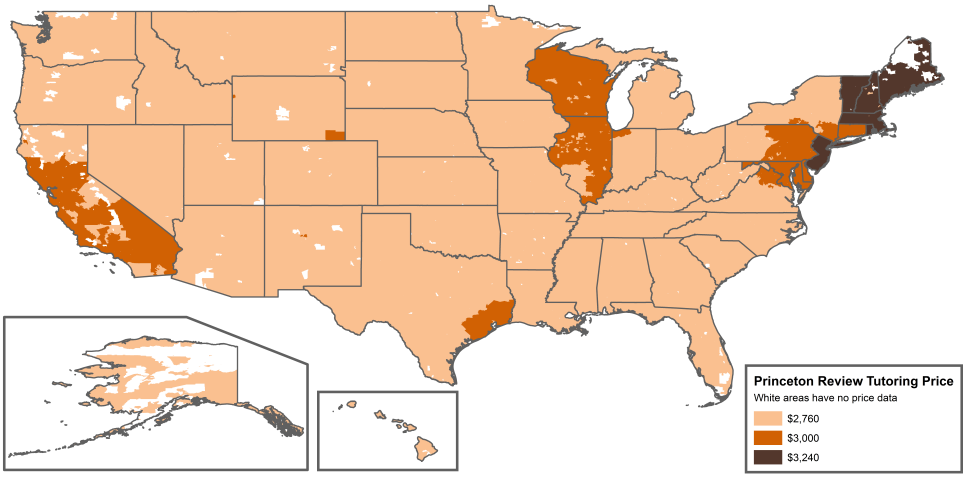
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Price Discrimination in The Princeton Review's Online SAT Tutoring Service

Keyon Vafa, Christian Haigh, Alvin Leung, Noah Yonack

Highlights

- We tested whether customers are seeing the same price for SAT tutoring on Princeton Review's website.
- We searched the website from 33,000 ZIP codes across the US.
- We found 3 different prices depending on the ZIP code input seemingly on a regional basis.



The Princeton Review's SAT tutoring package price across the US

Abstract

Prices for online tutoring services from The Princeton Review differ based on the consumer's geographical location in the United States. It is understandable that tutoring companies have different prices across different geographic locations for in-person tutoring, as tutoring quality and labor costs can differ across geographical regions. Online tutoring, however, should theoretically be priced consistently because it draws from the same group of tutors, regardless of the geographic location of the consumer.

Results summary: The Princeton Review website gives a price for its SAT Private Level 24-hr Online Tutoring Package based on the 5-digit ZIP (or postal code) in the United States entered. After capturing the prices given for each of 32,989 5-digit ZIP codes in the United States, we found 3 different prices for the same online tutoring package: $2,760 or $115 per hour (in 24,492 ZIPs or 74.2 percent of the ZIP codes), $3,000 or $125 per hour (in 5,971 ZIPs or 18.1 percent) and $3,240 or $135 per hour (in 2,526 ZIPs or 7.66 percent). ZIP codes receiving the higher prices were in the Northeast and parts of New York. Bands of the middle prices appeared in parts of California, Texas, and the Midwest. Consumers who enter almost any ZIP code outside these areas will receive the lowest price.

Introduction

When selling services over the Internet, companies are able to utilize customer personal information such as location, browsing and search history, posts, and other online behavior to sort consumers into categories that may determine what offers are made [1]. In a Northeastern University study, 4 out of 10 general merchandise websites and 5 out of 5 travel web sites showed evidence of differential pricing [2].

Can consumers turn this around? Can the Internet make price discrimination more transparent to consumers? Rose and Rahman found that they could simulate different online consumers worldwide by re-routing their computer's Internet connection through machines elsewhere in the world [3]. When they visited a popular travel website, the computer had an Internet address consistent with a consumer from that part of the world. Disguised in this manner, they found that a computer having an Internet address associated with Hong Kong, Australia and a few other places displayed significantly higher average prices on U.S. hotels and car rentals than did computers having Internet addresses from other places.

Are there online price differences within the United States for goods and services other than retail goods and travel? To answer these questions, we examined an online test preparation service.

The SAT (originally called the Scholastic Aptitude Test) is a standardized college admissions test used primarily in the United States to show colleges what an applicant knows about English reading, writing, and mathematics, and how well the applicant can apply that knowledge [4]. The Princeton Review is a prominent U.S. tutoring service that offers private in-person and on-line tutoring services for preparing applicants for the SAT [5]. The Princeton Review website features four online packages for SAT preparation. One package provides access to online material but does not provide access to a human tutor online. The other three packages provide on-line tutoring facilitated by a person communicating with the student over the Internet. These are called, respectively, the SAT Private Level 24-hr Online Tutoring Package, the SAT Premier Level 24-hr Online Tutoring Package, and the SAT Master Level 24-hr Online Tutoring Package. Each package offers 24 hours of online person-to-person tutoring. When a consumer visits the Princeton Review website, it asks for the

consumer's ZIP (or postal) code. Why? These online packages are the same, but are the prices the same across the United States?

Background

Economist Gregory Mankiw defined price discrimination as the business practice of selling the same good at difference prices to different customers [6]. Economists generally recognize three types of price discrimination: first, second, and third degree. First degree involves personalized pricing where each buyer is charged a different price; second degree involves quantity discounts where per-unit price may fall as quantity increases; and third degree involves differential pricing for different demographic groups such as seniors or children. The Internet is changing methods for both achieving and identifying price discrimination.

First-degree price discrimination allows the seller to possibly maximize the price for each unit sold. If the Internet facilitates the collection, compilation, and dissemination of personal information about a consumer, then an online seller may be able to identify at the time of an online purchase the maximum price the consumer will pay and offer only that price. Different consumers see different prices based on their individual profiles. An economics perspective suggests personalized online pricing could offer optimal market advantages to merchants because consumers who are willing and able to pay more do so. However, a consumer protection perspective suggests that consumers who pay higher than the average price are disadvantaged.

Second-degree price discrimination involves quantity discounts and bulk purchases. Buying clubs allow consumers to band together to make group purchases at lower prices, and the clubs have historically used mail order and brick-and-mortar options. On the Internet, the size of a group can be on a scale far greater than previously imagined. For example, Groupon offers a vast marketplace of unparalleled deals worldwide based on quantity discounts made possible by its ability to promote online campaigns directly to a large number of targeted people [7]. The Internet can empower consumers by supporting access to lower prices for the same goods.

Third-degree price discrimination means charging a different price to different consumer groups. In order for third-degree discrimination to occur, the seller must be able to identify different market segments. Sometimes, society supports third-degree discrimination. Examples include discounts for senior citizens and students. Other times, society legally protects some groups from price discrimination on specific kinds of products. For example, it is illegal to charge Asians more to eat the same meal at a restaurant simply because they are Asian.

In the United States, price discrimination is illegal if based on race, religion, nationality, or gender, or if it violates antitrust or price-fixing laws. Many federal laws in the United States have anti-price discrimination provisions. The Robinson-Patman Act targets the

anticompetitive effects of differential pricing between businesses. The Equal Credit Opportunity Act, U.S. Code civil rights laws, and the Fair Housing Act have provisions to prohibit price discrimination on the basis of certain personal characteristics (e.g., race, color, religion, sex or national origin) for certain kinds of products or services.

Reports show third-degree price discrimination occurring online. The popular travel website Orbitz, which shows comparison prices from multiple airlines, hotels and car rental companies to consumers seeking to travel, reportedly showed pricier hotels to consumers who visited with a Mac computer than to consumers who visited using a PC [8]. The popular stationery store chain Staples, which has more than 1,600 brick-and-mortar stores in North America [9], reportedly asked website shoppers for their ZIP code and then displayed different prices based on the perceived distance of the consumer to a rival's brick-and-mortar store [10].

If The Princeton Review offered the same online services for different prices based on a given ZIP code, the practice would be third-degree price discrimination.

Methods

In order to assess the price differences of online tutoring with respect to geography, we harvested quotes for the SAT Private Level 24-hr Online Tutoring Package from The Princeton Review website using different ZIP codes [5]. We chose the Private Tutoring 24-Hour Package for our study because it was the least expensive of the online private tutoring options.

We took a two-phase approach. In the first phase, we established whether third-degree price discrimination occurred based on ZIP codes. If so, in the second phase, we visualized the prices to look for regional effects.

Phase I

First, we downloaded a list of 32,989 5-digit ZIP codes in the United States reported from the 2010 U.S. Census [11]. Presumably, these are ZIP codes in which people reside.

Second, we modified the URL to The Princeton Review's quote website to display the result of a price query for each ZIP code on the list. Figure 1 shows an image of a page retrieved from The Princeton Review's website for ZIP 36503. The price for the SAT Private Level 24-hr Online Tutoring Package is $125 per hour (or $3,000 total for the 24 hours). The URL of the page is http://www.princetonreview.com/product/details?id=SAT-LOL-TUT24&z=36503. The last part of the URL, "36503" is the ZIP code. Changing this value to another ZIP code gives the price of the same product for another ZIP codes. See Figures 1, 2 and 3 for examples. We wrote a Python program that harvested prices by ZIP, randomly selecting which package to price. These prices were harvested in March 2015.

Once we confirmed price variation, we used another Python program to automatically visit the website as if it was a personal web browser and to then store the web page it received onto a local disk. On each visit to the website, the program substituted a value for the ZIP code. The computer made 32,989 visits to the website, one for each ZIP code. In a second phase, the program harvested the price information from the stored web pages, compiling them into a .CSV file (a file that can be loaded into different programs, such as Excel). We harvested prices using this Python program on August 8-9, 2015. Prices were consistent with the earlier results. Our analysis in this paper refers to this later data collection because it covers all ZIP codes for only one package.

Phase II

If prices from Phase I differed by ZIP code, we reasoned that there may be a relation between prices and geography. We plotted these data using ArcMap in order to visualize this correlation.

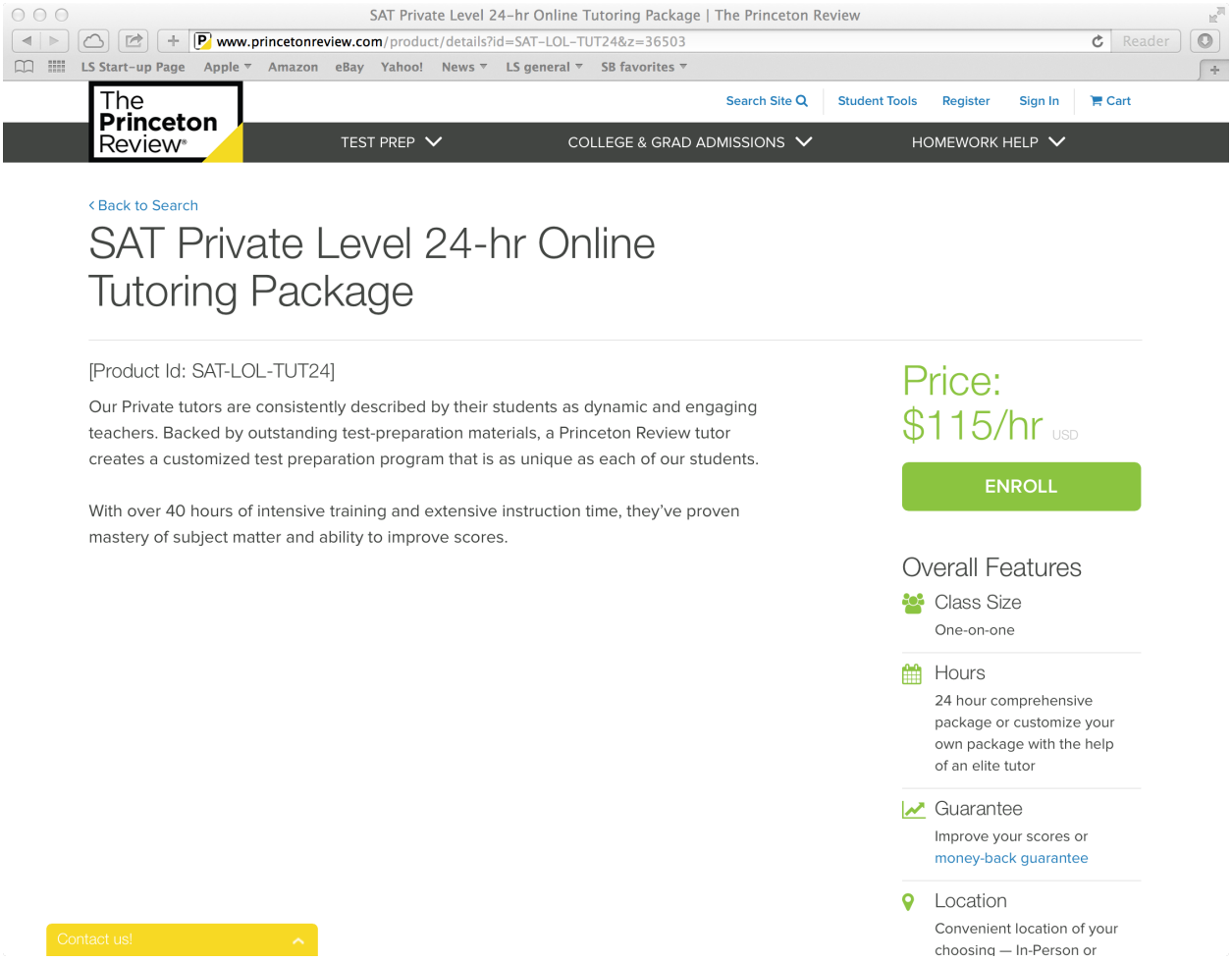


Figure 1. Web page showing the price for the SAT Private Level 24-hour Online Tutoring Package from The Princeton Review. At the top of the image is the URL:

http://www.princetonreview.com/product/details?id=SAT-LOL-TUT24&z=36503. The last part of the URL, 36503, specifies the ZIP code. The per hour price of $115 results in a total package price for the 24 hours of $2,760.

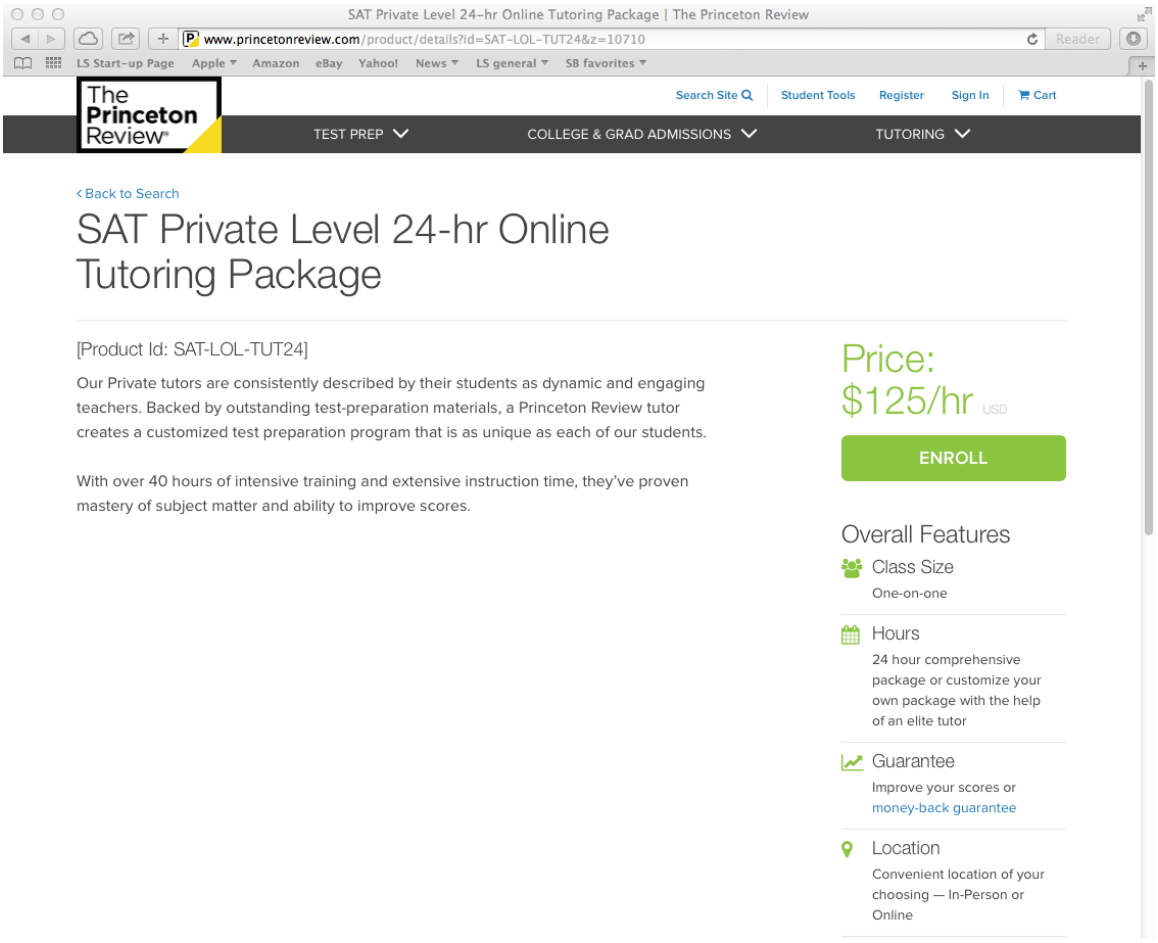


Figure 2. Web page showing the price for the SAT Private Level 24-hour Online Tutoring Package from The Princeton Review. At the top of the image is the URL: http://www.princetonreview.com/product/details?id=SAT-LOL-TUT24&z=10710. The last part of the URL, 10710, specifies the ZIP code for Yonkers, NY. The per hour price of $125 results in a total package price for the 24 hours of $3,000.

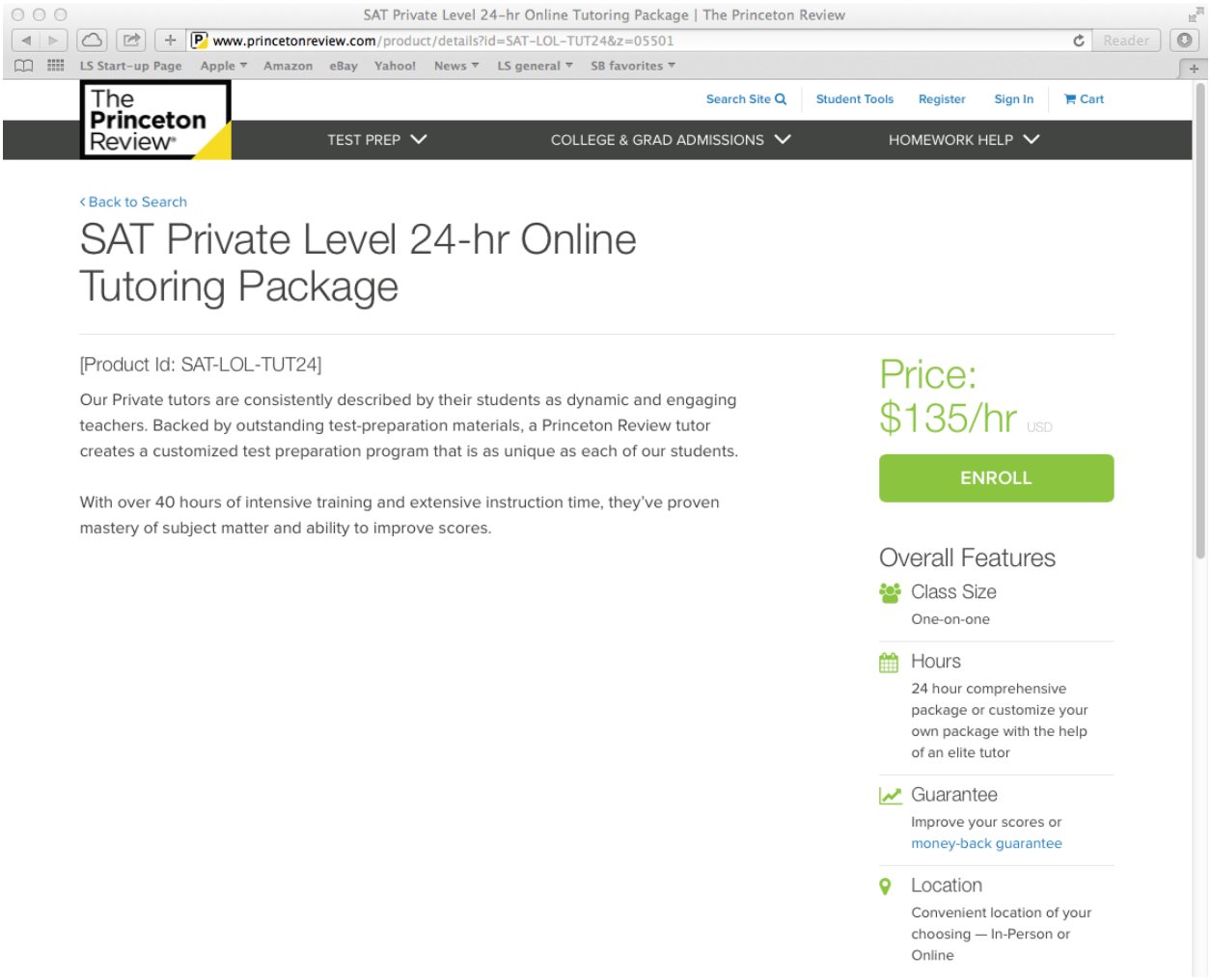


Figure 3. Web page showing the price for the SAT Private Level 24-hour Online Tutoring Package from The Princeton Review. At the top of the image is the URL: http://www.princetonreview.com/product/details?id=SAT-LOL-TUT24&z=05501. The last part of the URL, 05501, specifies the ZIP code. The per hour price of $135 results in a total package price for the 24 hours of $3,240.

Results

Querying by ZIP code and storing the resulting prices from The Princeton Review website, we obtained prices for all 32,989 ZIP codes in the United States for the SAT Private Level 24-hour Online Tutoring Package. Observed prices appeared in both 24 hour package totals and hourly rates. We found prices of $2,760 or $115 per hour in 24,492 ZIPs or 74.2 percent of ZIP codes, $3,000 or $125 per hour in 5,971 ZIPs or 18.1 percent, and $3,240 or $135 per hour in

2,526 ZIPs or 7.66 percent. The median price was $2,760, and the average price was $2,840.19 with a standard deviation of $147.10. Figure 4 shows a plot of the prices by ZIP code.

Figure 4 shows the gross trend: ZIP codes in the Northeast and parts of New York have the densest occurrences of the highest price (colored dark brown). Most areas across the United States received the lowest price (colored tan). Parts of California, Texas, Illinois, Wisconsin, Connecticut, Wyoming, and a few other states pay the medium price (rust color on the map).

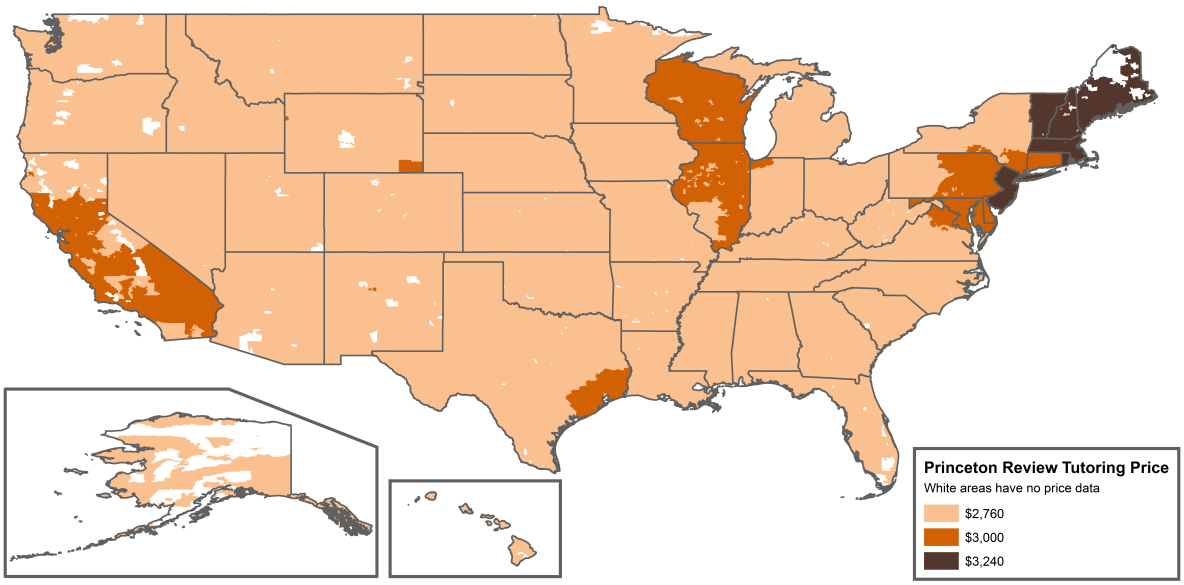


Figure 4. The Princeton Review prices for the SAT Private Level 24-hour Online Tutoring Package by ZIP code. There are three colors. Light orange is $2,760 (accounting for 24,492 ZIPs or 74.2 percent of the ZIP codes. Rust color is $3,000 (accounting for 5,971 ZIPs or 18.1 percent of the ZIP codes). Dark brown is $3,240 (accounting for 2,526 ZIPs or 7.66 percent of the ZIP codes). White areas had no data presumably because these are areas having no residences reported in the U.S. Census or the ZIP boundaries were not properly defined by the program ArcMap and the ZIP code mapping data used [12].

At the scale of the map in Figure 4, it appears that all ZIP codes in those regions get the same price. That is not always the case. Table 1 lists the number of ZIP codes appearing in each state by price category. New Hampshire has 230 ZIP codes. All but 5 ZIP codes in New Hampshire received $3240 (dark brown). The ZIP codes 03285, 03586, and 03593 were among those in New Hampshire that received the lower price of $2,760 (light orange). New York is the only state having ZIP codes in each price category. All but one of Massachusetts's ZIP codes (01434) is in the highest price category. All ZIP codes in Maine, New Jersey, Rhode Island and Vermont are in the highest price category. On the other hand, all of the ZIP codes in 31 states are in the lowest price category. See our data, available at our data citation, for price details by ZIP code.

State	Number of ZIP codes at $2760	$3000	$3240	State	Number of ZIP codes at $2760	$3000	$3240
AK	201	0	0	MT	315	0	0
AL	596	0	0	NC	743	0	0
AR	550	0	0	ND	373	0	0
AZ	344	0	0	NE	564	0	0
CA	328	1,319	0	NH	5	0	225
CO	458	0	0	NJ	0	0	552
CT	0	266	0	NM	265	10	0
DC	0	26	0	NV	152	0	0
DE	0	63	0	NY	1,004	250	345
FL	932	0	0	OH	1,013	0	0
GA	689	0	0	OK	586	0	0
GU	0	0	0	OR	398	0	0
HI	87	0	0	PA	669	803	0
IA	893	0	0	PR	0	0	0
ID	246	0	0	RI	0	0	75
IL	231	1,039	0	SC	379	0	0
IN	647	45	0	SD	350	0	0
KS	681	0	0	TN	602	0	0
KY	716	0	0	TX	1,447	288	0
LA	466	0	0	UT	227	0	0
MA	1	0	493	VA	668	169	0
MD	0	435	0	VI	0	0	0
ME	0	0	399	VT	0	0	244
MI	908	0	0	WA	532	0	0
MN	847	0	0	WI	12	713	0
MO	970	0	0	WV	561	0	0
MS	381	0	0	WY	132	11	0

Table 1. State-level distribution of ZIP codes by prices from The Princeton Review website for the SAT Private Level 24-hour Online Tutoring.

Figure 5 demonstrates variations appearing within states with a focus on New York, New Jersey, and Connecticut. New York City, Long Island, and New Jersey generally show $3,240. Parts of Upstate New York and Connecticut, including Greenwich, which has a very high median household income of $130,075 [13], show a lower price of $3,000. The remainder of New York State generally shows the lowest price of $2,760. In the case of Binghamton, NY, the city is divided with the ZIP codes 13901 and 13905 showing $2,760, whereas 13903 and 13904 show $3,000.

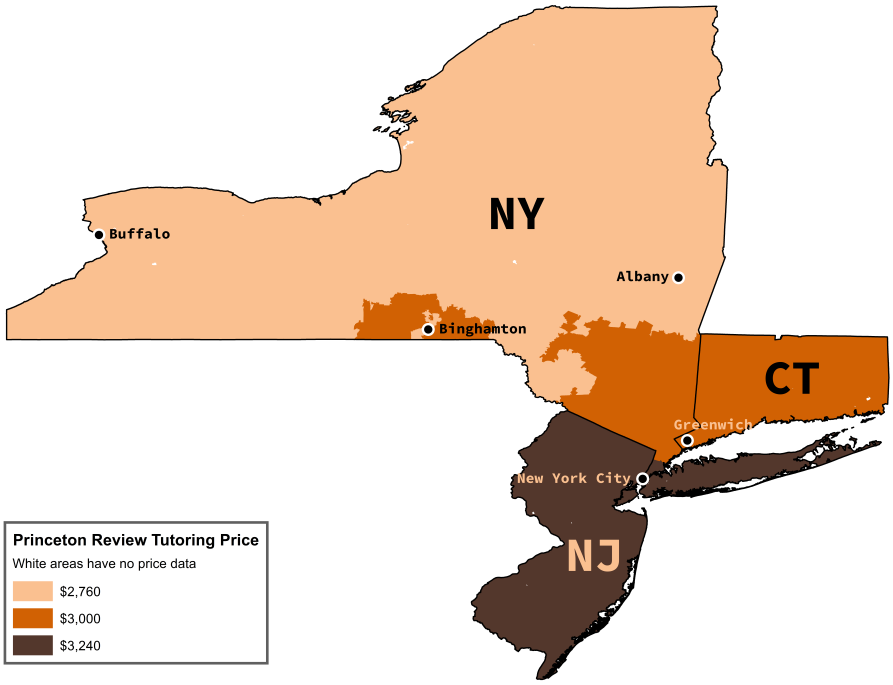


Figure 5. Geographical plot of prices in New York, New Jersey, and Connecticut from The Princeton Review website for the SAT Private Level 24-hour Online Tutoring.

Discussion

We demonstrated third-degree price discrimination in an online tutoring package offered by The Princeton Review. For most ZIP codes in the United States, The Princeton Review offered its lowest price, but the price in other ZIP codes was substantially higher for the same online package. Because the product is the same online service, factors such as labor cost, rent, and other fixed and variable costs should presumably be equal regardless of where the purchaser lives. Having prices readily available on the Internet allowed us to document this market segmentation.

Of course, in order for third-degree discrimination to occur, the seller must not only be able to identify different market segments as The Princeton Review did, but must also keep the markets separate so that a consumer in one market cannot elect a less expensive alternative. The Internet may make it possible for a consumer who resides in the highest priced market segment to provide another ZIP code in order to receive the lowest price. If so, the Internet may help consumers exploit third-degree price discrimination so that all consumers pay the same low price.

Is there a legal problem with the price discrimination found from The Princeton Review? We did not seek to answer this question. Our data is available for future work on correlations

with income, race, or ethnicity. The Staples example, mentioned earlier, reminds us that there may be other explanations for the market segments. The Princeton Review may offer a higher price in some areas owing to a lack of competition there. We do not know why these prices differ, only that they do.

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Authors

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Citation

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Data

Vafa K, Haigh C, Leung Al, Yonack N. Replication Data for: Price Discrimination in The Princeton Review's Online SAT Tutoring Service. Harvard Dataverse. September 1, 2015. http://dx.doi.org/10.7910/DVN/U4OKBP