THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF ECONOMICS

An Economic Analysis of the Pink Tax

TORI KOVALCHICK
SPRING 2024

A thesis
submitted in partial fulfillment
of the requirements
for a baccalaureate degree in Economics
with honors in Economics

Reviewed and approved* by the following:

Conor Ryan
Assistant Professor of Economics
Thesis Supervisor

Nima Haghpanah
Associate Professor of Economics
Honors Adviser

Bee Yan Roberts
Professor of Economics and Asian Studies
Faculty Reader

* Electronic approvals are on file.

ABSTRACT

This thesis aims to explore the existence of a pink tax, or an upcharge on products and services marketed toward women, through an economic lens. An extensive review of existing policies and empirical research is supplemented by a discussion of price discrimination, which is the basis for any form of a pink tax. Using survey data from the U.S. Bureau of Labor Statistics, regression analysis reveals that women spend $17.51 more than men on personal care goods, $33.48 more on salon services, $33.78 more on apparel, and $1,846 more on total expenditures. Application of concepts described throughout the paper, however, provide explanations beyond a discriminatory financial burden on women. Overall, this paper encourages a more thorough examination of the pink tax, so policies can eliminate the root problems that pressure women into spending more on a daily basis.

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ACKNOWLEDGEMENTS

First and foremost, I would like to thank my supervisor, Dr. Conor Ryan, for his continued support throughout this thesis process. In moments when I doubted my ability to complete this, he was there to encourage and keep me on track. I learned a lot about both myself and "the *joys* of working with data" over the course of the past few months, and I owe that to him.

I would also like to thank my family and friends for their encouragement since I applied to Schreyer four years ago. They have uplifted me and supported me every step of the way since then, through major changes and perpetual conversations about the pink tax. I am sincerely grateful for their love and patience and would not be at this point without them.

Finally, I would like to express my gratitude to Dr. Bee Roberts and our ECON 489M cohort. Since last fall, I have learned a great deal about my passion for economics from Dr. Roberts, and I have been continuously inspired by the intelligence and drive of everyone around me as we completed our theses. The guidance from this course has been invaluable.

Chapter 1

Introduction

The pink tax refers to an upcharge on products and services specifically marketed toward women, even when they are equal in composition and function to those targeted at men or a gender-inclusive base (i.e., a price difference between women's and men's products). The name of the tax derives from historical ties between femininity and the color pink, and its perception is established in the phrase, "shrink it, pink it and women will buy it at a higher price" (Alara Efsun Yazicioglu, 2018). Evidence of a pink tax is frequently cited on personal care products such as shaving cream and shampoo, or services such as drycleaning and haircuts. These items emphasize the different physical attributes associated with constructs of masculinity and femininity (Habbal, 2020). However, the pink tax also extends to products including wireless mice, children's toys, and pens (Maloney, 2016).

It is important to note that the pink tax is not a literal sales tax, or value-added tax, applied to the base price of a good or service. Rather, it is the idea that some products marketed toward women are more expensive, solely because they are made for women. In markets and product categories where researchers argue the existence of the pink tax, they suggest multiple reasons for this phenomenon. Aside from blatant discrimination or higher input costs, marketers, psychologists, and economists alike propose firms' desire to capitalize on the gender socialization patterns affecting shopping preferences (Habbal, 2020). These societal norms compel women to pay higher prices for products and services that "function as symbolic gender identity markers" (Avery, 2012). Still, the root of the pink tax remains ambiguous given the variation in results that is a consequence of a variety of research methodologies. Nevertheless,

understanding the foundation of this tax and its prevalence in different markets is critical to conversations surrounding women's rights and American policy.

The subsequent chapters study the politics and economics of the pink tax. By exploring the political history of the pink tax and the ambiguous implementation of laws combatting it, this paper establishes the need for stronger intuition to guide policy decisions. In turn, the theoretical underpinnings of how a pink tax might exist and persist are discussed. Finally, a linear regression analysis on spending trends among men and women across recent years is conducted to supplement this research. The results find that women do spend more than men in highly gendered consumer categories, but these differences do not vary greatly from the mean. Economic insight into second-degree price discrimination provides logical explanations for these variations. Ultimately, the stance is taken that societal pressures have conditioned women to be willing to pay more for goods and services that highlight their gender. Based on this interpretation, policy interventions should focus on spreading information about legal forms of price discrimination and implementing severe fines for illegal practices, creating more informed sellers and consumers.

In the remaining sections of this paper, Chapter 2 delves into the political background of the pink tax and its effects on gender roles in society. Chapter 3 presents a review of existing evidence for the pink tax and how frequent it is among different consumer categories. In Chapter 4, the economic insight behind different forms of price discrimination and their role within the context of the pink tax is uncovered. Chapter 5 provides the empirical framework for this thesis through description of the data source and regression relationships, with Chapter 6 elaborating upon the results of this analysis. Chapter 7 concludes the thesis by defining avenues for future research and applications of this work.

Chapter 2

Background

On a micro scale, the pink tax brings awareness to daily pressures faced by women to conform to gender roles, as well as the costs associated with this. On a macro scale, it forces conversations regarding the role of the government in truly guarding its protected classes from unjustified discrimination, if necessary.

Gender in Society

A study by Dellinger and Williams (1997), surveyed a diverse group of female professionals regarding appearance rules in the workplace. Their responses shared that makeup and outward clean hygiene were strongly correlated with conclusions on their credibility within the workplace; these women also felt powerless to effectively resist the institutional norms supporting these ideals. Consequently, there is undue societal pressure placed on women to accentuate their femininity, resulting in the financial burden of paying for products that materialize this identity (McGinley, 2019). As societal pressures increase the inelasticity of demand for women's personal care products, producers can arbitrarily raise prices without potential losses in revenue. If long-standing gender norms enable the existence of a pink tax, women may bear unfair discrimination.

Further, according to research by Blau and Kahn (2017), women earn an average of 83% of what men earn on a weekly basis. For executive and managerial positions though, this ratio falls to 69%. An arbitrary upcharge on women's goods is unfair on its own. Therefore, lower

wages for the same job, coupled with higher prices for the same goods, significantly hinder women's purchasing power and deepen the injustice of a pink tax.

Political History

Grounded in research claiming the existence of a pink tax, California and New York have adopted legislation to ban it, and a bill was proposed to Congress. In 1995, California instated the Gender Tax Repeal Act, authored by Democrat Jackie Speier. This legislation prohibits establishments from discriminating based on gender, with respect to the price of similar *services* (Civil Rights, 1996). In 2022, the law expanded through AB 1287. This new bill prohibits charging differently for *goods* based solely on the gender they are marketed toward; the inclusion of goods in the original legislation was vetoed by the governor at the time (Goodman, 2022).

After election into the United States House of Representatives, Speier attempted to continue her work. In 2019, she introduced H.R. 2048, the Pink Tax Repeal Act. The goal of the bill was "to prohibit the pricing of consumer products and services that are substantially similar if such products or services are priced differently based on the gender of the individuals for whose use the products are intended" (Pink Tax Repeal Act, 2019). No progress has been made on this bill.

New York has successfully joined California in passing legislation on the pink tax. A 1998 law prohibited retail establishments from discriminating based on gender; this included a mandate for visible signs that distinguished any necessary price differences (New York City Office of the Mayor, 2015). In 2020, the governor of New York fully banned the pink tax, making it illegal to charge women more for substantially similar goods and services (New York

Department of State, 2020). The law defines substantially similar goods based on materials, intended usage, and brand, while substantially similar services are based on length and difficulty of service, along with input costs (The New York State Senate, 2020). States rely on economic analysis to support the passage and effectiveness of legislation, creating legal and tangible implications of this research on the pink tax.

Current Policy Efficacy

Overall, these pink tax prohibition laws are ineffective, due in part to mild penalties for businesses and sellers. Evidence points to increased violation reports over time, suggesting the consequences are not significant enough to stop infringements of the laws. When New York passed legislation in 1998 banning gender-based pricing in services, the fee for first-time offenders was set at $50; the maximum fee for multiple offenses was capped at $500 (Essary, 2022). The law expanded in 2020 to include goods; at that time, those fees adjusted to $250 for first violations and a maximum of $500 for subsequent offenses (The New York State Senate, 2020). In New York, there is minimal incentive for businesses to commit to consistently upholding the law.

California does impose steep penalties for those found guilty of violating the Gender Tax Repeal Act. First violations incur a civil penalty up to $10,000, and additional infractions can cost $1,000 each, with total penalties limited to $100,000 (Gender Tax Repeal Act, 2023). Andy Chen, a licensed lawyer in both California and New York, notes that the cap on penalties is interesting; a set amount may encourage businesses to keep imposing the pink tax and view this cap as just another *potential* cost of doing business (Chen, 2023). Even given the hefty cost of

penalties in California, the process for reporting infringements on the act exposes a shortcoming of the pink tax laws in both states: consumer burden.

New York and California enforce their pink tax laws based on consumer reports, creating high opportunity costs for women pursuing legal action. People living in California must file complaints with the Department of Consumer Affairs (Essary, 2022). In his article, "California and the Pink Tax (Assembly Bill 1287)" (2023), Andy Chen observes that individuals cannot directly sue violators for continuing to implement the pink tax; the Attorney General in California is the only person with jurisdiction over these cases. Further, in New York, consumers must submit reports to the Division of Consumer Protection or Attorney General complete with pictures, advertisements, receipts, merchant location, and request for payment of the difference of gendered products (New York State Department of State, 2022).

In addition to requiring consumers to take legal action, New York also places the responsibility of understanding and noticing the pink tax on customers. The Department of State released a guide encouraging citizens to compare prices, be "savvy" about the pink tax, and even turn to gender-neutral items for products that "don't really need to have two versions" (Department of State, 2022). The dependence on consumers undermines the effectiveness of pink tax policies.

As they stand, these laws are not very effective, because the probability of consumer reporting is low, and penalties for infractions are also low. Consequently, there is little incentive to change pink tax pricing behavior. In 1999, there were 13 allegations of discriminatory gender pricing within drycleaning and hairstyling businesses in New York (Essary, 2022). In 2014 and 2015, there were 118 and 129 infractions, respectively (Essary, 2022). Also, these policies lack the economic foundation needed to truly enforce them. Without knowledge of the intuition

behind upcharges based on gender, policymakers will never be able to combat the pink tax in a targeted, efficient manner. Chapter 4 will explore this intuition and how it applies to the body of knowledge referenced by lawmakers when instituting related legislation.

Chapter 3

Review of Evidence on the Existence and Prevalence of the Pink Tax

Empirical ambiguity exists when it comes to determining if women are in fact subject to unfair price discrimination. In one study conducted by Guittar et al. (2021), the prices of 3,282 personal care products from Walmart, Target, CVS, and Walgreens were coded for gender, brand, price, volume, count, and any enhancements. Through multiple regression analysis, t-tests, and Chi-square tests, the researchers found that only three products demonstrated varying pricing per ounce based on gender. In their analysis, women pay more per ounce for lotions and deodorants, while men are charged more for shaving creams. Their research also pointed to noteworthy differences in the number of products marketed to each gender. From their sample, 83% of lotions, 71% of shampoos, and 74% of bar soaps were made for women, and shaving creams were the only products marketed more toward men at 72%. This provides interesting commentary about gender expectations in the market, which will be explored in a later chapter. In conclusion, Guittar et al. (2021) did not discover a consistent pink tax on women's products. Rather, while there are instances, the discrimination does not appear to be broad.

Despite uncertainty surrounding the nature of a pink tax, states rely on evidence supporting its existence to formulate and justify legislation. In 2020, the California Senate Committees on Judiciary and Women, Work, and Families held an informational hearing on their law banning the pink tax on services. According to a report in the 1995 bill, women paid $1,351 more annually for services compared to men (Gender Tax Repeal Act of 1995, 1995). Adjusted for inflation, this would be $2,191 as of 2018, and the value does not account for a pink tax on goods (Jacobsen, 2018). The California Judiciary Committees also reference a study by

Duesterhaus et al. (2011), in which the team found that across 538 products and services, women spend more than men to a degree that has important consequences in their daily lives. Another crucial piece of evidence in California's justification of their pink tax law is research from New York City.

In 2015, the New York City Department of Consumer Affairs (NYC DCA) published a study on the pink tax authored by Anna Bessendorf; it is the state's basis for their pink tax ban. The NYC DCA studied the gendered pricing of goods in the region: toys and accessories, children and adult clothing, personal care products, and home health care products for seniors. With consideration for branding and ingredients, the mean and median prices of 794 individual items from 35 different product categories were taken; researchers then compared price differences between men's and women's products. In summary, their results found that women's products were priced an average of 7% higher in 30 out of 35 categories. Furthermore, women's individual products cost more 42% of the time, compared to 18% for men's. Specifically relating to categories in this paper, they uncovered a 13% higher price in personal care products for women, 48% upcharge in hair care, and 8% in apparel. The findings by the NYC DCA support a pink tax in the New York City market (Bessendorf, 2015).

However, in their research on price premiums for women, authors Moshary, Tuchman, and Bhatia (2021) found evidence *against* the pink tax. Their work studied nine categories: bar soap, body wash, deodorant, hair coloring, razor blades, disposable and non-disposable razors, shampoo, and shaving cream. Part of their goal was to first replicate Bessendorf's paper, determining if it could be generalized to an area beyond New York City. Specifically, they wanted to find if women's products were priced consistently higher in the same 6 out of 7 personal care categories. When utilizing the same methodology and accounting for other retail

stores across the country, the researchers agree with the NYC DCA that women experienced price discrimination in 6 out of 7 categories. Yet, the researchers noted that these results cannot be generalized, because those products represent less than 6% of the market, and many pairs varied by ingredients. The continuation of their project exposed opposition to a pink tax.

Utilizing Nielsen RMS data from 39,697 stores between 2015-2018 and not controlling for product attributes, they found that prices for women's products were higher in four categories (bar soap, body wash, deodorant, and razor blades), but three categories found men paying more. This test reflects a negative "pink gap," since those differences could account for markups *or* general input costs. Therefore, the researchers controlled for gender (through Nielsen branding and label insight), active ingredients, and size. After this, the results of their model indicated that deodorant, body wash, shampoos, and shaving creams targeted at women are less expensive than men's, and overall, unit prices for women's products are 5% cheaper for substantially similar products. Without controlling for manufacturer, size, and ingredients, unit prices for women were 18% more expensive.

In conclusion, Moshary et al. (2021) contend that evidence of a consistent pink tax does not exist. Since gender segmentation of goods directly leads to product differentiation, varying prices could reflect a number of things. Current legislation focuses on "substantially similar products," which is exceedingly complex to determine without systematic evidence. When this evidence is synthesized empirically on a national level, women do not experience price discrimination across the market. In the personal care category, women do not systemically pay higher prices, especially for comparable products, which is the focus of arguments and legislation targeting the pink tax.

Altogether, evidence of a pink tax varies with the methodology used to determine it. Given the real-life, political implications of the tax, it is crucial to understand how researchers reach conclusions on its effects.

Chapter 4

Economic Intuition

The existence of a pink tax implies a form of price discrimination, but empirical evidence within existing literature debates the nature of it. The degree of price discrimination associated with a pink tax is important, because it determines the viability of enacting legislation to combat it. Price discrimination is based on willingness to pay and how sellers utilize knowledge of consumer preferences to set prices.

First-degree price discrimination, also known as perfect price discrimination, occurs when sellers set each unit price at a consumer's willingness to pay (Varian, 1989). Given individual preferences, sellers can extract the maximum amount possible from buyers. Knowledge of every single consumer's willingness to pay is rare, nearly impossible, so this form of price discrimination is unlikely to be a foundation for the pink tax. However, if everyone received their own price, and women's prices were higher on average, this could violate laws prohibiting the pink tax.

Second-degree price discrimination is set based on sellers utilizing a variety of products on the market to gauge individual preferences. In other words, different types of consumers are attracted to products with different attributes, so producers can extract their willingness to pay for each product and charge different prices. Consequently, consumers may experience a larger surplus (Varian, 1989). In the context of the pink tax, it allows producers to segment the market through substantial attribute differences in products targeted at men or women, including ingredients and size (Moshary et al., 2023). In an expansion of their paper, "Investigating the Pink Tax: Evidence Against a Systematic Price Premium for Women in CPG," researchers

Moshary et al. (2023) sought to objectively categorize the pink tax into a form of price discrimination by calculating price differences for gendered goods. They controlled for product ingredients, then did not control for them. Comparison of substantially similar products (based on ingredients) rendered no statistically significant price premium for women's products, while differentiation in ingredients led to large price differences. In addition, they found that producers differentiate products for men and women by means of unique formulations. Therefore, the researchers contend that the pink tax is a form of second-degree price discrimination, because sellers must differentiate products and separate the market. If consumers had to choose between men's and women's products that are the same, they would simply pick the cheapest one. Through second-degree price discrimination, consumers are induced to select into the market for the products that match their gender, providing sellers with insight into individual preferences. If this is true, laws aimed at combatting the pink tax would not substantially change prices for women; prices are already similar when the products are similar too (Moshary et al., 2023).

Third-degree price discrimination, on the other hand, occurs when sellers charge different prices to segments of the market based on varying demand elasticities and characteristics including age and gender (Ferrell et al., 2016). It is often regarded as a controversial form of price discrimination, especially in the context of gender. First, third-degree price discrimination breaches the equal treatment norm: buyers should be treated equally regardless of the demographic to which they belong (Marcoux, 2006). Especially in the United States, people are guarded from discrimination based on gender; sex is a protected class under laws such as Title IX, the Equal Pay Act, and the Affordable Care Act (Pirrotti, 2023). Second, unitary pricing cannot hold when price discrimination exists, because consumers are not charged the same amount for the same service or good. Therefore, consumers do not have equal access to those

items (Ferrell et al., 2016). Third-degree price discrimination in the form of a pink tax seems to be a common notion among policymakers. For this to hold, however, men must buy men's products, and women must buy women's, even if the products are identical and the prices are different. If this holds, given the protection guaranteed to people of all sexes under United States law, a pink tax based on third-degree price discrimination would defy legislation that targets large price gaps in substantially similar products (Moshary et al., 2023).

Since the degree of price discrimination described by a pink tax is crucial to determining the efficacy of policy, the literature that shapes those policies must be carefully applied. Guittar et al. (2021) did not find evidence of a consistent pink tax, but they did uncover more expansive varieties in the market for women. For example, from their product range, 83% of lotions, 71% of shampoos, and 74% of bar soaps were made for women. Sellers are likely playing into women's willingness to pay for variety of goods with targeted or luxury purposes, given gender expectations on appearance (Dalziel & Sharp, 2023). In addition, this range implies a larger array of preferences from women in general. By engaging with these purchasing behaviors, producers can better understand women's preferences and potentially second-degree price discriminate.

The claim by Moshary et al. (2023) that substantially similar products by ingredient list do not vary in price exposes a flaw in the report by the NYC DCA. In their study, the NYC DCA did not establish an objective or quantitative means for comparing ingredient formulation. Rather, "[the] Agency selected products that had similar male and female versions and were closest in branding, ingredients …" (Bessendorf, 2015). If precise knowledge of ingredient similarities between products targeted at men and women explains not only price differences, but also potential price discrimination, it is critical to meticulously account for formulations. In stating that women pay thousands more over their lives for products similar to men's, the NYC

DCA asserts third-degree price discrimination, which must be completely understood given the legal implications in the state. In conclusion, the degree of price discrimination behind a pink tax may determine the ability of a law to combat it, as third-degree price discrimination is the only realistic illegal practice. Knowledge of the reasons why women *may* be paying more for everyday goods is critical to ensuring if they legally *cannot* be paying more.

Chapter 5

Evidence on Spending Patterns in Survey Data

This chapter outlines the survey dataset utilized to explore women's expenditure habits compared to men's in highly gendered categories, with the goal of uncovering potentially substantial impacts of pink tax upcharges through regression analysis.

Regression Analysis

The empirical analysis for this thesis is based on the Consumer Expenditure Survey (CE) by the U.S. Bureau of Labor Statistics, which gathers demographic, income, and expenditure data in the United States (U.S. Bureau of Labor Statistics, 2023). These surveys are separated into two categories: interview and diary. This thesis uses the interview data, specifically variables from the FMLI file (consumer unit (CU) summary expenditures, income and assets, and CU characteristics and weights), the MEMI file (member-level income and characteristics), and the XPB file (expenditures related to haircuts and salon services). The analysis will investigate this information from a five-year period: 2018-2022.

The use of linear regression analysis enables an understanding of how different independent variables affect spending habits of women. To specifically measure expenditures most closely affected by a pink tax, the variables for three highly gendered categories were selected to serve as dependent regression terms based on frequent citations in pink tax policies and studies, as well as common market segmentation based on gender. These include total expenses for haircuts, styling, attached hair pieces, manicures, massages, or other salon services,

total expenses for all personal care goods and services, and total expenses for apparel and related services. The total expenditure category was also included to quantify broader differences in spending patterns. These variables were all measured in the previous quarter, since the values were much higher, suggesting that the current quarter responses did not capture all spending during that time. The four linear regression equations are defined as:

1. $$PersonalCare_{it} = \beta_0 + \beta_1 Sex_{it} + \beta_2 Age_{it} + \beta_3 Salary_{it} + \beta_4 TotExpend_{it} + \beta_5 FamSize_{it} + \beta_6 Edu_{it} + \beta_7 Race_{it} + \beta_8 Marital_{it} + \beta_9 Year_t + \beta_{10} Quarter_t + \beta_{11} State_{it} + \beta_{12} WorkStatus_{it} + \beta_{13} College_{it} + \varepsilon_{it}$$

2. $$Apparel_{it} = \beta_0 + \beta_1 Sex_{it} + \beta_2 Age_{it} + \beta_3 Salary_{it} + \beta_4 TotExpend_{it} + \beta_5 FamSize_{it} + \beta_6 Edu_{it} + \beta_7 Race_{it} + \beta_8 Marital_{it} + \beta_9 Year_t + \beta_{10} Quarter_t + \beta_{11} State_{it} + \beta_{12} WorkStatus_{it} + \beta_{13} College_{it} + \varepsilon_{it}$$

3. $$Salon_{it} = \beta_0 + \beta_1 Sex_{it} + \beta_2 Age_{it} + \beta_3 Salary_{it} + \beta_4 TotExpend_{it} + \beta_5 FamSize_{it} + \beta_6 Edu_{it} + \beta_7 Race_{it} + \beta_8 Marital_{it} + \beta_9 Year_t + \beta_{10} Quarter_t + \beta_{11} State_{it} + \beta_{12} WorkStatus_{it} + \beta_{13} College_{it} + \varepsilon_{it}$$

4. $$TotExpend_{it} = \beta_0 + \beta_1 Sex_{it} + \beta_2 Age_{it} + \beta_3 Salary_{it} + \beta_4 FamSize_{it} + \beta_5 Edu_{it} + \beta_6 Race_{it} + \beta_7 Marital_{it} + \beta_8 Year_t + \beta_9 Quarter_t + \beta_{10} State_{it} + \beta_{11} WorkStatus_{it} + \beta_{12} College_{it} + \varepsilon_{it}$$

Thirteen control variables were selected for the regression analysis. These were included given effects on expenditure habits, such as how many people an individual is buying for, or how much disposable income is available for purchases. Sex is a dummy variable that highlights how much more women spend than men and relative to average spending in the four categories; analysis focuses on this variable's coefficient and is expected to be positive. Age defines the respondent's age, and $Salary$ explains annual income, which is important to the amount of spending money one can budget. To account for the people in a household that purchases apply to, $FamSize$ describes family size (maximum of 10 in this dataset), and the $Marital$ variable is a dummy variable defining marital status (married, single, widowed, or divorced). This is critical to determining multiple income streams, or the amount of people involved in purchases. The dummy variable Edu defines education level from some high school through professional degrees, as this determines salary outcomes; $College$ outlines if the respondent is currently in college for the same reasons. $Race$ is a dummy variable that categorizes the respondent by their race: Hispanic, Pacific Islander, Black, Asian, White, Native American, or other. There is a known racial wage gap, so this variable accounts for that in addition to salary (Leonhardt, 2023). The $Year$ and $Quarter$ variables break down the data into four quarters in each year from 2018-2022. Including $State$ as a variable, which measured 42 different states through dummy variables, accounts for regional differences in prices, job outcomes, and salaries. $TotExpend$ quantifies total expenditures, which was a control variable given its effects on available, disposable income. Finally, $WorkStatus$ defines if the respondent was employed at the time of the survey, again affecting available income. Table 1 includes some of these key variables and a summary of their observations in the data.

Table 1: Summary Statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Age	34,994	47.7	12.58	19	88
Salary	34,994	$81,548	$76,805	$1	$357,358
Family Size	34,994	3.261	1.311	2	14
Total Expenditures (previous quarter)	34,994	$16,600	$14,765	$1,085	$357,008
Total Expenditures (current quarter)	34,994	$8,410	$10,869	$0	$214,711
Apparel Expenditures (previous quarter)	34,994	$335	$564	$0	$13,100
Apparel Expenditures (current quarter)	34,994	$164	$374	$0	$15,825
Personal Care Expenditures (previous quarter)	34,994	$132.40	$174.50	$0	$6,180
Personal Care Expenditures (current quarter)	34,994	$66.45	$106.50	$0	2,000
Salon Expenditures	34,994	$193	$214	$0	$6,180
Sex	34,994	0.401	0.49	0	1

Note: Other categorical variables including education level, race, year, marital status, work status, college enrollment, quarter, and state are excluded.

The variables involved in this regression analysis are descriptive. Since spending is studied, they can provide insight into factors affecting it, but not explain causal relationships between the dependent variables and control variables. Additionally, it is important to note in these relationships that sex is an exogenous variable. Its value and measure are independent from other variables in the model, but it still provides valuable insight into the expenditure outcomes.

Chapter 6

Results and Discussion

Using the relationships defined in Chapter 5, the regressions divulge quarterly spending patterns for women. In the results, the variable defining a male respondent was eliminated, meaning the coefficients explain women's purchasing habits in comparison to men's. Table 2 highlights the key results of all four regressions. Table 3, which includes the coefficients for more created variables, can be found in the Appendix.

Table 2: Linear Regression Results for Spending Patterns by Sex

	(1)	(2)	(3)	(4)
VARIABLES	Personal Care	Salon	Apparel	Total Expenditures
Sex	17.51***	33.48***	33.78***	1,846***
	(2.036)	(2.541)	(6.335)	(166.3)
Mean	$132.40	$193	$335	$16,600
Constant	42.74***	64.02***	82.31**	1,621*
	(11.12)	(13.88)	(34.60)	(910.1)
Observations	30,761	30,761	30,761	30,761
R-squared	0.156	0.115	0.204	0.171

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The regression model also controlled for age, salary, family size, education level, race, marital status, state, year, quarter, work status, and college enrollment, but they were excluded for conciseness. The mean is not a regression result; it was included for quick comparison to the coefficient.

Personal Care

In the regression results describing personal care expenditures, the coefficient corresponding to the sex variable is 17.51, meaning women pay an average of $17.51 more on personal care products and services than men. This value is statistically significant over a 95% confidence interval and is 13.22% higher than the mean for all surveyed individuals, which was $132.40.

Moshary et al. (2023) hypothesized that the market for personal care products behaves differently compared to others, given the magnitude of gender-based pricing and market segmentation. Their theory of second-degree price discrimination as the basis for a pink tax presents an explanation for these regression results. If women are afforded a larger variety of products, particularly with more luxurious, targeted functions, that they feel pressured to select, it is natural that their personal care costs should be higher. This is not necessarily unfair discrimination. It may be the only choice of sellers to segment the market and understand consumers' purchasing preferences.

Salon

A coefficient of 33.48 on the sex variable describes $33.48 in higher expenditures on hair styling and other salon services for women. This value is statistically significant over a 95% confidence interval and is 17.38% higher than the overall mean, which was $192.60.

There is evidence to suggest that women are unfairly charged for similar haircuts to men. Duesterhaus et al. (2011) found that only 15 out of 100 surveyed salons offered the same starting price for haircuts for all genders, even when asked for an identical cut. It is noteworthy, however,

that women generally have longer hair and different textures compared to men, making the input costs (both time and money) higher for women's styling. Laws banning the pink tax, including in New York, clearly state that businesses are allowed to charge more if services require more time and effort (The New York State Senate, 2020). Further, women seem willing to pay more for goods and services that accentuate their gender identity; hairstyling and other salon services are some of the most outward ways of doing this. To quote Barber (2008), "purchasing beauty work in the salon is one way women… participate in the 'naturalizing' of social arrangement." Based on this logic, it makes sense from both women's and businesses' perspectives to pay or charge more for salon services, explaining these higher spending patterns.

Apparel

Based on the regression results, women spend $33.78 more than men on apparel. This value is statistically significant over a 95% confidence interval. The mean value for all respondents was $334.50, meaning women's expenditures were 10.10% higher. This is likely the result of both price and quantity discrepancies. Like personal care products, women demonstrate broader preferences for apparel, so sellers can offer a variety at different, higher prices (Jacobsen, 2018). Further, women's trends change more rapidly over time, with less opportunities to repeat and mix new articles of clothing (Miller, 2022). Hence, they are apt to buy more apparel to keep up with these social changes. The magnitude of this additional spending makes sense in the context of the pink tax.

Total Expenditures

The average reported total expenditure was $16,600. According to the regression results, women spend 11.12% higher than this, or $1,845.83 more than men. While women demonstrate higher spending in the other, highly gendered categories, this pattern holds true in a broader sense. The otherwise heightened spending may also be a driving factor in total spending habits. Additional total expenditures present concerns given the gender wage gap. If women are making 69-83% of what men are, then spending 11% more, their overall purchasing power is significantly hindered (Blue & Kahn, 2017). Also, given that wage gap, their relative spending compared to men would be even higher.

Discussion

Regression analysis of all four categories reveals that women spend more overall and in highly gendered categories, but interpretation of these results alludes to reasons beyond a discriminatory pink tax. Namely, the minor differences in the personal care and apparel categories point to the necessary second-degree price discrimination that permeates these markets, and higher salon charges are natural given the services typically selected by women.

It is important to note that all these results are descriptive and involve both price and quantity factors in expenditure patterns. The results highlight reasons for policy concerns about consumer spending among women. However, their descriptive nature is also consistent with both the idea of a pink tax and the notion that women’s demand and willingness to pay are simply different than men’s.

Interestingly, when each regression was run without any control variables, just the dependent expenditure variable and sex, the gap between women's and men's spending significantly decreased. Namely, women only spent $6.97 more on personal care, $12.29 on salon services, and $4.25 on apparel. In the total expenditure category, women spent $707.99 *less* than men without the 12 additional controls. The control variables were all carefully selected based on their ability to impact disposable income and the amount of people the expenditures would apply to. Nevertheless, this discovery points to the dangers of overfitting a model, or including extraneous predictors that contribute random variation (Hawkins, 2004). These control variables combined may have skewed the resulting expenditure data, taking away from the true underlying causes of a pink tax.

One of the limitations of this methodology is ignorance of what exactly the respondents are spending money on. While specific goods and services for each variable were outlined, the precise items women are spending money on is unknown. Therefore, educated inferences must be made about how the spending patterns relate to the economic intuition behind the pink tax.

Chapter 7

Conclusion and Areas for Future Research

This thesis seeks to investigate the existence of a pink tax. Existing literature is vastly inconclusive, with some researchers claiming a substantial upcharge for women, while others doubt its prevalence entirely. When price discrimination is considered, the conversation becomes more complex. If second-degree price discrimination is in place, the pink tax is necessary for sellers to collect data on consumer preferences and encourage people to select products that align with their gender identity. However, third-degree price discrimination distinguishes price based on sex, violating an American protected class.

The empirical analysis in this thesis demonstrates higher purchasing habits by woman compared to both men and the average in four categories: personal care products and services, hair styling and salon products, apparel, and total quarterly expenditures. However, this spending never exceeds 18% higher than the mean, and within the context of existing research, the additional spending is unlikely to be the product of third-degree price discrimination. Regardless, it is crucial to continue this research on the pink tax.

An original goal of this thesis was to craft a differences-in-differences (DID) model, with California's 1995 Gender Tax Repeal Act serving as a treatment. This model would allow a study of the pure causal effects of pink tax bans on women's expenditures, through comparison of states with and without the legislation in the time periods before and after it was enacted. However, a lack of consistency within the selected dataset prevented this exploration; since the Gender Tax Repeal Act only targeted services, they are the only expenditures that could be studied. None of the surveyed categories provided consistent values for exclusively services.

Further, there was no readily available data to study legislation targeting goods, as those were implemented within the past two years. Once more data is ready for synthesis, a DID model would be an excellent way to analyze the effects of pink tax legislation on women's purchasing habits, noting if these policies can do anything to decrease spending. This empirical evidence is critical to policy discussion, as current reports provide little insight into the micro effects of the policies.

Existing literature, economic intuition, and the regression results in this thesis disagree with the pink tax as a consistent, blatantly discriminatory upcharge on items for women. In some cases, women do pay more for goods and services, but the same is true of certain products for men. In addition, some price discrepancies are the result of second-degree price discrimination, which is a legal practice. Firms can segment the market and divulge consumer preferences through price, quantity, and selection differences. If not a pink tax, spending differences in the data can be attributed to societal pressures experienced by women. There is a widespread emphasis on outwardly expressing femininity through enhanced personal care products, diverse attire, and a multitude of salon treatments. In turn, women have become conditioned to pay higher prices or purchase more goods to maintain these expectations. Policy interventions cannot reverse societal attitudes toward the physical manifestation of gender, but legislators can support research on gender equality and promulgate information on the true foundations of the pink tax. Existing laws such as those in New York and California must be revised to explain the legality of second-degree price discrimination and introduce harsher fines to demonstrate the severity of third-degree price discrimination. Then, businesses and buyers alike can be more informed on the pink tax and consumption habits by gender.

While evidence of a pink tax remains ambiguous, women are still experiencing societal pressures to spend extra money on goods and services that accentuate their femininity. Businesses must consider their motivation for encouraging this behavior through choices and price; policymakers alike need to inspect the root cause of upcharges to develop actionable legislation to combat them. Continued research on the pink tax is integral to creating an equitable society for people of all genders.

Appendix

Tables

Table 3: Linear Regression Results for Spending Patterns

VARIABLES	(1) Personal Care	(2) Salon	(3) Apparel	(4) Total Expenditures
Age	0.185**	0.694***	-1.809***	67.89***
	(0.0814)	(0.102)	(0.253)	(6.648)
Sex	17.51***	33.48***	33.78***	1,846***
	(2.036)	(2.541)	(6.335)	(166.3)
Salary	0.000180***	0.000477***	0.000489***	0.0641***
	(1.42e-05)	(1.78e-05)	(4.43e-05)	(0.00111)
Family Size	-0.900	2.980***	34.11***	869.8***
	(0.789)	(0.985)	(2.455)	(64.40)
Marital Status	-12.23	-90.51	-344.9	1,927
	(96.72)	(120.7)	(300.9)	(7,916)
Work Status	19.91***	39.01***	48.99***	4,577***
	(3.991)	(4.981)	(12.42)	(325.6)
Total Expenditures	0.00387***	0.00225***	0.0141***	
	(6.97e-05)	(8.70e-05)	(0.000217)	
Member Race (2)	72.06***	91.08***	93.75***	-805.8**
	(4.154)	(5.184)	(12.92)	(339.9)
Member Race (3)	8.007	-6.304	196.5***	1,663
	(14.43)	(18.01)	(44.91)	(1,181)
Member Race (4)	-42.50***	-65.99***	-51.71***	-1,673***
	(3.891)	(4.856)	(12.11)	(318.3)
Member Race (5)	5.519	1.085	-145.9***	2,935**
	(15.11)	(18.86)	(47.02)	(1,237)
Member Race (6)	-15.12*	-29.35***	80.69***	791.8
	(8.024)	(10.02)	(24.97)	(656.7)
In college (2)	11.31	12.78	21.78	997.1
	(9.122)	(11.39)	(28.38)	(746.6)
In college (3)	11.60	8.976	52.73**	-252.8
	(7.773)	(9.701)	(24.18)	(636.1)
Constant	42.74***	64.02***	82.31**	1,621*
	(11.12)	(13.88)	(34.60)	(910.1)
Observations	30,761	30,761	30,761	30,761
R-squared	0.156	0.115	0.204	0.171

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: The regression model also controlled for education level, state, year, and quarter, but they were excluded for conciseness.

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