

# Price Discrimination and the Internet:

## A look at the changing face of the college textbook industry

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### Abstract

Textbook publishing companies generally publish two versions of a textbook: a domestic edition (sold in the United States) and an international edition (sold elsewhere in the world), with the domestic edition costing more. Prior studies have found that this is an example of third-degree price discrimination. (Clay and Tay, 2001; Cabolis et al, 2005). I expand on previous research by exploring the effect of Internet use of textbook prices. I hypothesized that because the Internet makes it easier for arbitrage to occur by lowering search and transaction costs, publishing companies have lost their ability to price discriminate, forcing this gap in prices to narrow. I found that for every additional 100 Internet users per 1000 people, the price gap between domestic and international editions of a textbook decreases by \$1.48, which supports my hypothesis.

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## I) INTRODUCCION

College textbooks provide a clear example of international price discrimination. Publishers frequently publish two otherwise identical versions of a book: one is a hardcover printed for sale in North America, and the other is a paperback international edition labeled for sale elsewhere in the world. The North American, or domestic, edition costs considerably more than the international edition. For example, the domestic edition of Stock and Watson's textbook *Introduction to Econometrics* costs \$130 while the international edition can be purchased online for \$71. The international edition contains harsh wording condemning its sale in North America<sup>2</sup>. Although the sale of this book in North America is not illegal, in the past it was infeasible because there was no easy way for American buyers to find international sellers. However, with the rise in popularity of Internet commerce, it has become extremely easy to find and purchase international editions of textbooks. The textbook publishing industry has observed this phenomenon and is attempting to pass legislation banning the re-importation of international editions into the U.S. for sale on the gray market.

There has been a small amount of research concerning the pricing practices of the textbook industry. Clay and Tay (2001) and Cabolis, Clerides, Ioannou, and Senft (2005) used empirical research of online book vendors to show that textbook prices tend to be higher in the United States than in other countries. Outside of the textbook industry, much research has been published about international price differences in other industries, ranging from IKEA furniture (Feuerstein, 2003) to European cars (Haskel, 2001). However, the textbook market differs from these. Because of their lower prices, homogeneity, ease of shipping, and the abundance of Internet retailers which sell them, textbooks are easily bought and sold over the Internet with low transaction costs. What existing research lacks is an explanation of how the increasing

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<sup>2</sup> The back cover of the international edition of *Introduction to Econometrics* reads: "If you purchased this book within the United States or Canada you should be aware that it has been wrongfully imported without the approval of the Publisher or the Author"

popularity of Internet commerce will affect the ability of book publishers to set different prices for different markets.

In this research paper, I look at how the pricing of textbooks has changed over the past several years. Specifically, I compare the price changes of domestic and international editions of textbooks. The question I looked to answer is: has the Internet affected the ability of textbook stores to price discriminate among international consumers? My hypothesis is that because the Internet lowers searching and transaction costs, it has encouraged international arbitrage and forced publishing companies to reduce the dramatic price differences between international and domestic editions. The data obtained indicates that international prices were lower than domestic prices before the Internet became prevalent. As the Internet has garnered more users, international prices have risen faster than domestic prices, supporting my hypothesis.

Section II is a review of relevant literature. It addresses literature written about the structure of the college textbook industry, international price differences of textbooks and other consumer goods, and the effect of the Internet on markets. Section III describes how I chose to analyze this problem and the theory behind my work. Section IV is a summary of the data and how it was obtained. In Section V I report the findings of my analysis, and in Section VI I present conclusions based on these findings.

## **II) REVIEW OF LITERATURE**

In this section, I show that there is a clear gap in the professional literature concerning the potential effect of the Internet on price discrimination of textbooks. Overall, the economics literature has provided us with analysis of the textbook industry and international differences that exist in textbook prices, but it has failed to look at how the Internet may be breaking down the international trade barriers.

The textbook industry has been analyzed for many years. Economists have looked into how textbook publishers pay authors (Horvitz, 1966), how publishers can attempt to influence the market for used textbooks (Miller Jr, 1974; Rust, 1986; Fudenberg and Tirole, 1998), and product differentiation within the industry (Stiglitz, 1988). The publishing industry has several distinct aspects. For one, it is characterized by high fixed costs and low marginal costs (Clerides, 2002). In order to eliminate the market for used books, publishers will frequently come out with new editions. Furthermore, there is an agency issue that arises, because often professors select the book, students buy it, and parents pay for it. (Cabolis et al, 2005). This agency problem is relevant because it allows for price discrimination to occur even though the textbook industry is not run by a monopolist. These papers all illustrate facets of the textbook industry which make it unique.

There have been numerous empirical studies written which compare prices for the same good in different countries (Haskel and Wolf, 2001; Feurstein, 2003; Cabolis et al, 2005). I will address one study by Feuerstein (2003) about European automobiles because it contains several principles which are relevant for this paper. In his study, Feurstein discusses how there is a premium charged in the home country for an automobile produced there because consumers value their country's cars more; similarly, there is a premium charged in the U.S. for textbooks, presumably because of a higher demand here. He mentions that lowering transaction costs (in the case of his paper, trade barriers set up by European countries) will reduce differences in prices between countries. Feurerstein also mentions that countries with a more elastic demand will be charged a lower price. Perhaps most interesting is how he noted that intra-industry trade decreased, because producers focused their efforts on the more lucrative home market. All of these facts are applicable to my topic.

Little has been specifically written about price discrimination in the textbook industry. Clay and Tay (2001) gathered prices of 91 English language textbooks from different disciplines

at major Internet retailers targeted at consumers of Canada, Germany, the United States, and the United Kingdom. The study found that prices for American textbooks were substantially higher than the same textbook purchased in the UK. The differences were especially large compared to differences in prices commonly found among Internet book sales within the United States. The study also mentioned some caveats to Internet purchases: smaller, lower-priced vendors often receive complaints about slow shipping times or unavailable products. The study did an excellent job correcting for any currency conversion issues, using the average conversion value for the week the book was sold. In order to further homogenize the product, the study compared prices both with standard shipping (which varied by as much as a week) and expedited shipping, which was a standard 1-3 business days. The paper concludes with a suggestion that we should see price differences between countries shrink as more consumers become aware of the gap.

A more recent study, by Cabolis et al (2005), was similar in nature. This study limited its comparisons to Amazon.com's US and UK sites and looked only at economics textbooks and high-selling general books. It found that differences in price between the two countries were much larger for textbooks than for general books, with the US having higher prices for both. Among economic textbooks, those published by commercial presses had a larger difference in price between the US and UK than those published by university presses. The paper also looked into how the publishers practiced price discrimination by limiting consumer options—in this case, by only marketing hardcover books in the US while marketing both hardcover and paperback books in the UK<sup>3</sup>. The study found that, when paperbacks were marketed in both countries, the price difference between the two was smaller. The report also stated that differences in costs could not account for the large price differences, nor could they explain why textbooks were more expensive in the US but other books were not. The report theorized that

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<sup>3</sup> The practice of using quality discrimination to price discriminate is also used by publishers of general books. They first come out with a hard cover edition, then, some time later, a paperback edition (Clerides, 2002)

higher prices in the U.S. are due to a more inelastic demand for the textbooks; unlike British college classes, American college courses tend to require a textbook and base the course on that book. The authors concluded with a prediction that the price differentials would shrink, with foreign prices rising rather than American prices falling because the market for American books accounts for most of the publishers profits.

The final area of economics which this paper is concerned with is the effect of the Internet on markets. This paper will address how the arbitrage that the Internet facilitates can decrease a firm's ability to price discriminate. Economics literature has had surprisingly little to say about that. Rather, it frequently mentions how Internet retailers use the wealth of information they can gather about their customers to more effectively price discriminate (Odlyzko, 2003). Verlinda and Lane (2004) discuss how the airline industry, one known for price discrimination, has seen ticket prices fall because of the way the Internet lowers search costs for consumers. However, this market is very different than that for textbooks; for instance, the non-transferability of airline tickets removes the possibility of a secondary market existing. Brown and Goolsbee (2002) report that because the Internet makes information more accessible, it has made the life insurance market more competitive, resulting in lower prices. Little has been said about the effect of the Internet on goods that can be resold.

This paper looks to fill that void in the economics literature. My research is focused around comparing the historic prices of domestic and international editions of textbooks. I test my hypothesis that the Internet has diminished the ability of textbook publishers to price discriminate among international consumers, resulting in a narrowed gap in prices between domestic and international editions. Results obtained support this hypothesis.

### III) THEORETICAL FRAMEWORK

In this section, I look at the underlying economic theory applicable to this issue. Specifically, I look at third-degree price discrimination and how arbitrage works. I then relate them both to my topic.

Third-degree price discrimination exists when a firm with some level of pricing power is able to divide his market into two or more segments. Members of the different segments must be identifiable to the firm, consumers must not be able to switch between segments, and trade between segments must be impossible. The firm then treats each segment as a completely separate market, finds the profit-maximizing price to charge each, and charges each segment a different price (Pashigian, 1995). An example of third-degree price discrimination is how movie theaters charge lower prices to students. Figure 1, shown on the next page, illustrates how third-degree price discrimination may be used in the college textbook industry. Note how the greater demand in the U.S. leads to a higher price.

Arbitrage is what occurs when, in an environment with free trade and no transaction costs, the same good has different prices on different markets. Someone seeing the price difference will buy the good in the low-priced market and simultaneously sell it in the high priced market, turning a profit. As this continues, the low-priced market will see supply fall and prices rise, and the high-priced market will see the market become saturated and prices begin to fall. Eventually, prices will be equal and trading will cease. This result is known as the law of one price, which says that, after adjusting for currency exchange rates, the price of a good should be equal in any two markets between which it can be freely and costlessly traded.

It is also necessary to take costs associated with importing the foreign good into account. These costs include search costs, transaction costs, and shipping costs, and they represent the maximum amount of difference between the two prices. Let  $P_N$  be the price of a homogenous good in country N and let  $c$  be the sum of all costs associated with importing a good from

country B to country A. If  $P_A > P_B$  but  $P_A < P_B + c$ , arbitrage will not occur, because it would not be profitable to buy the good in country B, pay  $c$ , and sell it in country A. So, it is possible that  $P_A > P_B$ , as long as  $P_A \leq P_B + c$ .

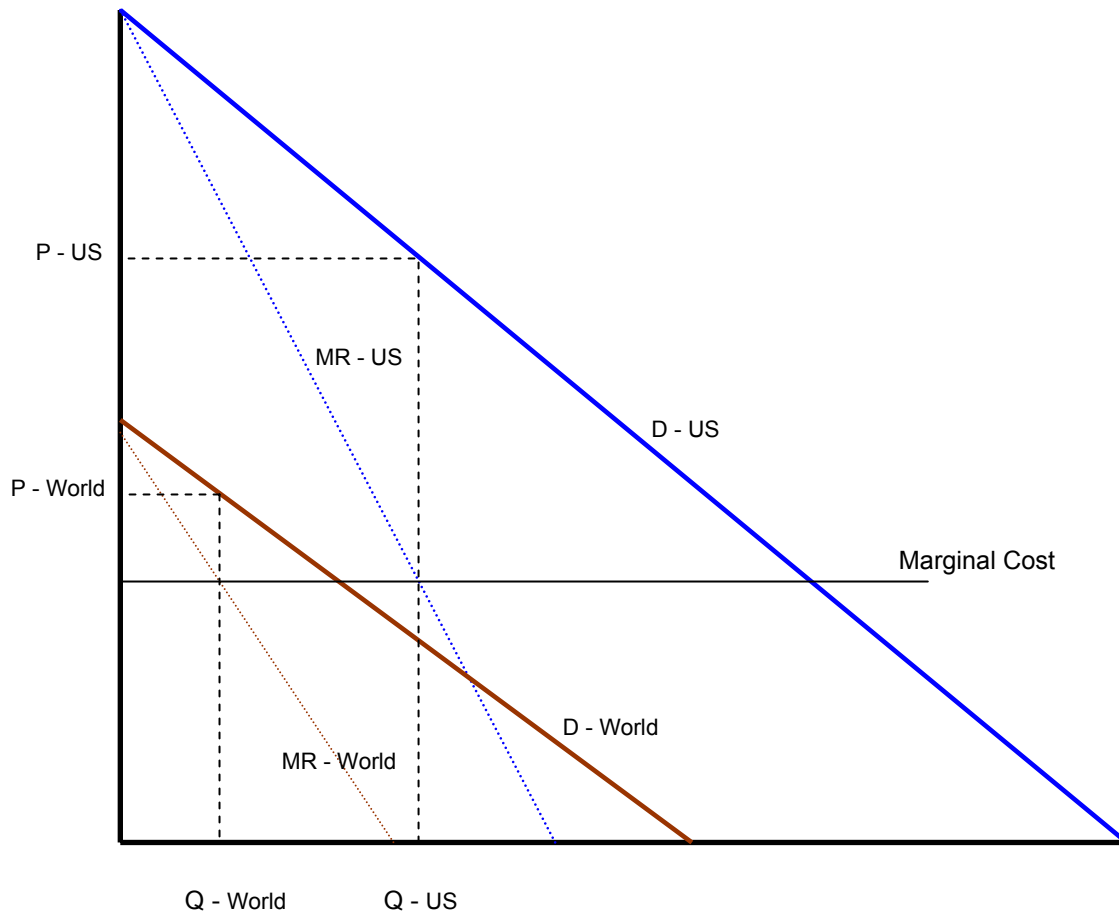


Figure 1: This graph illustrates third-degree price discrimination. In this case, U.S. consumers have a greater demand than consumers in other parts of the world. They purchase a greater quantity and pay a higher price.

It is easy to see how third-degree price discrimination and the law of one price clash: the law of one price requires that the trading of goods be possible and costless, whereas price discrimination requires that  $c$  be sufficiently high that it is not desirable to import the good. The textbook industry is in the midst of this clash. While it used to be nearly impossible for a consumer in North America to find someone in Europe willing to sell him a textbook, the



Internet has made this easy and secure. Sites like eBay and other Internet retailers have greatly reduced search and transaction costs associated with importing an international edition textbook into the United States.

Because the most the two prices can differ is  $c$ , if the Internet is truly causing  $c$  to decrease, the differences in the market price of international and domestic textbooks should also be decreasing, from the old value of  $c$  to the new value of  $c$ . Because the textbook industry would prefer that it get all profits from book sales rather than allowing arbitragers to turn profits, it should change its prices to reflect the new, lower  $c$ . This could be done either by lowering the domestic price or by raising the international price. Because domestic sales account for a much bigger share of the textbook industry's profits, I expect that I will see international prices rise, rather than see domestic prices fall. This outcome was also predicted by Cabolis et al (2005).

#### IV) DATA

Using the online database Books in Print, I gathered the following information for several textbooks published between 1979 and 2004: publication date, edition number, list price, number of pages, and the country in which the book was sold. There were a total of 71 data points.

Because the goal of this study is to show the effect the Internet has had on the premium charged for textbooks sold in North America, the ideal data set would give information on how the price of the domestic and foreign editions of the same textbook has changed over the years, holding everything else equal. I used different editions of the same textbook to approximate a homogenous product, with fixed affects being used to account for the different textbooks.

Because domestic and international editions are produced in the same factories, it is reasonable to infer that anything affecting the supply cost of one affects that of the other. So, the only reason for a price difference would be a difference in demand. This study looks to see how the Internet

has affected this demand. Specifically, I will show that the price gap between two editions of the same book has decreased over time.

Books in Print publishes the book's list price in the currency of the country where the book is sold. So, where necessary, the currency was converted to U.S. dollars, based on the average conversion rate in the year the book was published. Then, using CPI data, the price was converted to 2005 dollars. The average price of each book in U.S. dollars when adjusted for inflation is \$82.09. Domestic editions have an average price of \$90, and international editions have an average price of \$76. The books ranged in price from \$7.09 for an international version of a computer science textbook to \$181.47 for a domestic edition of an organic chemistry textbook.

I also gathered data on Internet use from the World Development Indicators database. The WDI has yearly data on Internet users per 1000 citizens for many countries. As an index to approximate relevant global internet use, I used the average of the three foreign countries whose books were most represented in the sample: Australia, Canada, and the United Kingdom<sup>4</sup>. As expected, the index was constant at zero until 1989. From 1990 until 2003, the figure grew exponentially from 3 to 490.<sup>5</sup> This series, depicted on the next page in Figure 1, will be referred to as Internet Index.

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<sup>4</sup> Internet use grew at approximately the same rate in all of these three countries, so taking a simple average did not hurt the results.

<sup>5</sup> Because data was only available through 2002, a third-order polynomial was used to approximate internet use in 2003 and 2004.

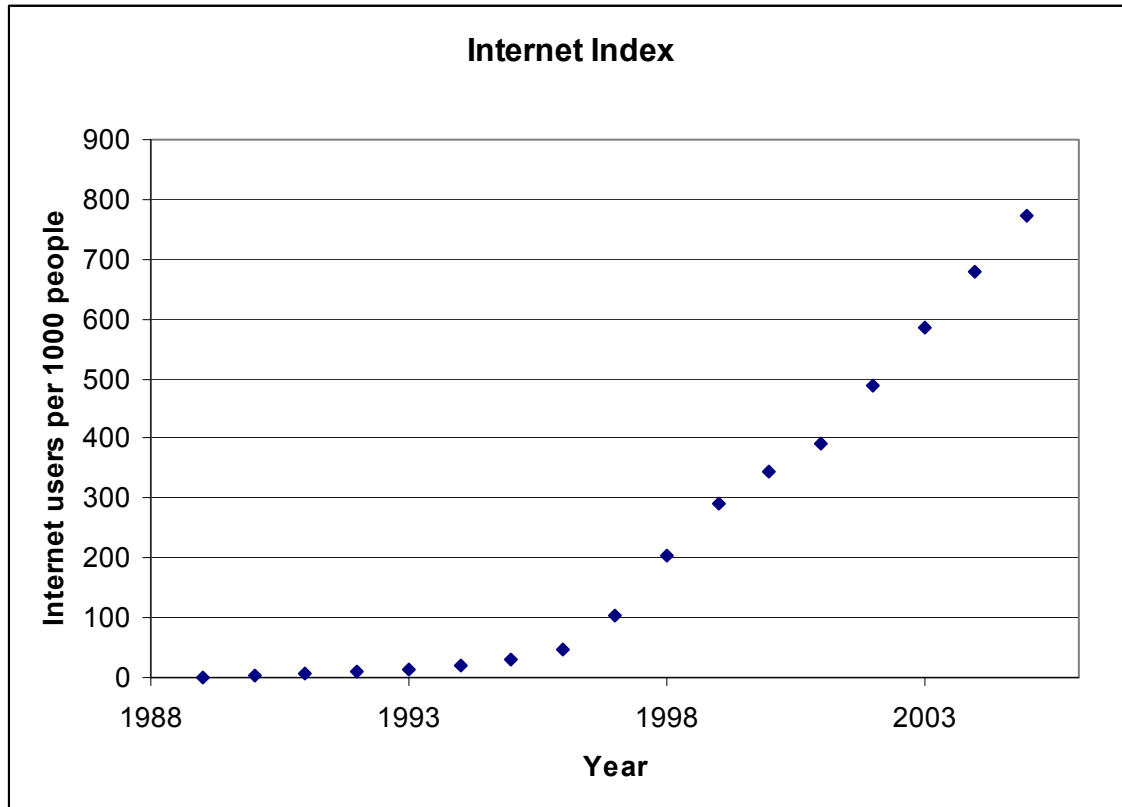


Figure 2: This graph depicts the Internet Index, a measure of the number of Internet users per 1000 citizens in the countries where foreign edition textbooks were sold.

### V) Empirical Specification and Results

In order to test my hypothesis that the increase in Internet use has led textbook publishers to reduce the price discrepancies between international and domestic editions, I use the following model to attempt to determine the effect of internet use on the price difference in books:

$$\text{Price} = \beta_0 + \text{Domestic} (\beta_1) + [\text{Netuse} \bullet \text{Domestic} ](\beta_2) + [\text{Netuse} \bullet (1 - \text{Domestic}) ](\beta_3)$$

**Price** is the price of the book, in 2005 U.S. dollars. **Domestic** is a dummy variable equal to 1 for domestic editions and equal to 0 for international editions. For domestic books, **Netuse • Domestic** is equal to the Internet Index for the year the book was published, and for international books it is equal to zero. For international books, **[Netuse • (1 - Domestic)]** is

equal to the Internet Index for the year the book was published, and for domestic books it is equal to zero. Coefficients  $\beta_0$  through  $\beta_3$  are estimated using OLS with fixed effects being used to absorb different editions of a textbook by the same author.

This setup allows for domestic and international books to be captured in the same regression while still allowing each to have a separate slope and y-intercept. For domestic books, the relevant regression is  $\text{Price} = \beta_0 + \beta_1 + \beta_2 * \text{Netuse}$ . For international books, the relevant regression is  $\text{Price} = \beta_0 + \beta_3 * \text{Netuse}$ .

The goal of my data analysis is twofold. First, I wished to see if my results would agree with the work of others who have found that domestic editions tend to cost more than foreign editions. If my hypothesis is correct,  $\beta_1$  should be positive; this indicates that before the 1990s, when Internet Index was zero, domestic textbooks were more expensive. Secondly, I wished to see if that gap has narrowed as the Internet, which makes it harder to price discriminate, has become more prevalent. If this is the case, according to my hypothesis,  $\beta_3$  is greater than  $\beta_2$ , indicating that international prices have risen relative to domestic prices. A two-sample non-paired difference of means T-test is used to compare  $\beta_3$  and  $\beta_2$ .

	Coefficient	Standard Error
Constant ( $\beta_0$ )	62.93 *	6.27
Domestic ( $\beta_1$ )	22.6 *	8.85
Internet Use * Domestic ( $\beta_2$ )	0.0248506	0.0196
Internet Use * (1-Domestic) ( $\beta_3$ )	0.0396661 *	0.0166
* indicates significance at the 2% level		

Table 1: Results of initial regression

As shown in Table 1, all coefficients except for **Netuse • Domestic** are significant at the 2% level. **Netuse • Domestic** is approximately zero; an F-test gives a p-value of 0.21. Because

fixed effects were used, the constant has little practical meaning. The value of  $\beta_1$  indicates that when Internet Index equaled zero, domestic editions cost, on average, \$22.60 more than international editions. The final two coefficients indicate that for every 100 additional Internet users per 1000 people, the price of a domestic book increases by \$2.49 and the price of an international edition increases by \$3.97. In other words, for every 100 additional Internet users per 1000 people, the price difference narrows by \$1.48. This seems reasonable; from 1990 to 2000, Internet use increased by about 350 people per 1,000. Therefore, over that 10 year period, price differences would have narrowed by \$4.44, or about 6% of the total cost of the average international edition textbook.

The first step in testing my hypothesis is to see if domestic editions of textbooks were initially more expensive. That is, to see if international price discrimination was indeed occurring. The domestic dummy variable is positive and significant at the 1% level, indicating that this is the case. This is consistent with other empirical studies on the textbook industry (Clay and Tay, 2001; Cabolis et al, 2005) and shows that the price discrimination is not a new phenomenon. (While the two previous studies were written after 2000, my regression shows that price discrimination had occurred at least 10 years prior to their findings.)

The next step in testing my hypothesis is to see if international prices are rising relative to domestic prices as the Internet becomes more prevalent. If this is the case, it will indicate that textbook publishers are losing their ability to price discriminate, causing a smaller price gap between domestic and international editions. Using a two-sample non-paired difference of means T-test, the hypothesis that  $\beta_3 > \beta_2$  was tested. I obtained a 96% confidence level that the data supports the hypothesis. Figure 3, shown on the next page, gives a graphical representation of the results of the regression.

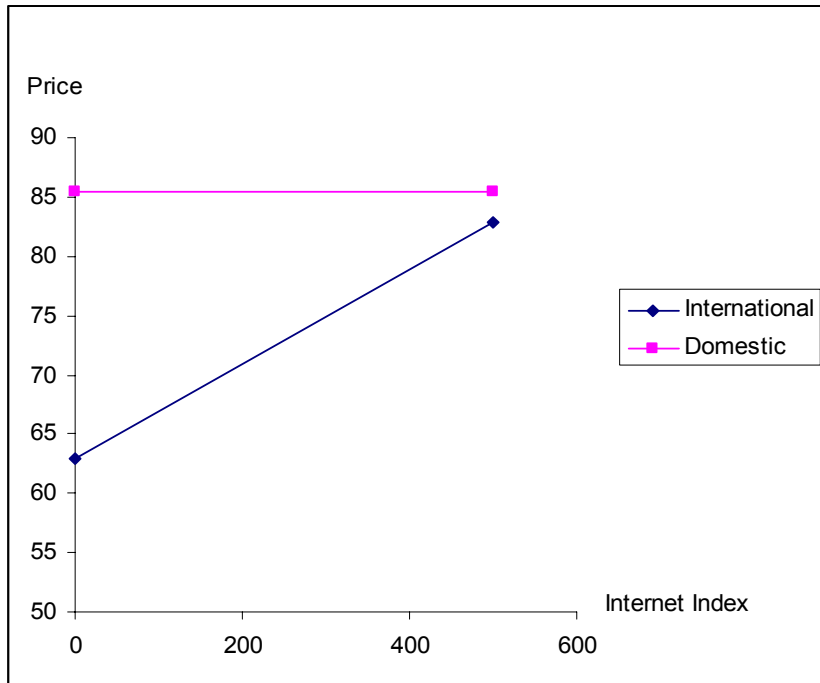


Figure 3. As depicted above, as Internet use rose, international prices, which started off lower, rose faster than domestic prices. Because the OLS estimates indicated that the slope of the domestic line is not statistically different from zero, it is shown here with a slope of zero. Internet Index is a measure of Internet users per 1000 people.

One further test was conducted to verify the results. International prices and Internet use have both increased over time. The first regression showed that they were correlated. A diff-in-diffs regression was run to find if the magnitude of a change in price was correlated with the magnitude of the change in Internet use. This test was run once for domestic books and once for international books, and supported the results of the first regression – that the coefficient for international books is positive and significant, and the coefficient for domestic books is not significantly different from zero. More detailed results can be found in the appendix.

While the findings supported my hypothesis that the gap in textbook prices had narrowed as the Internet became more prevalent, the fact that international prices rose faster does not necessarily mean that publishers are losing their ability to price discriminate. Prices are affected by a change in supply or demand. So, it is possible that something affecting supply costs

or demand of international editions could have caused this price increase. In the next paragraphs, I look to refute other possible explanations for the price increase of international editions.

Supply costs are almost identical for domestic and international editions, because domestic and international books are produced in the same factories and are nearly identical. (Cabolis et al, 2005) However, an increase in the supply cost of international editions could have occurred if international shipping costs have risen as Internet use has risen. If this is the case, textbooks which are printed in the United States and shipped abroad would have seen their marginal cost increase. The result of this would be higher international prices, even as textbook companies continued to price discriminate. However, this would have required a steep increase, as shipping represents just a small fraction of the total cost of a book, and international shipping rates have experienced no such increase. (Hummels, 1999)

Another explanation is that demand for the books has increased outside the United States and textbook companies have raised international edition prices accordingly. This, however, is highly unlikely. The three international countries in this study – Australia, Canada, and Great Britain – have been using American textbooks for a long time, and it is unlikely that a sudden upsurge in demand would have occurred so recently. Furthermore, if this were the case, it would have manifested itself in the profit margins of the textbook publishers. Unfortunately, relevant data is almost nonexistent; publicly traded publishing giants Pearson and McGraw-Hill make very little relevant information available. However, their available annual reports, which mention the growing Asian market, give no mention of an increased demand in Australia, Canada, or Great Britain.

## VI) CONCLUSIONS

In this study, I set out to answer the following question: Has the Internet affected the ability of textbook publishers to price discriminate between domestic and international consumers. I hypothesized that as the Internet has become more prevalent, it has hindered the ability of publishing companies to price discriminate among domestic and international consumers, prompting publishing companies to narrow the large gap in prices. The first necessity was to confirm that price discrimination was indeed occurring. In my data analysis, I showed that there were indeed different prices being charged for domestic and international editions, with domestic editions being more expensive. Then, I showed that while both domestic and international editions have become more expensive as Internet use has increased, the prices of international editions have increased faster. This has caused the gap in prices to narrow, supporting my hypothesis.

One topic for further research would be to explore whether the price gap did not narrow as much for books with small circulations. It may be the case that for books that are not widely read, search costs are still sufficiently large that publishers are able to charge a large premium.

Another interesting topic for research is the welfare effects of this gap narrowing. Consumer welfare abroad obviously goes down because international prices are raised. Producer welfare also decreases, because it no longer can effectively charge the monopolist price to the two groups. Consumer welfare domestically is less apparent. The price of domestic editions should go down, at least slightly, as publishers are forced to sell at the new monopolist price, which has an upward limit of the old domestic price. So, the winners here are American consumers, who should see a slight rise in consumer surplus. However, international consumers and publishing companies should both see a significant decrease in surplus.

This has potential policy implications. In 2005, the United States Congress asked the Government Accounting Office to complete a report on the rising price of American textbooks.



Specifically, they were curious as to why textbooks could be bought overseas at a substantial discount. If congress takes steps to encourage the re-importation of textbooks or forces the publishing companies to charge a single price for both domestic and international editions, they may find that American consumers benefit very little, and their gains come at the expense of both international consumers and American textbook companies. In fact, the results from this analysis showed that domestic prices were not significantly affected by an increase in Internet use, implying that the increase in American consumer surplus is practically zero.

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## Appendix

For International books, the following regression was estimated using OLS:  $Dprice = \beta_0 + \beta_1(Dnetuse)$ , where  $Dprice$  is the change in the price of an international edition textbook between years, and  $Dnetuse$  is the change in Internet use over that time period. For example, if a textbook was available in 1995 for \$63 and available in 1996 for \$72, and over that period of time the Internet Index grew from 29.7 to 47.6, the value for  $Dprice$  would be \$9 and the value for  $Dnetuse$  would be 17.6. An identical regression was run for Domestic books. The results can be found in Table A1.

	International		Domestic	
	Coefficient	Standard error	Coefficient	Standard error
$Dnetuse (\beta_1)$	0.098 *	0.044	-0.031	0.066
* indicates significance at the 5% level				

Table A1: The results of the diffs-in-diffs regression support findings of the first regression. They indicate that the effect of Internet use on International prices is positive and significant, and that the effect of Internet use on Domestic prices is approximately zero.