costs of production. We assume that $c_1 < c_2$, i.e., the marginal costs of production for Firm 2 are higher than those for Firm 1 and we attribute the lower costs

of Firm 1 to its use of a superior technology. We assume such a production structure in order to allow for the fact that in existing markets high-technology and low-technology firms co-exist. The fact that Firm 2 uses an inferior technology can be attributed to various reasons. For example, it could be the case that Firm 2 entered the market before Firm 1 and did not adjust its production process after the entry of Firm 1, due to high costs of changing technology. This situation leads to an asymmetric duopolistic market structure in the host economy where Firm 1 produces a larger quantity of good *Q* and realises higher profits than Firm 2.[2]

We assume a simple linear (inverse) demand function $p = a - b(q_1 + q_2)$ and, in order to keep the analysis simple, we set *b=1*, i.e., we assume the slope of the demand function to be equal to *-1*. Assuming that competition is of the Cournot type, i.e., firms decide on quantities rather than prices,[3] it can be easily shown that the profit maximising output for Firm 1 and Firm 2 respectively are

$$q_1 = \frac{1}{3}(a - 2c_1 + c_2), \tag{1}$$

$$q_2 = \frac{1}{3}(a - 2c_2 + c_1) \tag{2}$$

which shows that $q_1 > q_2$. The total market output and price will be equal to

$$Q = \frac{1}{3}(2a - c_1 - c_2), \tag{3}$$

$$p = \frac{1}{3}(a + c_1 + c_2) \tag{4}$$

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[2] Note that these cost differences are between firms in the same period. Pal (1991) examines a duopoly structure with identical costs for each firm, but cost differences across periods.

[3] We do not examine Bertrand competition in this paper. Since we assume the production of a single homogenous good, Bertrand competition would yield prices being equal to marginal costs. In this case, the low-cost firm might simply price the high-cost firm out of the market.

Note that the price is higher (since $c_1 < c_2$) and the total output is lower than in the standard Cournot outcome with two low cost firms. Profits for the two firms are

$$\Pi_1 = \frac{1}{9}(a - 2c_1 + c_2)^2 = q_1^2, \tag{5}$$

$$\Pi_2 = \frac{1}{9}(a - 2c_2 + c_1)^2 = q_2^2 \tag{6}$$

Since $q_1 > q_2$, the profits for Firm 1 are higher than those realised in Firm 2.

2.2 Market Entry by the Foreign Firm

Now consider a foreign firm (Firm 3) that wants to enter the market since there are positive supernormal profits to be gained. We assume that the firm considering market entry has already determined that it chooses to do so via FDI. We assume away the possibility of exporting through the assumption of a closed market, while the choice between FDI and other alternatives such as licensing or joint-ventures has been discussed by, for example, Buckley and Casson (1981, 1996, 1998), Horstmann and Markusen (1987, 1996) and the literature cited therein. The entering firm has three alternatives of market entry:

- acquisition of existing low-technology Firm 2 (Scenario A)
- acquisition of existing high-technology Firm 1 (Scenario B)
- set up of an entirely new greenfield plant (Scenario C)

We assume that the entering firm has access to a standard of technology higher than the one used in Firm 1, i.e., $c_2 > c_1 > c_3$. Since both Firm 1 and Firm 3 are high-technology firms we assume the difference

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The Cournot model seems more appropriate to focus on the effects of market entry on market structure.

between c_2 and c_1 to be higher than the difference between c_1 and c_3. In fact, we may assume the difference between c_1 and c_3 to be very low. The high level of technology reflects the existence of an ownership-advantage in the foreign firm that allows it to compete abroad (see Dunning, 1988).

Since the establishment of a firm abroad inevitably imposes higher costs on a firm than producing in the home country we presume, following Buckley and Casson (1998), that the foreign firm faces two types of additional costs of entry.

First, the foreign firm lacks the knowledge of the local market and in order to acquire this knowledge, it has to incur a once-and-for-all marketing cost of *m*. We assume that these marketing costs in the case of greenfield investment are higher than the costs for acquisitions, i.e., the take-over of one of the existing firms. In the case of the take-over the foreign firm can avail of the marketing expertise existent in the acquired firm. Thus, we treat the marketing costs in the case of acquisitions as being equal to zero while these costs are greater than zero in the case of greenfield investment, i.e., $m_C > 0;\ m_A = m_B = 0$.

Second, the product and production process used in the foreign companies have to be adapted to the requirements of the local market. In order to achieve this, the firm incurs adaptation costs *d*. In the case of the take-over of the low-technology firm the foreign firm has to adapt both the production process (process adaptation) as well as the product to meet local demand preferences (product adaptation) while in the case of the take-over of the high-technology firm product adaptation but only little process adaptation is necessary since the firms use a similar technology. If the entering firm decides to enter the market via greenfield investment, only product adaptation is necessary. For the sake of simplicity and without loss

of generality we assume that adaptation costs in the case of greenfield investment are negligible. Thus, we can define that $d_A > d_B > 0;\ d_C = 0$.

Furthermore, we assume that the take-over of an existing firm in the market is costly for the entering firm. It has to pay a premium *u* for the take-over of the capital stock of the respective firm. For simplicity we set the premium for the take-over of Firm 2 equal to zero and use the term *u* only in the analysis of the acquisition of Firm 1, i.e., we implicitly focus on the difference in the premium for the take-over of Firms 1 and 2. In a sense we follow, therefore, Buckley and Casson (1998) in assuming that Firm 2 plays a passive role in the process of the take-over. Firm 2 realises that Firm 3 has superior technology and decides to exit the market and move resources to the best alternative use. On the other hand, Firm 1 does not play a totally passive role during the acquisition process. While it may not be able to resist the take-over by Firm 3, it is able to impose a higher premium for the take-over of its capital stock.

Marketing costs *m*, adaptation costs *d* and the premium *u* are once-and-for-all costs (sunk costs) occurring when the firm sets up in the market. They are, therefore, independent of output produced by the firm and do not enter into the firm's first order condition for profit maximising. The costs are distributed over the expected life duration of the firm by financing through borrowing at a given interest rate *r*. Thus, the costs for marketing, adaptation and the premium in any given period are *rm*, *rd* and *ru* respectively.[4]

If the foreign firm enters the market this has implications for the market structure after market entry. We discuss the effects of the three

[4] As pointed out above, Buckley and Casson also discuss another category of entry costs for the foreign firm, namely costs of building trust in the acquired firm. In order to keep our analysis simple, we do not explicitly examine this cost factor, though one might think of these costs as being included in the costs *m*, i.e., in the costs of acquiring market knowledge.

different scenarios discussed above in turn. Note that we still assume a linear demand function but that output may now be produced by three firms, i.e., the linear (inverse) demand function takes the form $p = a - b(q_1 + q_2 + q_3)$, where q can be either positive or equal to zero. As in the previous section, we set $b=1$ for the sake of simplicity.

Scenario A

Consider firstly the case that Firm 3 enters the market via the acquisition of the existing Firm 2, i.e., the low-technology, high cost firm. As a result, there will be two firms in the market (Firm 1 and Firm 3) which produce using high levels of technology. However, since we assume that the level of technology is higher in Firm 3, this firm has a cost advantage over Firm 1. In this case, the profit maximising quantities produced by the respective firms are as follows:

$$q_1 = \frac{1}{3}(a - 2c_1 + c_3) \tag{7}$$

$$q_3 = \frac{1}{3}(a - 2c_3 + c_1) \tag{8}$$

Since $c_1 > c_3$ if follows that $q_1 < q_3$.[5] Total profit maximising output and price prevailing in the market are

$$Q = \frac{1}{3}(2a - c_1 - c_3), \tag{9}$$

$$p = \frac{1}{3}(a + c_1 + c_3) \tag{10}$$

where the quantity is higher and the price lower than in the situation before market entry of the foreign firm discussed in Section 2.1. This is due to the introduction of higher technology and, therefore, lower unit costs in the production of good *Q*. The difference between quantity and price in this

scenario and in the situation before entry of Firm 3 depends crucially on the difference in unit costs between the low cost and high cost firms. Compared with the situation before market entry the quantity produced by Firm 1 is lower than before. Subsequently, profits for Firm 1 are less than before the entry of the foreign firm:

$$\Pi_1 = \frac{1}{9}(a - 2c_1 + c_3)^2 = q_1^2 \qquad (11)$$

This shows that both incumbent firms lose as a result of market entry by Firm 3; Firm 1 realises lower profits while Firm 2 exits the market. Firm 3 realises higher per unit profits than Firm 1 but has to face the additional costs *m* and *d*. Taking these into account and assuming that the costs *m* are equal to zero in this scenario, the profits for Firm 3 are

$$\Pi_3 = \frac{1}{9}(a - 2c_3 + c_1)^2 - rd_A = q_3^2 - rd_A \qquad (12)$$

Note that *d* is independent of output produced and does not, therefore, impact on the profit maximising problem of Firm 3. Needless to say, Firm 3 will only enter the market if $\Pi_3 > 0$. This analysis shows that in Scenario A the entry of the foreign firms leads to an increase in total output produced and a decrease in the market price of good *Q*.

Scenario B

In Scenario B we assume that Firm 3 acquires the high-technology, low cost Firm 1. As pointed out above, we presume that the acquisition of Firm 1 imposes a premium *u* on Firm 3 for the take-over of Firm 1's capital stock. Firm 3 will only incur this premium if its present value is equal or less than the summation of the present values of Firm 3's discounted expected profits over the expected life time of the investment.

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[5] In the limit case where $c_1 = c_3$ this scenario would yield the standard Cournot outcome with both firms producing identical quantities.

The take-over of Firm 1 leads to a market structure similar to the one before entry of Firm 3. There is one high-technology firm, now Firm 3, which produces higher output than the low-technology, high cost Firm 2. However, since we assume that Firm 3 has a cost advantage over Firm 1 the output produced by Firm 3 will be higher than output produced by Firm 1 before entry by Firm 3. On the other hand, Firm 2 produces less output than in the initial situation. Profit maximising quantities produced by the two firms are

$$q_2 = \frac{1}{3}(a - 2c_2 + c_3) \tag{13}$$

$$q_3 = \frac{1}{3}(a - 2c_3 + c_2) \tag{14}$$

and total profit maximising output and price prevailing in the market are

$$Q = \frac{1}{3}(2a - c_2 - c_3), \tag{15}$$

$$p = \frac{1}{3}(a + c_2 + c_3) \tag{16}$$

Total output produced is higher than in the initial situation before market entry of Firm 3 but is less than in Scenario A. Subsequently, the price prevailing in the market is less than in the initial situation but higher than in Scenario A. Profits realised in both firms are

$$\Pi_2 = \frac{1}{9}(a - 2c_2 + c_3)^2 = q_2^2 \tag{17}$$

$$\Pi_3 = \frac{1}{9}(a - 2c_3 + c_2)^2 - r(d_B + u) = q_3^2 - r(d_B + u) \tag{18}$$

which shows that profits for Firm 2 are less than its profits before market entry of Firm 3 as in equation (6).

Scenario C

The final scenario of market entry to be considered here is that of a greenfield investment by Firm 3. This will lead to a market structure where three firms co-exist in the market and will, thus, yield higher competition than in the cases discussed above. While there will be two firms (Firms 1 and 3) with high levels of technology (although $c_1 > c_3$) Firm 2 uses an inferior technology and, thus, produces at higher marginal costs than both Firms 1 and 3. Under this scenario, profit maximising outputs produced by the firms are

$$q_1 = \frac{1}{4}(a - 3c_1 + c_2 + c_3) \tag{19}$$

$$q_2 = \frac{1}{4}(a - 3c_2 + c_1 + c_3) \tag{20}$$

$$q_3 = \frac{1}{4}(a - 3c_3 + c_1 + c_2) \tag{21}$$

which implies that $q_2 < q_1 < q_3$.[6] Economic intuition would suggest that Firm 1 produces less output in Scenario C than in Scenario A due to the entry of a third firm.[7] Firm 2 will also produce less output in Scenario C than in Scenario B. Total profit maximising output and the price in the market will be

$$Q = \frac{1}{4}(3a - c_1 - c_2 - c_3) \tag{22}$$

$$p = \frac{1}{4}(a + c_1 + c_2 + c_3) \tag{23}$$

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[6] As pointed out in the previous footnote, there is a limit case where $c_1 = c_3$ which would yield $q_1 = q_3$.

[7] The algebra seems to suggest a case where output in Scenario C may be higher for Firm 1 than in Scenario A. Using equations (7) and (14) one can show that $q_1^A < q_1^C$ if $c_2 > \frac{1}{3}(a + c_1 + c_3)$. In this case, however, output of Firm 2, as in equation (15) would turn out to be negative, i.e., Firm 2 would exit the market, which would lead to the same outcome as in Scenario A. Therefore, the case that output by Firm 1 in Scenario C is higher than in Scenario A is not feasible.

Note that the price is less than in Scenario B and less than in Scenario A since $c_1 < c_2$.[8] This implies that the total quantity produced is higher in this case than in both Scenario B and Scenario A. Thus, the effect of higher competition through the new greenfield investment leads to lower prices and more output available in the market. Given these output and price equations we can determine profits for each of the firms

$$\Pi_1 = \frac{1}{16}(a - 3c_1 + c_2 + c_3)^2 = q_1^2 \tag{24}$$

$$\Pi_2 = \frac{1}{16}(a - 3c_2 + c_1 + c_3)^2 = q_2^2 \tag{25}$$

$$\Pi_3 = \frac{1}{16}(a - 3c_3 + c_1 + c_2)^2 - rm_c = q_3^2 - rm_c \tag{26}$$

Looking at the profits for Firm 1 note that they are unambiguously less than in the situation before entry of Firm 3 (Section 2.1). Since the quantity produced by Firm 1 in Scenario C is less than in Scenario A, profits will be less in this scenario as well. The profits for Firm 2 in this scenario will be less than in Scenario B, given that c_1 is assumed to be lower than c_2. As outlined above, we assume the costs for product adaptation *d* for Firm 3 to be equal to zero in this scenario.

2.3 Choosing the optimal strategy for market entry

Concerning the choice of the optimal market entry strategy, Firm 3 will choose the strategy which yields the highest profits for itself. We can compare the different profits obtainable under the different scenarios discussed above:

[8] Again, the algebraic possibility that the price in Scenario C is higher than in Scenario A can be dismissed following the same line of thought as in the previous footnote. One can show that $p^A < p^C$ if $c_2 > \frac{1}{3}(a + c_1 + c_3)$ which would not allow Firm 2 to produce positive quantities.

$$\Pi_{3A} = \frac{1}{9}(a - 2c_3 + c_1)^2 - rd_A = q_{3A}^2 - rd_A \tag{27}$$

$$\Pi_{3B} = \frac{1}{9}(a - 2c_3 + c_2)^2 - r(d_B + u) = q_{3B}^2 - r(d_B + u) \tag{28}$$

$$\Pi_{3C} = \frac{1}{16}(a - 3c_3 + c_1 + c_2)^2 - rm_c = q_{3C}^2 - rm_c \tag{29}$$

As regards the first term in the respective profit functions (i.e., the quantities produced squared) we can deduce that this term is unambiguously higher in Scenario B than in Scenario A since $c_2 > c_1$. Comparing the first terms in equations (27) and (29) one can show that this will be higher for Scenario A only if $c_2 < \frac{1}{3}(a + c_1 + c_3)$. In other words, if c_2 is relatively high compared to c_1 and c_3 this term will be higher in equation (29), i.e., in the case of market entry via greenfield investment. Similarly, we find that the first term in equation (28) will only be higher than in equation (29) if $c_1 < \frac{1}{3}(a + c_2 + c_3)$. In this case, however, we may expect this inequality to hold in general, since Firm 1 is a high-technology firm with only slightly higher costs than Firm 3.

The profit functions also indicate that the profits are affected by the additional costs a firm has to incur. We defined above that $m_C > 0$ and $d_A > d_B > 0$. Given the multitude of different types of additional costs we computed some simulations which are reported in Figures 1 to 4. In these simulations we hold one or more additional cost parameters constant while varying the others. The demand function and the values of marginal production costs are also held constant.[9]

[9] We assumed $a = 80$, $c_1 = 20$, $c_2 = 30$, and $c_3 = 10$. At this level of c_2 profits in Scenario A are initially higher than in Scenario C. In an alternative simulation we assumed $c_2 = 40$ which yields initially higher profits in Scenario C but does not alter the conclusions of the simulations concerning the additional cost parameters.

The simulation reported in Figure 1 assumes m_C to be constant at a low level of 500.[10] In this case we can see that greenfield investment can be the preferred alternative of market entry for a foreign firm if the costs for adaptation are relatively high compared to *m*. In other words, if the costs for acquiring market knowledge in the foreign market are relatively low compared to costs for product adaptation a foreign firm may be better off entering the market via greenfield investment.

Figure 2 charts the result for a simulation where d_B is set constant at 500. Profits in Scenario B, i.e., where the foreign firm acquires the existing high-technology Firm 1, will then be unambiguously highest while greenfield investment yields the lowest profits. Profits for Scenario B decrease even though d_B is assumed to be constant due to the effect of the take-over premium *u* on Firm 3's profits, as shown in equation (28).[11] In the simulation in Figure 3 we keep both d_B and *u* constant at 500. In this case we find constant profits for Scenario B which are the highest in the comparison of the 3 scenarios. Again, greenfield investment would be the least preferred strategy for market entry.

These results indicate that the acquisition of the high-technology Firm 1 will usually be the preferred alternative of market entry, especially if there are high costs of acquiring market knowledge in the foreign market or if the costs of adaptation would be considerably higher in the case of the acquisition of the incumbent low-technology firm. This supports the empirical finding by Hennart and Park (1993) that Japanese firms tend to prefer the acquisition of an existing firm as their strategy of market entry in the US if they intend to produce a different product in the foreign market than at home. In that case, they would have to incur relatively high costs of

[10] Also, *u* is assumed to be constant at 2000.

acquiring market knowledge, such as knowledge of actual or potential competitors and information on available distribution systems, which can be most easily obtained through the acquisition of an existing firm.

Keeping both d_A and d_B constant yields the results shown in Figure 4. Since we assume that $d_A > d_B$ we set d_A equal to 500 and d_B equal to 400. In this case, profits in Scenario B decrease due to the influence of *u*. This results in Scenario A being the preferred entry strategy if *u* is relatively high compared to d_A and d_B, i.e., the take-over of the low-technology Firm 2 tends to be the most profitable entry strategy if the acquisition of Firm 1 would incur a relatively high take-over premium.[12] In this case, the higher costs of adaptation for the acquisition of Firm 2 are outweighed by the high premium which the foreign firm would have to pay for the acquisition of Firm 1.

3 Impact on the Host Economy

While the emphasis of this paper is on the choice of entry strategy for a firm we also examine the effects of the different entry strategies on the host economy. In this section we compare the welfare in the host country in the period before entry of the foreign firm and welfare in the three different scenarios of market entry for the foreign firm.

We use a very simple definition of welfare $W = \sum_i \Pi + CS$, (i=1,2), where *CS* denotes the consumer surplus and the summation term represents the profits of Firm 1 and Firm 2. The definition of welfare in this way assumes that the profits of the foreign firm are completely repatriated to the

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[11] We get a similar result to the one reported in Figure 5 if we assume *u* to be constant and allow d_B to vary.

[12] Recall that we set the premium for the take-over of Firm 2 equal to zero.

home economy.[13] Under the assumption of a linear demand function $p = a - bQ$ the consumer surplus can be written as $CS = (a - p) \times \frac{1}{2} Q$. Thus, we can derive the welfare in the period before market entry of the foreign firm as

$$W_0 = \frac{1}{18}\left[2\left\{(a-c_1)^2 + (a-c_2)^2 + 4(c_2-c_1)^2\right\} + \left\{(a-c_1)+(a-c_2)\right\}^2\right] \qquad (30)$$

where the first term in the squared parentheses determines the sum of profits and the second term stands for consumer surplus. This expression indicates that the welfare depends crucially on the level of costs and on the difference in costs between the high-technology and low-technology firm.

As shown above, the entry of Firm 3 has implications for the market structure and, subsequently, for prices, quantities produced and profits in the market. Therefore, we expect changes in the welfare in the host economy following the market entry of the foreign firm. Since the welfare equations are quite tedious we present some simple simulation results in Table 1 and in Figures 5 to 7 in order to compare welfare in the different scenarios. The table distinguishes between total profits and consumer surplus, which affect total welfare.

In the case that the foreign firm acquires the existing low-technology Firm 2 (Scenario A) we showed that this leads to lower prices, i.e., increased consumer surplus in the market. This is confirmed in our simulation results. If c_1 and c_3 are relatively low, the profit repatriation of Firm 3 leads to a lower welfare W_A in that scenario than would have been obtained in the situation before market entry of the foreign firm. If the marginal costs of production are relatively high, however, our results show that welfare may be higher in Scenario A than in the initial situation.

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[13] The welfare analysis can be expected to yield different results if the foreign firm retains all or part of its profits in the host country; this will raise the host country's welfare after entry of the

If the foreign firm chooses to enter the market via the acquisition of the high-technology Firm 1 we showed that this also yields lower prices than before, i.e., consumer surplus increases compared to the initial situation. However, welfare W_B will normally be less than in the situation before market entry of the foreign firm, only in the case of relatively high production costs can welfare be higher in Scenario B.

In case the foreign firm chooses greenfield investment as its strategy for market entry, entry introduces increased competition leading to lower prices in the market. Subsequently, consumer surplus will be higher than before market entry of the foreign firm; we actually find the highest consumer surplus in this scenario. As the results in Table 1 and Figures 4 to 7 indicate, welfare W_C can be higher than in the initial situation in the case of relatively high c_2, regardless of the value of c_1 or c_3.

These results indicate that welfare can be improved by the entry of a foreign firm if the incumbent indigenous firms produce with relatively high costs and the entering firm has a cost advantage over the incumbents. In this case, the market entry of Firm 3 results in the incumbent firms having lower output, i.e., the "business stealing effect" (Mankiw and Whinston, 1986) which, in turn leads to an increase in social welfare. This may be due to the fact that Firm 3 steals business from the indigenous firms which operate with higher costs, this leading to a more efficient market outcome.

Let us suppose that the host country, despite the possible negative effects on welfare, decides to pursue a policy of attracting FDI into the country. This could be due to other positive effects of FDI which are not captured in the simple welfare analysis, such as technology spillovers from foreign to indigenous firms (see Kokko, 1994) or positive effects on skill levels and wages in the host economy (see Caves, 1996, Chapter 9), or due

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foreign firm.

to non-optimal behaviour on the part of the government. In this case, assuming that other positive effects are identical for all strategies, what would be the preferable strategy of market entry for the foreign firm *from the perspective of the host country*? Inspection of the potential welfare to be realised in the different scenarios of market entry may enable us to draw some conclusions on this.

Comparing Scenario A and Scenario B the results of the simulation indicate that welfare can be expected to be higher in Scenario A. In other words, it would be more beneficial for the host country if the foreign firm entered the market through acquiring the low-technology firm, since this would lead to lower prices and, therefore, higher consumer surplus than in the case of the take-over of the high-technology firm.

Our results indicate that greenfield investment will always yield the highest welfare, i.e., Scenario C is superior to either Scenario A or B. The reduction in the price of the good yields the highest consumer surplus in the case of the foreign firm entering the market via greenfield investment. Moreover, welfare is improved due to the fact that both indigenous firms 1 and 2 make profits and retain them in the host country.

Admittedly, this welfare analysis is highly simplified in its focus on only consumer surplus and company profits, which are the variables that are actively affected by the market entry of the foreign firm. In particular, we do not consider corporate taxation as an option even though it has been identified in the literature as a crucial determinant of welfare in a host country (see, for example, Bond, 1991 and Janeba, 1995). The choice of optimal tax rates has to be made by the government and cannot be actively influenced by the entering firm.

Lahiri and Ono (1997) analyse the optimal policy for a host country which uses profit taxation and local content requirements as policy

instruments for encouraging or discouraging foreign direct investment by examining the welfare effects of policy changes. Their model of FDI is different from the one proposed in this paper in its focus on the host economy as the decision making entity choosing optimal policies. Since our emphasis is on the decision making process in the firm our welfare analysis simply attempts to make a point, *viz.*, that greenfield investment may have positive effects on host country welfare even if complete profit repatriation is assumed.

4 Possible Extensions of the Analysis

The analysis in this paper is based on a number of simplifying assumptions. First, we assume a simple linear demand function for the derivation of our results. If we assumed another functional form, the entry of the foreign firm may affect the expansion of outputs and lowering of prices differently. This may yield the result that, for example, the entry of the firm would have less effects on changes in consumer surplus.

Also, we have set the slope of the demand function b equal to 1, i.e., we do not consider the effect of changes in the elasticity of demand on the outcomes. This may not impose any major problems for our analysis since we are only carrying out a static analysis where the elasticity of demand does not change over time.

We assume that firms produce one single, homogenous good only. In the case where firms produce differentiated products welfare effects might be assumed to be different, since consumers enjoy a wider range of products to choose from. Also, in the case of differentiated products price competition, i.e., Bertrand competition, would yield different results than in the case of homogenous products, where Bertrand competition simply leads

to prices set equal to marginal costs. Cournot and Bertrand might yield different results if we assumed differentiated products.

Our model allows only a static analysis of a single entry of a foreign firm in a given time period. If the entry process was assumed to be dynamic then the result obtained in our paper may suggest that firms with higher technologies would be most likely to enter into the market. This, in turn, could have favourable effects on the level of technology in the host country. These refinements are part of our future research agenda in the area of foreign market entry and its effect on the host economy.

5 Conclusions

This paper attempts to rationalise the decision that a company faces once it has decided to enter a foreign market via foreign direct investment. The first possibility is that it can acquire an existing firm in the host country; alternatively it can set up a completely new production facility. We examine these different strategies for the case of a non-traded good, our analysis may therefore be particularly applicable to firms in the services sector.

We show that this process is not only influenced by the additional costs that a foreign firm has to incur when it enters the market, but also by the effects the market entry of the foreign firm may have on market structure, output produced and prices prevailing in the market. Our analysis indicates that in general the take-over of the existing indigenous high-technology firm may be the form of market entry preferred by the foreign firm. However, we also discuss scenarios where the take-over of a low-technology firm or greenfield investment may be the preferred alternatives.[14]

[14] These results depend on the magnitude of the marginal and additional cost parameters used in the analysis which may differ across host countries. In particular, one may expect them to differ depending on the type of host country, i.e., whether the host country is a developing country, transitional country or a developed country.

This paper analyses critically the point made (but not really developed) by Buckley and Casson (1998), namely that "Market structure is very important when discussing the choice between greenfield investment and acquisition [...] because entry through greenfield investment increases local capacity and intensifies competition whereas entry through acquisition does not" (p. 7). Our results suggest that, as one might expect, in a market with an asymmetric duopoly greenfield investment leads to increasing competition yielding higher total output and lower prices in the market.

In this paper, we emphasise the decision problem for the entering firm, i.e., the profit maximising problem for the firm deciding which strategy to take. We look only briefly at the other side of the coin, namely the effects on welfare in the host economy. As pointed out above, the welfare analysis is highly simplified, neglecting, *inter alia*, the effects of corporate taxation on welfare in a host country. Our results, however, yield a surprising result, namely, that welfare in the host country may increase especially after greenfield investment by a foreign firm even if all profits are repatriated by the foreign firm. This is the case if the production costs of Firm 2 are relatively high, i.e., production in this firm is relatively inefficient.

Our analysis may give some preliminary support to government strategies that aim at attracting greenfield investment, in the case where the host country is characterised by an oligopolistic market structure and cost differences across firms. However, in order to decide on an optimal policy strategy a far more comprehensive evaluation of the effects of FDI on the host country needs to be undertaken. Such an analysis would have to go far beyond a simple analysis of welfare in the host country, as done in this paper, and would have to take account of various other effects of foreign direct investment on the host economy.

Tables

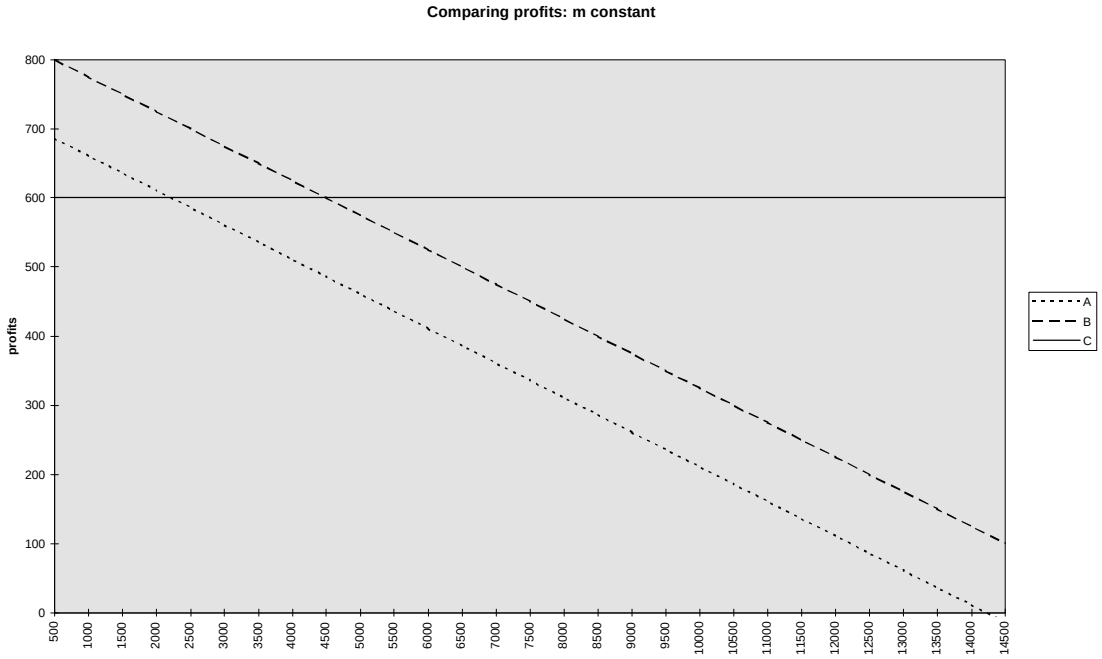
Table 1: Simulation Results for Welfare Analysis

			W_J			W_A			W_B			W_C		
c_1	c_3	c_2	Π	CS	W	Π	CS	W	Π	CS	W	Π	CS	W
2	1	3	13.00	12.50	25.50	5.44	16.06	21.50	2.78	14.22	17.00	5.00	18.00	23.00
2	1	4	12.89	10.89	23.78	5.44	16.06	21.50	1.00	12.50	13.50	5.13	16.53	21.66
2	1	5	13.89	9.39	23.28	5.44	16.06	21.50	0.11	10.89	11.00	6.50	15.13	21.63
2	1	6	16.00	8.00	24.00	5.44	16.06	21.50	0.11	9.39	9.50	9.13	13.78	22.91
2	1	7	19.22	6.72	25.94	5.44	16.06	21.50	1.00	8.00	9.00	13.00	12.50	25.50
2	1	8	23.56	5.56	29.11	5.44	16.06	21.50	2.78	6.72	9.50	18.13	11.28	29.41
2	1	9	29.00	4.50	33.50	5.44	16.06	21.50	5.44	5.56	11.00	24.50	10.13	34.63
2	1	10	35.56	3.56	39.11	5.44	16.06	21.50	9.00	4.50	13.50	32.13	9.03	41.16
3	2	3.5	10.25	10.13	20.38	4.00	12.50	16.50	2.78	11.68	14.46	3.91	14.45	18.35
3	2	4	9.89	9.39	19.28	4.00	12.50	16.50	1.78	10.89	12.67	3.63	13.78	17.41
3	2	5	10.00	8.00	18.00	4.00	12.50	16.50	0.44	9.39	9.83	4.00	12.50	16.50
3	2	6	11.22	6.72	17.94	4.00	12.50	16.50	0.00	8.00	8.00	5.63	11.28	16.91
3	2	7	13.56	5.56	19.11	4.00	12.50	16.50	0.44	6.72	7.17	8.50	10.13	18.63
3	2	8	17.00	4.50	21.50	4.00	12.50	16.50	1.78	5.56	7.33	12.63	9.03	21.66
3	2	9	21.56	3.56	25.11	4.00	12.50	16.50	4.00	4.50	8.50	18.00	8.00	26.00
3	2	10	27.22	2.72	29.94	4.00	12.50	16.50	7.11	3.56	10.67	24.63	7.03	31.66
4	3	4.5	7.47	7.35	14.82	2.78	9.39	12.17	1.78	8.68	10.46	2.66	10.70	13.35
4	3	5	7.22	6.72	13.94	2.78	9.39	12.17	1.00	8.00	9.00	2.50	10.13	12.63
4	3	6	7.56	5.56	13.11	2.78	9.39	12.17	0.11	6.72	6.83	3.13	9.03	12.16
4	3	7	9.00	4.50	13.50	2.78	9.39	12.17	0.11	5.56	5.67	5.00	8.00	13.00
4	3	8	11.56	3.56	15.11	2.78	9.39	12.17	1.00	4.50	5.50	8.13	7.03	15.16
4	3	9	15.22	2.72	17.94	2.78	9.39	12.17	2.78	3.56	6.33	12.50	6.13	18.63
4	3	10	20.00	2.00	22.00	2.78	9.39	12.17	5.44	2.72	8.17	18.13	5.28	23.41
5	4	5.5	5.14	5.01	10.15	1.78	6.72	8.50	1.00	6.13	7.13	1.66	7.51	9.16
5	4	6	5.00	4.50	9.50	1.78	6.72	8.50	0.44	5.56	6.00	1.63	7.03	8.66
5	4	7	5.56	3.56	9.11	1.78	6.72	8.50	0.00	4.50	4.50	2.50	6.13	8.63
5	4	8	7.22	2.72	9.94	1.78	6.72	8.50	0.44	3.56	4.00	4.63	5.28	9.91
5	4	9	10.00	2.00	12.00	1.78	6.72	8.50	1.78	2.72	4.50	8.00	4.50	12.50
5	4	10	13.89	1.39	15.28	1.78	6.72	8.50	4.00	2.00	6.00	12.63	3.78	16.41
6	5	6.5	3.25	3.13	6.38	1.00	4.50	5.50	0.44	4.01	4.46	0.91	4.88	5.79
6	5	7	3.22	2.72	5.94	1.00	4.50	5.50	0.11	3.56	3.67	1.00	4.50	5.50
6	5	8	4.00	2.00	6.00	1.00	4.50	5.50	0.11	2.72	2.83	2.13	3.78	5.91
6	5	9	5.89	1.39	7.28	1.00	4.50	5.50	1.00	2.00	3.00	4.50	3.13	7.63
6	5	10	8.89	0.89	9.78	1.00	4.50	5.50	2.78	1.39	4.17	8.13	2.53	10.66
7	6	7.5	1.81	1.68	3.49	0.44	2.72	3.17	0.11	2.35	2.46	0.41	2.82	3.23
7	6	8	1.89	1.39	3.28	0.44	2.72	3.17	0.00	2.00	2.00	0.63	2.53	3.16
7	6	9	2.89	0.89	3.78	0.44	2.72	3.17	0.44	1.39	1.83	2.00	2.00	4.00
7	6	10	5.00	0.50	5.50	0.44	2.72	3.17	1.78	0.89	2.67	4.63	1.53	6.16
8	7	8.5	0.81	0.68	1.49	0.11	1.39	1.50	0.00	1.13	1.13	0.16	1.32	1.48
8	7	9	1.00	0.50	1.50	0.11	1.39	1.50	0.11	0.89	1.00	0.50	1.13	1.63
8	7	10	2.22	0.22	2.44	0.11	1.39	1.50	1.00	0.50	1.50	2.13	0.78	2.91
9	8	9.5	0.25	0.13	0.38	0.00	0.50	0.50	0.11	0.35	0.46	0.16	0.38	0.54
9	8	10	0.56	0.06	0.61	0.00	0.50	0.50	0.44	0.22	0.67	0.63	0.28	0.91
10	9	10	0.00	0.00	0.00	0.11	0.06	0.17	0.11	0.06	0.17	0.13	0.03	0.16

Source: Own estimations

Figures

Figure 1: Comparing profits: m constant at 500



Note: The values on the x axis are for d_A and m_C respectively if they are assumed to vary. d_B is assumed to be $d_A - 500$ if it varies.

Figure 2: Comparing profits: db constant at 500

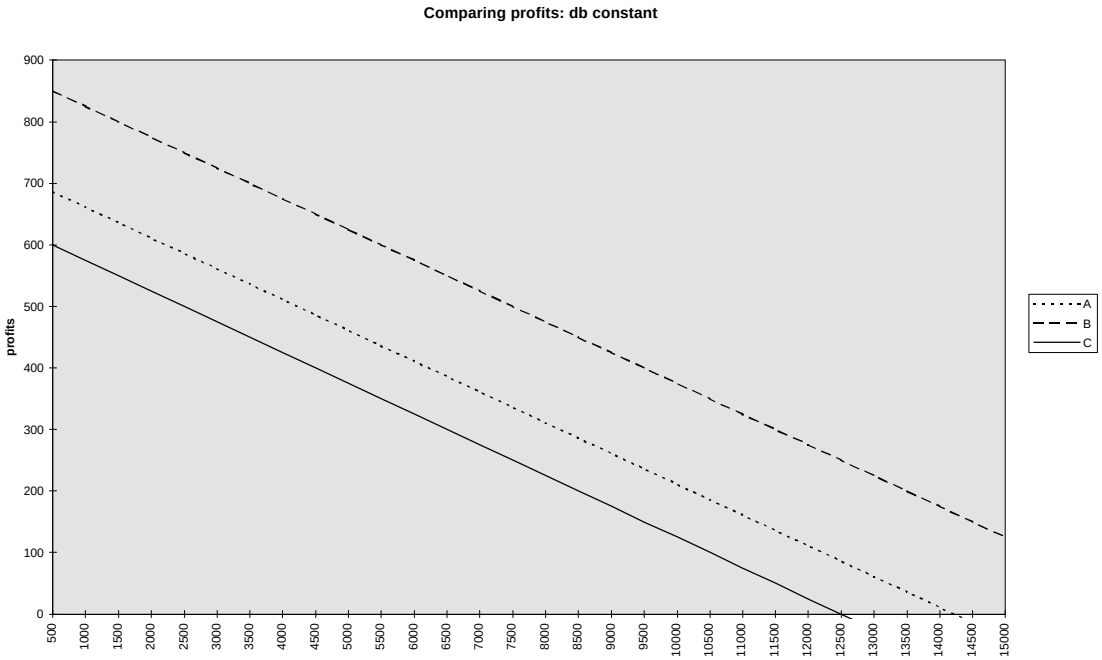


Figure 3: Comparing profits: db and u constant at 500

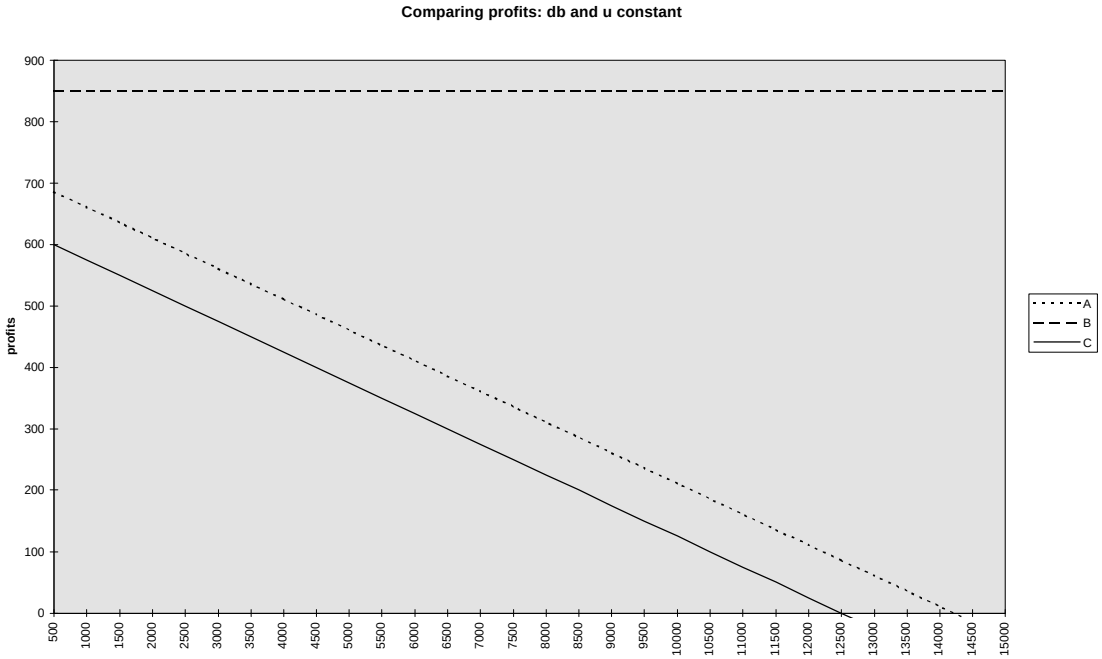


Figure 4: Comparing profits: da and db constant at 500 and 400 respectively

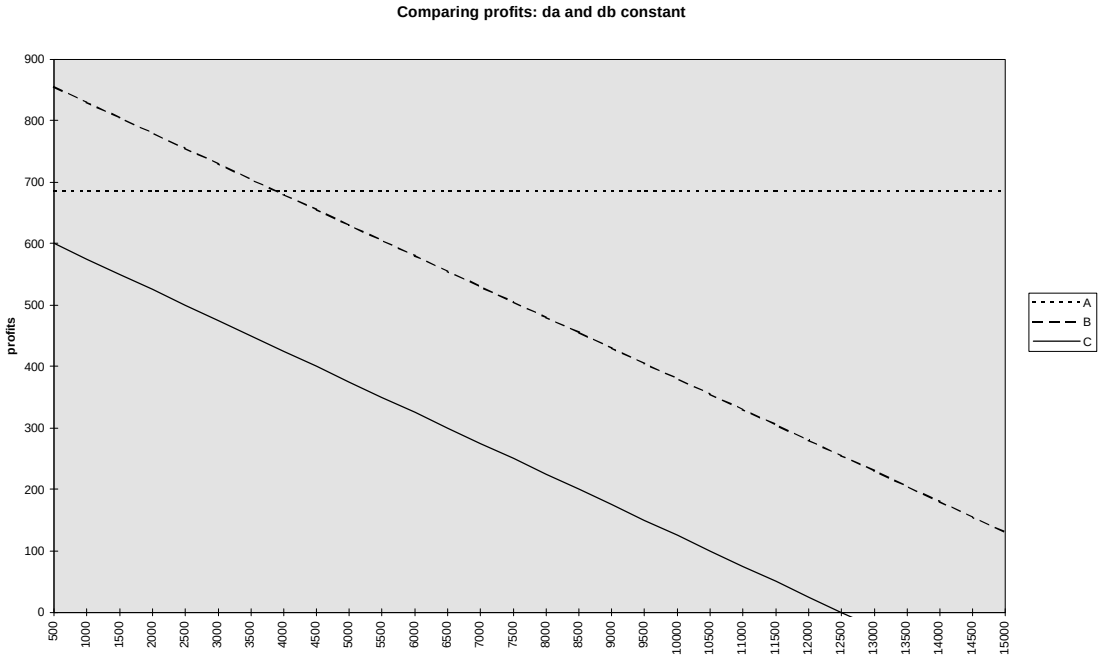


Figure 5: Welfare Analysis if c1 = 2, c3 = 1, a = 10

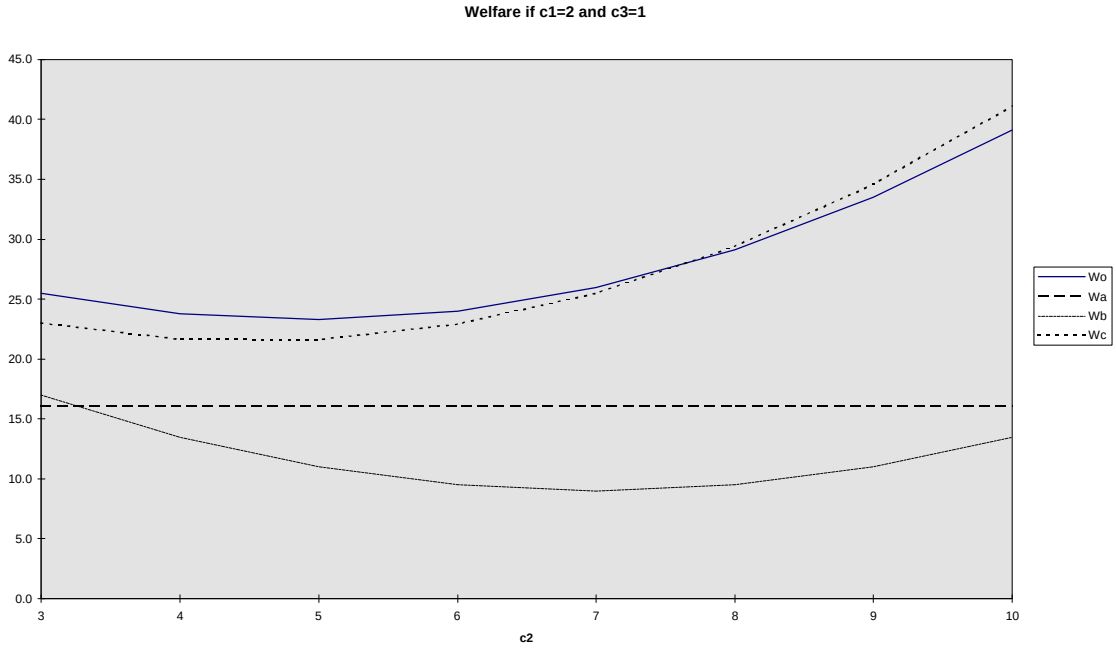


Figure 6: Welfare Analysis if c1 = 5, c3 = 4, a = 10

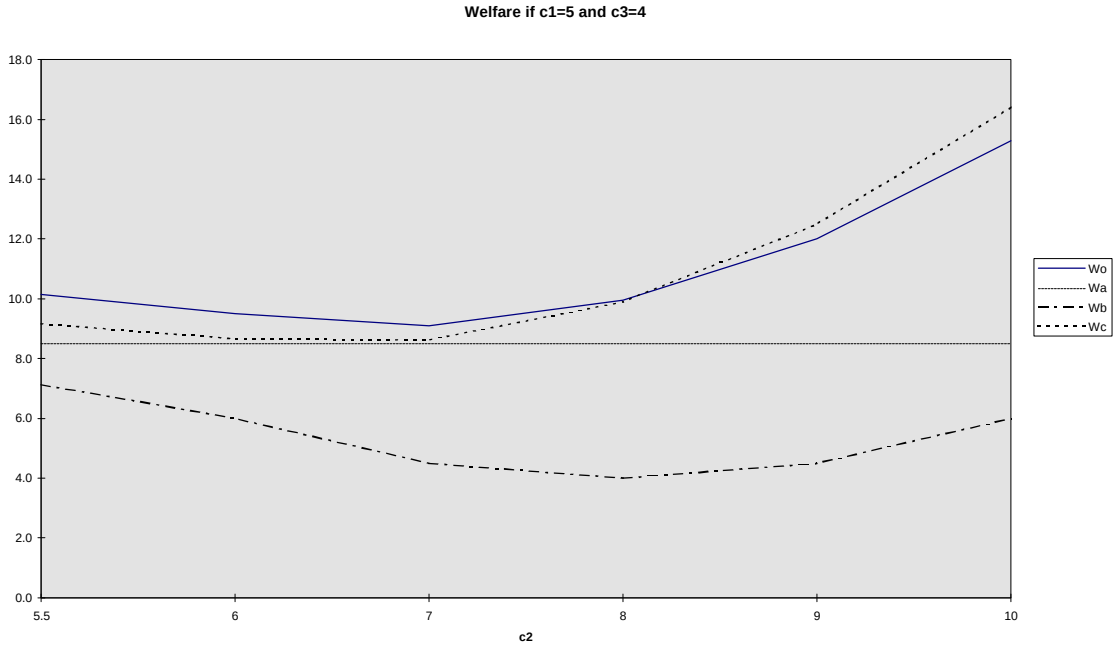
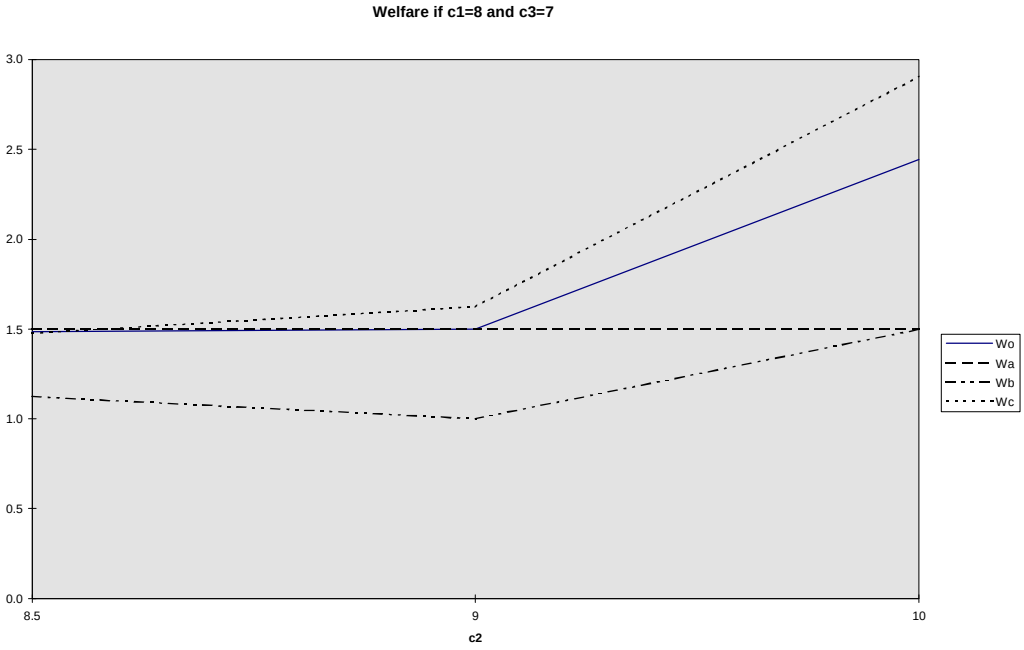


Figure 7: Welfare Analysis if c1 = 8, c3 = 7, a = 10



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