when differentiated products are sold to different consumers, and specifically, when different product characteristics make up for the relatively high price discrimination does not occur 

2. Most authors agree that it is possible to price discriminate with differentiated products, by charging different prices on the goods. For example, Jean Tiroff (1988), [name] why this is a name: naming the product.

The phenomenon is sufficiently well known among marketing professionals and those who study the topic. We thank Bruce Smilth, Felix Varma, and seminar participants at Cornell, Harvard, Michigan.

We will argue in this paper that this is not an isolated incident. Without decomposing demand for the superior product very much, the extra price can still be charged to customers who do not value the superior product so much.

1. Introduction

result in a price improvement. Many instances of this phenomenon are observed. It may

Inequities may intentionally damage a portion of their goods in order to

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Damaged Goods
Here must be discrimination.

I owe this to the manufacturer: a higher price on the good, the manufacturer could hire the high-quality workers and sell a lower price on the product. This is a lower price on the product, but I feel the manufacturer would suffer the high price of goods to increase the productivity. This is a higher price on the product, but I feel the manufacturer would suffer the high price of goods to increase the productivity.

This paper adds to standard research—hard to price discrimination. The example of quality differentiated services. In our context, the case for price discrimination per unit rise in the price, the manufacturer, to the more common.

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This paper adds to standard research—hard to price discrimination. The example of quality differentiated services. In our context, the case for price discrimination per unit rise in the price, the manufacturer, to the more common.
In the single case scenario, then this is a single plausible outcome of the dual case, with a lesser plausible outcome that the issue would be resolved in order to change production may make every effort of and lead to price improvements. The main theoretical consideration of our paper is to prove that the firms' price discrimination may arise, not necessarily by the discrimination that is used in the case of second degree price discrimination to homogenize the product, but by a change of the interaction of prices of the two different firms. If we extend the concept of the second degree price discrimination to the products of the different firms, we can observe that the price paid by the consumers in the second degree price discrimination is lower than the price paid by the consumers in the first degree price discrimination. However, because of the absence of demand information, results in a zero degree price discrimination. Therefore, because of the absence of demand information, results in a zero degree price discrimination. Therefore, because of the absence of demand information, results in a zero degree price discrimination.
performs like the 486DX that it really is. (Frenkel, 1991)

387SX, however, the 487SX is not a real coprocessor.

Although it is more costly for Intel to produce the 486SX, it sold in

appropriate difference—in the internal math coprocessor is dis-

pared. (Frenkel, 1991)

2.1 THE 486SX

Journal of Economics & Management Strategy
the machine pauses and hence prints more slowly. Moreover, this is
the controllers or drivers, circuits that perform no function other than to make
That is, IBM has added chips to the Laserprinter F that serve as
which it can market at a lower price.

slow the Laserprinter in firmware so

to some expense to slow the Laserprinter in firmware, so

inserts wait states to slow print speed. IBM has gone

units indicate that the Laserprinter is firmware in effect

mounted chips. PC Laps, featuring the newer Laserprinter

of four socketed firmware chips and one surface

The controllers in our evaluation unit differed only by the

Ceptron:

E uses the same "etude" and virtually identical parts, with one ex-

for the Laserprinter. According to Jones (1990), the firmware

is used in the Laserprinter. In its original Laserprinter, except that the

a lower cost alternative to the popular Laserprinter. The Laserprinter,

announced the introduction of the Laserprinter F.

2.2 IBM Laserprinter E

In May 1990, IBM announced the introduction of the Laserprinter F.

1991),

a series of notebook computers (Symantec,

mounted without a socket, thereby freeing up space that is at a pre-

Laserprinter E was virtually identical to the original Laserprinter, except that the

so that the SX socket won't accept the 486DX.

that the SX socket is a 486SX, with disabled math coprocessor.

In the Laserprinter E, mounted without a socket, thereby freeing up space that is at a pre-
For an in-depth discussion of the technology underlying Minidiscs, see Happy.

Minidiscs, now being introduced on standard compact disc players, provide 74 minutes of music, Sony's engineers devised a data compression algorithm that permits squeezing the content of an entire audio compact disc onto a disc which is only 2.5 inches in diameter. The Sony compact disc player is not only smaller than a regular CD player, but is also immune to the infringement of music caused by shock or vibration in portable applications. Sony accomplished this by inventing a memory buffer between the laser pickup and the digital decoding circuitry, a feature that is essential to providing a clear, crisp, and high-quality sound. Minidiscs are also compatible with the compact disc radio receiver and the Sony laser printer. To achieve the small form factor deciad, the engineers developed a compact laser diode to replace the usual laser assembly, but retaining greater output. The only difference in the two machines, in particular, the diminution in variety.
2.4 TONNES

STORES. An MD data disk will have a maximum capacity of 128 MB.

Sony already has plans to make the technology available for computers. The MD Recorder reads the information in this non-erasable area, which includes the <file name deleted> erased. In fact, a CD, the lead-in, has this placed on a CD. The mere fact that an MD is a rewritable, this area, called the inner radius is less noticeable. This area, called the inner radius of mass, is the title of the CD, an MD is a rewritable. Blank MDs are polycarbonate substrates coated with very thin layers of metallic material. A ring of polycarbonate

has made this nearly impossible.

One might think that a clever user could circumvent this scheme by

constraining a device that alters the label of contents. However, Sony

keeps the room on the media. (Hayes, 1994)

There's room on the media. (Hayes, 1994)

and prevents recording beyond this length, even though

A code in the label of contents identifies a 60-minute disc.

The 60- and 74-minute discs are identical in manufacture.

$16.99. Despite the difference in price and recording length, the two

minute discs. The list prices for these discs are currently $23.99 and
IBM 2319 Disk Drive: A disk drive is composed of two major components.

2.5 OTHER EXAMPLES

Monopoly is apparently affecting them today.

Although there is an abundance of new opportunities, there are also many old problems and opportunities increased, which random payroll bonds disappear.

The potential to price discrimination between individuals who differ in their income—indicates that they were originally commodities. Interestingly, some economists strongly argue that these anomalies satisfied a desire for gambles. "Let's make a good deal."

Jour.

1.56
2.5.2 Consumer Electronics: Combining the Product is a Popular HC

a. Gimmicky tactic' to 'buy time'.

IBM Vice President W. Kaploun described the 2319 as

went for at little as $145,415.

the adapter (changed controller on a 320/133 processor)
the 360, a similar number of 2319 spindles along with the
with IBM, share the $256,000 for

which essentially the same product, but at

IBM would favor 370 customers at the expense of 360 users,

From Zenger (1986).

The extent of the price discrimination is summarized by Dela.

language.

a controller and a spindle to decode the controller communication
intercept and, hence, block any read or write to offer both

IBM's strategy to dupe customers was well. To undersell HewlettPackard, IBM

controller, which was previously an optional device (separate unit),

IBM announced its existing 3244 disk drive the 2319.

According to DeLamarre (1986), this scheme worked as follows:

"A new customer would be required to "pay" a name later changed to "mal." To protect the market for 370 disk drives, IBM introduced a

as old customers.

IBM's accordingly loss of disk drive sales for new customers as well

and thus IBM recouped some of its new disk drive system's

more powerful than the old 360s, but its new disk drive system's

Someopened disk drives and just plug them into the IBM main.
have a coprocessor? It's a Coprocessor to operate: most student users are therefore likely to already have a coprocessor. However, the performance of a coprocessor is often lower than that of a main computer, making some kinds of numerical calculations more expensive than on a main computer. This is especially true for the more expensive versions of software, which do not use a main coprocessor.

2.5.3 Educational Software: It appears that the normal way of providing educational software is to use educational versions of educational software. If this is not the case, the normal way of providing educational software would be to use educational versions of software.

While deeply entrenched as a strategy in electronics and computer industry, the same is true of the hand-held multimedia industry. This is analogous to that of the hand-held multimedia industry.

Robert Harper, one of the authors' research students, has shown that

This is similar to the notion of the "hand-held multimedia industry."
associated with consumer sales:

Interagency, packagers note the ineffectiveness of these large bundles

once it is difficult for us to buy these items with a low price per
blocks for wholesalers [who sell to retail grocery] replenishing

With larger sizes, manufacturers are cleaning up

manufacturers are competing the market

for product for, "economy size" in grocery stores. Nonetheless,
duced packages of 175 units for warehouse clubs is introduced a 40
monthly, Clorox sold its products in packages of five. Having informed

slinky, Clorox sold its products in packages of five. Having informed

not want the expense of designing additional cost directly.

Cleaning multipacks, or bundling, incurs additional cost directly.

specifically for this market

be demanded by even a large family, and by producing larger
better, to produce a minimum purchase larger would normally
are exposed to two ways: by bundling a number of units to

of course underestimates the normal grocery store habits, and manufa-

Buying clubs specifically for large quantities. Purchases in large numbers

maker for many consumer items according to the quantity purchased.

2.5.4 Buying Clubs: The proliferation of discount "buying club"

for 69.95.

for the grocery market, which has "reduced chain handling capabilities"

for the "comfort of customers. The full retail version sells for 99.95. The

with this deck is an explanatory data analysis and statistics package

Damaged Goods
The price difference was evidently too great, and accepted
as a fact.

Means of damaging the product.

In the following two examples, there is no evidence available to
prove that the manufactory actually damaged the product. Instead, the
evidence that the manufactory committed adulteration is due to
the following two circumstances:

1. The evidence is suggestive that manufactories create larger sizes than

2. The evidence is not consistent with the idea of a single, mass-produced


No洲, esed (ed)

Profit to the dealer trade. (Stocking and Watkins, 1947, p.

Bookkeepers who found they could cash a good check, and accepted
the difference was evidently too great, and accepted
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3. THE DUAL USE CASE

Implications of damaged goods in the dual use case:

Implications of damaged goods in the dual use case...
X. 

Theorem 1. If the quantity supplied is greater than the quantity demanded, then the price will tend to increase. Conversely, if the quantity demanded is greater than the quantity supplied, then the price will tend to decrease. This is known as the law of supply and demand.

Theorem 2. If the price of a good is increased, then the quantity demanded for that good will decrease. Conversely, if the price of a good is decreased, then the quantity demanded for that good will increase.

Corollary. If the price of a good is increased, then the total revenue of the seller will decrease. Conversely, if the price of a good is decreased, then the total revenue of the seller will increase.

Proof. Let the initial price be $p_i$, the final price be $p_f$, the initial quantity demanded be $q_i$, and the final quantity demanded be $q_f$. Then

\[
\begin{align*}
\text{Initial Revenue} &= p_i q_i \\
\text{Final Revenue} &= p_f q_f
\end{align*}
\]

If $p_f > p_i$, then $q_f < q_i$. Therefore, $\text{Final Revenue} < \text{Initial Revenue}$. Conversely, if $p_f < p_i$, then $q_f > q_i$. Therefore, $\text{Final Revenue} > \text{Initial Revenue}$.

Corollary. If the price of a good is increased, then the total cost of the seller will increase. Conversely, if the price of a good is decreased, then the total cost of the seller will decrease.

Proof. Let the initial cost be $c_i$, the final cost be $c_f$, the initial quantity produced be $q_i$, and the final quantity produced be $q_f$. Then

\[
\begin{align*}
\text{Initial Cost} &= c_i q_i \\
\text{Final Cost} &= c_f q_f
\end{align*}
\]

If $c_f > c_i$, then $q_f < q_i$. Therefore, $\text{Final Cost} < \text{Initial Cost}$. Conversely, if $c_f < c_i$, then $q_f > q_i$. Therefore, $\text{Final Cost} > \text{Initial Cost}$.

Corollary. If the price of a good is increased, then the profit of the seller will decrease. Conversely, if the price of a good is decreased, then the profit of the seller will increase.

Proof. Let the profit be $\pi = \text{Revenue} - \text{Cost}$. Then, if $p_f > p_i$, then $q_f < q_i$. Therefore, $\pi_f < \pi_i$. Conversely, if $p_f < p_i$, then $q_f > q_i$. Therefore, $\pi_f > \pi_i$.
Then the improvement is strict: all three areas strictly benefit.

\[ \int_{N} dp \ (d)^{2} \cdot \omega > \int_{N} dp \ (d)^{2} \cdot \omega \]

**Theorem 1** Suppose that (1) holds, and suppose that \( x \) is in \( \lambda \) of \( H \) and \( \alpha \) of \( X \).

This theorem is proved in the appendix.

Due to the low quality good \( L \), and the introduction is a Pareto improvement. If under these assumptions, the firm will always choose to introduce a price for which the demand for \( L \) is positive.

The inequality (2) ensures that a consumer would prefer to purchase a positive quantity of the low good. If it is possible that at any price for which \( x \) consumer is not a meaningful characterization.

This effect need not dominate the effects of the incentive for \( H \). This effect need not dominate the effects of the incentive for \( H \). This effect need not dominate the effects of the incentive for \( H \).

Our next set of assumptions serves to guarantee that the introduction of good \( L \) is parallel, and produces a Pareto improvement.

The market is not served if the firm sells only one quality. That is, \( \lambda \) must be the maximum value of \( \lambda \) of \( X \). We assume that the firm sells only one quality. Then, the quantity of good \( L \) is parallel, and produces a Pareto improvement.

**Damaged Goods**
(6) \[
\frac{(\lambda d)\lambda}{(\lambda d)\lambda - 1} - H_d - d = 0
\]

When offering only high quality, the profit-maximizing price \(d\) must satisfy
\[
|((d)_{1-\gamma})\lambda - 1| (d)_{1-\gamma} - d \leq |(d)\lambda - 1| |H_d - d| (H_d \leq dA)
\]

i. If \(H_d \geq dA\), \(d\) produces high quality.
ii. If \(H_d < dA\), \(q\) implies that if the firm produces only one qual-

Note that the demand for the high quality good at price is
\[
q > c > c \leq H_d \leq 1
\]

The monopolist has constant marginal cost \(H_d\) for the low quality
(7)
\[
\lambda > (a)\gamma \geq 0 (aA) \text{ and } a \geq (e)
\]

The single use case

4. THE SINGLE USE CASE

continuum of consumer types, rather than two distinct markets.

Theorem 1 seems relevant for several of the examples discussed.

\(H_d\) is sufficiently high that the \(X\) type is able to

ensures that this will never happen in equilibrium.

\[ 22. \quad \text{The critical value may lie outside the range } [v, \varphi], \text{ but profit maximization} \]

\[ \frac{d}{dN} - (H_d\nu) = H_d - H_a \]

recently between purchasing either good, let be the consumer type who is high-
consumer's. More precisely, let be the consumer type who is high-
valuation consumers, and low valuation consumers, and high quality towards low valuation
If both goods are offered for sale, high quality will be larger towards low
valuation. \( a \nu \) is increasing in \( q \nu \), but \( \nu \) is decreasing in \( q \nu \).

By \( b \nu \), the premium a consumer is willing to pay for the increase

can be determined under which he is willing to introduce \( L \)

This theorem of these two opposing forces: We will now set up

\[ \frac{(a)\xi}{(a)\eta - 1} (a)\nu - (a)\nu \]

we assume \( ((q)\nu, \nu) \in \mathcal{Q} \).

To guarantee that the profit function \( \pi \) has a unique maximum for

\[ \left( \frac{((d)\nu - \gamma)\xi}{((d)\nu - \gamma)\eta - 1} (\frac{(d)\nu - \gamma - d}{(d)\nu - \gamma} \right) \frac{((d)\nu - \gamma)\xi}{(d)\nu - \gamma} = \frac{d\varphi}{d\omega} = 0 \]

Thus,

\[ \left( ((d)\nu - \gamma)\eta - 1 \right) (\gamma - d) = (d)\omega \]

also proves useful. Solving only the low quality good, the firm earns

\[ q > (d)\nu > \nu \]

We also assume that \( \lim_{x \to \nu} \frac{(x)\xi}{(x)\eta - 1} (q, \nu) \in \mathcal{Q} \).

\[ \frac{(x)\xi}{(x)\eta - 1} - x \]

usual hazard rate assumption, familiar in all adverse selection models.

To ensure uniqueness of a solution to eq. (6), we employ the

Damaged Goods
convex, or not too concave.

weak condition (61)’ holds if and only if

\[ (\alpha_f) \frac{f}{(\alpha_f) - 1} [(\alpha_f) - 1] - (\alpha_f) - \alpha \quad \text{is increasing.} \]

Assumption 26: Provided \( \frac{f}{(\alpha_f) - 1} \) is a strictly increasing function, then the number of problem (61)’ is equivalent to the corresponding

assumption 26. In order to make a precise computation, the assumption 26 is equivalent to the requirement

\[ \frac{f}{(\alpha_f) - 1} \text{ is a strictly increasing function.} \]


(41)

\[ \frac{H_n f}{(H_n) - 1} (H_n - 1) Y - \tau - (H_n) Y = \frac{H_n f}{(H_n) - 1} - H_n - H_n. \]

Note that if \( H_n > \tau \), the right-hand side of (41) is zero, in evidence with (6) in (81). In order to ensure a unique solution, let the right-hand side of (41) be non-positive.

\[ \frac{H_n f}{(H_n) - 1} \text{ is a strictly increasing function.} \]

Then, the right-hand side of (41) is non-positive.

The first-order conditions for maximizing the value of \( H_n > \tau \) subject to \( q \leq H_n \leq \tau \) are that we can view the firm's maximization problem as maximizing

\[ [(\tau_n) - 1][\tau - (\tau_n) Y] + [(H_n) - 1][H_n - \tau] Y + (H_n) Y - H_n = \]

\[ [(\tau_n) - (H_n)] \times 

\[ [\tau - (\tau_n) Y] + [(H_n) - 1][H_n - 1] Y + (H_n) Y - H_n = 

\[ [(\tau_n) - (H_n)] \tau - \tau_n + [(H_n) - 1][H_n - H_n] = \mu. \]

When consumers make purchases rather than the prices directly, it is useful to express the monopolists' profits in terms of the price. Let \( \mu \) be the price of the monopolist purchase \([q', H_n] \), and consumers purchase \([H_n', \tau_n] \) in the interval of price \([q', H_n] \), and consumers

\[ (\tau_n) Y = \tau_n \]
of the environment, as the next result shows.

due the case: Indeed, assumption (20) fails for many specifications of the
mean for the single use case are much more stringent than for the

Nevertheless, the condition guarantees a Pareto improvement. A

Conjecture:

These are satisfied if $\eta$ is near zero and $a, c > 1$. All of the assumptions

satisfy

and

The parameters are assumed to

Example I. Let $P = 0.5, v_{\alpha}(\cdot) = (\alpha)\gamma$ with $\gamma > 0$. Then, the

not vacuous. As the following example demonstrates. The hypotheses of the

Theorem 2 in combination with (19), (20), are

that is, introducing the low quality good is a Pareto improvement.

Theorem 2

Theorem 2

strictly better off.

Theorem 2

strictly better off. Obviously, by (20), the monopolist, by (20), the monopolist

where he is selecting only the high quality. Note that introducing the

Lemma 2 shows that, selling two qualities, the monopolist sells

Lemma 2

Proposition (19), hold. Then, if

Lemma 1

Lemma 1

under these conditions, we have:

Damaged Goods.
a Pareto improvement harder to achieve. A lower price of good \( L \) is now more likely to be a price increase, making the distinction between the two cases appear to have more to do with discrete lumps of demand than model production functionally similar. But the general case uses this definition, and one is interested in the evolution of prices and demand. The demand is inelastic (as in the evolution of prices and demand in the single use model), the single use model also differs from the dual use model in that individual

THEOREM 3

Then we have

\[
\frac{(1d)\mathcal{F}}{(1d)\mathcal{F} - 1} (1d)\mathcal{V} + (1d)\mathcal{V} = \frac{1}{2}
\]

Lemma 3 Suppose \( \mathcal{V}(\mathcal{V}) \) is nonincreasing. Then (20) fails.
5. Conclusion

Damaged Goods
\[(H_t)H_t(H_c - H_d) + (\gamma d)^{\gamma d - \gamma d} \]

is a solution to the following maximization problem:

\[\max_{H_t, H_c} f(x) \text{ s.t. } x = a + bH_t + cH_c + dH_d\]

From (3), if the firm sells both goods, \( H_t \) and \( H_d \), let \( H_t \) be the price of \( H_t \) and \( H_d \), and let \( H_t \) be the price of \( H_t \) and \( H_d \).

**Proof of Theorem 1.** From (3), if the firm sells both goods, \( H_t \) and \( H_d \), let \( H_t \) be the price of \( H_t \) and \( H_d \). Let \( H_t \) be the price of \( H_t \) and \( H_d \). The

**Appendix: Proofs**

...
and that by (3), \( x \geq x' \geq y \), we have (3) \( x \leq y \).

\[
\begin{align*}
0 \leq \frac{(\gamma d)f}{(\gamma d)d - 1} (\gamma d)x - \gamma c - (\gamma d)y
\end{align*}
\]

Proof of Lemma. Suppose that \( x \) only offers one quality.

\[0 > (\gamma d)tx(\gamma c - \gamma d) = (\gamma d)tx + (\gamma d)tx(\gamma c - \gamma d) + \frac{\gamma dp}{H dp} \left[ (c)_{H \gamma W}H \gamma + (c)_{H \gamma W}H \gamma (\gamma c - H \gamma W) \right] = \frac{\gamma dp}{H \gamma W},\]

sufficiently small, for \( \gamma \). (\( x \), IC) is satisfied. This deviation increases proofs when \( x \).

\[
\begin{align*}
\text{(IC)} & \quad dp (d)tx \int_0^\infty = dp (d)\gamma x \int_0^\infty \\
\text{(IC)} & \quad dp (d)\gamma \int_0^\infty = dp (d)\gamma \int_0^\infty
\end{align*}
\]

\text{Damaged Goods}
\[ 0 > \left[ \gamma \gamma - (q)\gamma + \frac{H}{\gamma} + q - \right] (q) = \frac{H}{\mu \theta} \]

(8) By the same reasoning:

\[ 0 < (q)f \iff q = \frac{\gamma}{\gamma} \iff \gamma \quad \text{and} \quad \gamma > \frac{\gamma}{\gamma} \]

Therefore, \(1') \iff \gamma > \frac{\gamma}{\gamma} \)

This implies that \(\gamma > \frac{\gamma}{\gamma} \)

Thus, \(\gamma \quad \text{and} \quad \gamma \quad \text{and} \quad \gamma \quad \text{and} \quad \gamma \quad \text{and} \quad \gamma \)

\[ 0 > \left( \frac{(q)f}{(q)f} \right) (q) = \frac{\gamma}{\gamma} \]

(20) By the same reasoning:

\[ 0 > \left( \frac{(q)f}{(q)f} \right) (q) = \frac{\gamma}{\gamma} \]

and that \(\gamma = \frac{\gamma}{\gamma} \)

Then \(\gamma \quad \text{and} \quad \gamma \quad \text{and} \quad \gamma \quad \text{and} \quad \gamma \quad \text{and} \quad \gamma \)

Conversely, suppose that \(\gamma = \gamma \)

contradiction.

Therefore, \(\gamma \quad \text{and} \quad \gamma \quad \text{and} \quad \gamma \quad \text{and} \quad \gamma \quad \text{and} \quad \gamma \)

\[ 0 > \left( \frac{(q)f}{(q)f} \right) (q) = \frac{\gamma}{\gamma} \]

The hypotheses and then imply that

\[ (q) > \frac{\gamma}{\gamma} \]

(6) By

\[ \left[ \frac{(q)f}{(q)f} \right] + \left[ \frac{(q)f}{(q)f} \right] - \frac{\gamma}{\gamma} \]

(9) By
\[
\frac{(1d)_f}{(1d)_f - 1} \cdot \frac{(1d)_Y}{(1d)_N - 1} \cdot \frac{z(1d)_f}{(1d)_f - 1} + z \quad + \quad \frac{(1d)_f}{(1d)_f - 1} \cdot \frac{(1d)_Y - 1}{(1d)_N - 1} + \frac{(1d)_f}{(1d)_f - 1} \cdot \frac{z(1d)_f}{(1d)_f - 1} + z \quad = \quad (1 - \frac{\gamma \varphi}{\eta \omega} (1d)_Y + \frac{\gamma \varphi}{\eta \omega} [(1d)_Y - 1]) = \frac{\gamma \varphi}{\eta \omega} (1d)_Y + \frac{\gamma \varphi}{\eta \omega} \quad \text{and} \quad (1d) = \eta = H_{1d} = \eta \varphi \text{ we have } \gamma \varphi z_2 = \gamma \varphi \\
\frac{(H_{1d})_f}{(H_{1d})_f - 1} \cdot \frac{(H_{1d})_Y - 1}{(H_{1d})_N - 1} + \frac{(H_{1d})_f}{(H_{1d})_f - 1} \cdot \frac{z(H_{1d})_f}{(H_{1d})_f - 1} + z \quad [((H_{1d})_Y - 1)] = \frac{\gamma \varphi}{\eta \omega} (H_{1d})_Y + \frac{\gamma \varphi}{\eta \omega} \quad \text{and} \quad (H_{1d}) = \eta = H_{H_{1d}} = \eta \varphi
\]

First note that implies by the monotonicity assumptions and Lemma 3.

Proof of Theorem 2. By the monotonicity assumptions and Lemma 3.

\[0 > \left( \frac{(\eta)_f}{(\eta)_f - 1} \cdot (\eta)_Y - \frac{(H_{1d})_f}{(H_{1d})_f - 1} \cdot (H_{1d})_Y \right) = \]

\[\left( \frac{(1d)_f}{(1d)_f - 1} - \frac{(1d)_f}{(1d)_f - 1} \cdot (\eta)_Y + [(H_{1d})_Y - 1] \frac{(H_{1d})_f}{(H_{1d})_f - 1} \right) = (1d - (\eta)_Y + (H_{1d})_Y - H_{1d} = 1d - H_{1d}
\]

Proof of Theorem 2. By the monotonicity assumptions and Lemma 3.

for some neighborhood around \( q \). In either case, this contradicts the optimality of \( H_{1d} \).

\[0 > \frac{H_{1d}}{\omega} \quad \text{implies that} \quad 0 = (q)_f / [(x)_f - 1] \text{ for some } q = H_{1d} \]
REFERENCES

\[ 0 > c \alpha - H \gamma (1) \gamma = \]

\[ c \alpha - \left( \frac{(1)^d}{(1)^d} - 1 \right)^{(1)} + \frac{(1)^d}{(1)^d} - 1 \right) (1)^d \gamma = \frac{(1)^d}{(1)^d} - 1 \]

\[ \alpha \leq (a), \text{Thus, Lemma 3.} \]

\[ \text{Proof of Lemma 3.} \]

By (13) and (19), this is positive if and only if \( \alpha < 0 \). That is, by (13)