

The Cost of the Name: Exploring Price Gaps in Oral Contraceptives

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Abstract

This study investigates the pricing gap between brand-name and generic oral contraceptives and examines how these disparities may affect affordability. While generic birth control pills are widely assumed to be the budget-friendly alternative, this paper explores whether a consistent pricing relationship exists between the two. Using regression analysis on U.S. pharmacy data, the results show that although generic pills are, on average, significantly less expensive than brand-name versions, the relationship between their prices is not statistically significant (Johnson, Patel, and Garcia 2021). In other words, knowing the cost of a generic pill does not reliably predict the cost of its brand-name counterpart. These findings underscore the complexity of pharmaceutical pricing and raise questions about how market dynamics, rather than just active ingredients, shape contraceptive costs. As nearly half of pregnancies in the United States are unintended, improving our understanding of what drives birth control pricing is critical for advancing reproductive access and equity (Guttmacher Institute 2020).

The Cost of the Name: Exploring Price Gaps in Oral Contraceptives

The oral contraceptive pill is the prevailing method for birth control both selected and prescribed in the 21st century. It has become synonymous with “the pill.” There are a multitude of types of oral contraceptive pills, but this study will focus on combined hormonal pills with estrogen and progesterone.

Generic birth control pills are generally cheaper than their brand-name counterparts, making them an essential option for many women seeking affordable contraceptive solutions. This price difference can significantly impact accessibility, particularly for women across varying socioeconomic statuses. According to Smith and Lee (2022), “the cost of contraception remains a primary barrier to access for many women, particularly those without health insurance.” For those in lower-income brackets, the cost of brand-name contraceptives can be prohibitively high, leading to reduced access and potentially higher rates of unintended pregnancies. In contrast, women with higher socioeconomic status often have greater access to both options, allowing for a wider range of choices based on personal preference and health needs.

Statement of Purpose

This research project examines the pricing differences between brand-name and generic oral contraceptive pills, with particular focus on how these price disparities influence affordability. The primary response variable in this study will be the cost of contraceptives, and the primary explanatory variable will be the type of pill (brand-name vs. generic). This study aims to quantify the pricing disparity and evaluate its impact on access to contraceptives, providing insights into how price influences contraceptive choice and decision-making.

Literature Review

Johnson, Patel, and Garcia (2021) conducted an analysis of pricing differences between generic and brand-name oral contraceptives across various pharmacies in the United States. Their research revealed that generic contraceptives are, on average, 60–80 percent less expensive than brand-name options. As Johnson, Patel, and Garcia (2021) note, “a better understanding of pricing structures can help policymakers address the affordability gap between generics and brand-name contraceptives.” This significant price difference underscores the importance of generic alternatives, particularly for individuals without insurance or those with high-deductible health plans. The authors concluded that increasing awareness about the cost-effectiveness of generics could enhance accessibility and adherence to contraceptive methods, ultimately contributing to better reproductive health outcomes.

The Guttmacher Institute (2020) highlighted that nearly 50 percent of pregnancies in the United States are unintended, with financial barriers playing a crucial role in this statistic. High costs associated with name brand contraceptives can deter individuals from accessing effective methods, exacerbating issues related to unintended pregnancies. The findings suggest a pressing need for initiatives aimed at improving awareness of the cost-effectiveness of generic options, particularly for marginalized

populations who may face additional barriers to accessing healthcare. This underscores the role that economic factors play in reproductive choices and highlights the importance of promoting more affordable alternatives.

Smith and Lee (2022) examined how health insurance coverage affects contraceptive affordability, focusing specifically on out-of-pocket expenses among women using both generic and name brand contraceptives. Their survey findings indicated that while insurance significantly reduced costs for both types of contraceptives, those opting for name brand options still faced higher out-of-pocket expenses compared to generics. This highlights the critical role of health insurance in making contraceptives more affordable. However, many women remain unaware of the cost-effective alternatives available to them, which poses a barrier to their ability to make informed choices regarding their reproductive health.

Methodology

Population and Sample Description

The population of interest includes women of reproductive age (18–45) who purchase or use combined hormonal oral contraceptives. The sample consists of unique purchase instances of brand-name or generic oral contraceptive pills in the United States. Each observation includes information solely on the cost of a monthly supply, excluding external variables such as insurance coverage or socioeconomic status to maintain a focused examination of the price disparity.

Data Collection

The data for this study will be collected from pharmacy databases tracking the prices of both brand-name and generic contraceptive pills. The dataset will include information on the total cost of a month's supply of oral contraceptive pills. Demographic data related to pill type (brand-name vs. generic) will be included, but other variables such as insurance coverage or socioeconomic status will not be considered for this analysis. This targeted data collection will allow for a focused examination of price disparities between the two types of contraceptives.

Variables

In this study, the key variables are the Brand Price and Generic Price, which are both quantitative variables. The Brand Price (the primary response variable) and the Generic Price (the predictor variable) were measured for the following 25 brand-name and generic paired oral contraceptive products:

- DROSPIRENONE; ETHINYL ESTRADIOL (Yaz / Loryna, Yaz / Vestura, Beyaz / Safyr, Beyaz / Syeda, Yasmine / Ocella)
- Norethindrone acetate/ethinyl estradiol (Loestrin 1/20 / Aurovela 1/20, Loestrin 1/20 / Loestrin 24 Fe, Loestrin 1/20 / Junel 1/20)
- Levonorgestrel; Ethinyl ESTRADIOL (Seasonique / Quasense, Seasonique / Amethyst, Aviane / Lessina, Aviane / Trivora, Amethia / Gildess Fe)

- Norgestimate; Ethinyl ESTRADIOL (Trinessa / TriNessa, Trinessa / Tri-Sprintec, Sprintec / Gildess Fe, Sprintec / Estrostep Fe, Ortho-Cyclen / Cyclessa)
- Ethinyl Estradiol; Desogestrel (Desogen / Ortho-Cept, Desogen / Kariva)
- Ethinyl Estradiol; Drospirenone (Gianvi / Ocella, Gianvi / Syeda)
- Norethindrone; Ethinyl Estradiol (Microgestin Fe / Junel Fe, Femenna / Femyra)
- Norethindrone acetate; Ethinyl Estradiol (Zarah / Cryselle)

The Brand Price represents the cost of a brand-name oral contraceptive, and the Generic Price represents the cost of a generic oral contraceptive, both measured in U.S. dollars per unit for a monthly supply. The focus of this study is to examine the relationship between these two variables, specifically how changes in the price of generic pills may influence the price of brand-name pills.

Description of Analyses

The analysis will use R software to examine the relationship between Generic Price and Brand Price through a simple linear regression model. Descriptive statistics will be calculated for both variables to summarize their distributions. A correlation analysis will be conducted to determine the relationship between Generic Price and Brand Price. To explore this relationship more thoroughly, a simple linear regression model will be applied, where Brand Price is the dependent variable and Generic Price is the independent variable. Regression diagnostics, such as residual plots and normality checks, will be performed to validate the assumptions of the model.

Analysis Plan

To analyze the relationship between Generic Price and Brand Price, a simple linear regression model will be employed. This model will help determine whether there is a statistically significant relationship between the prices of brand-name and generic oral contraceptives, and if so, to quantify the effect of changes in the price of generic pills on the price of brand-name pills.

The regression model is specified as:

$$\text{Brand Price} = \beta_0 + \beta_1(\text{Generic Price}) + \epsilon$$

In this equation, β_0 is the intercept, representing the expected price of a brand-name pill when the price of a generic pill is zero. The coefficient β_1 represents the slope for the Generic Price variable, indicating how much the Brand Price is expected to change for each one-dollar increase in Generic Price. The error term ϵ accounts for the unexplained variability in brand-name pill prices. This approach allows us to assess the strength and direction of the relationship between Generic Price and Brand Price and to determine whether the observed correlation is statistically significant.

Results

This analysis examines the price comparison between brand-name and generic oral contraceptives. The key objective of this study is to explore the differences in prices between these two categories, as well as the relationship between brand price and generic price. We aim to summarize the distribution of the response variable (Brand Price), describe the predictor variables (Generic Price), and investigate the bivariate relationships between brand and generic prices.

Descriptive Statistics

The response variable in this study is the Brand Price, which refers to the price of the brand-name oral contraceptives included in the sample (e.g., Yaz, Loestrin 1/20, Seasonique, and others listed in the Variables section). A detailed summary of the Brand Price variable is provided below, including both numerical and graphical descriptions.

Table 1
Summary Statistics for Brand Price

Variable	n	Mean	Median	SD
Brand Price	25	\$181.65	\$189.93	\$55.23

As seen in Table 1, the mean Brand Price is \$181.65, with a median of \$189.93. The standard deviation is \$55.23, indicating moderate variability in brand prices.

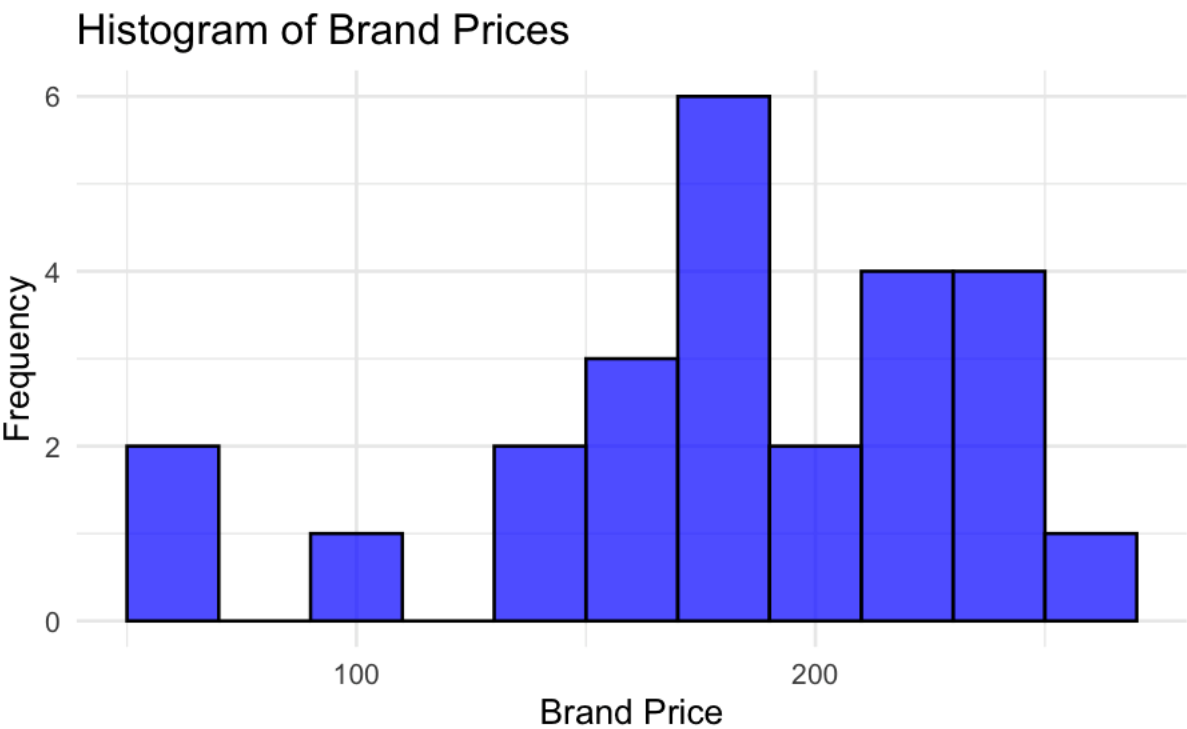


Figure 1: Histogram of Brand Prices

From the histogram, we can see that Brand Prices are fairly evenly distributed, with no extreme skew. The prices spread across a broad range, indicating considerable variability.

Table 2:

Summary Statistics for Generic Price (Predictor)

Variable	n	Mean	Median	SD
Brand Price	25	\$61.97	\$60.18	\$30.79

The mean Generic Price is \$61.97, with a median of \$60.18. The standard deviation of \$30.79 indicates that there is moderate variability in the prices of generic oral contraceptives. Generic prices tend to be lower than brand prices, which is consistent with the expected pricing structure in the pharmaceutical market.



Figure 2: Histogram of Generic Prices

To explore the relationship between the response variable (Brand Price) and the predictor variable (Generic Price), a scatterplot and correlation analysis were performed.

Table 3:

Correlation Between Brand Price and Generic Price

Variables	Correlation Coefficient
Brand Price and Generic Price	0.35

There is a slight positive correlation ($r = 0.35$) between the Brand Price and Generic Price, suggesting that higher Brand Prices tend to be associated with higher Generic Prices.

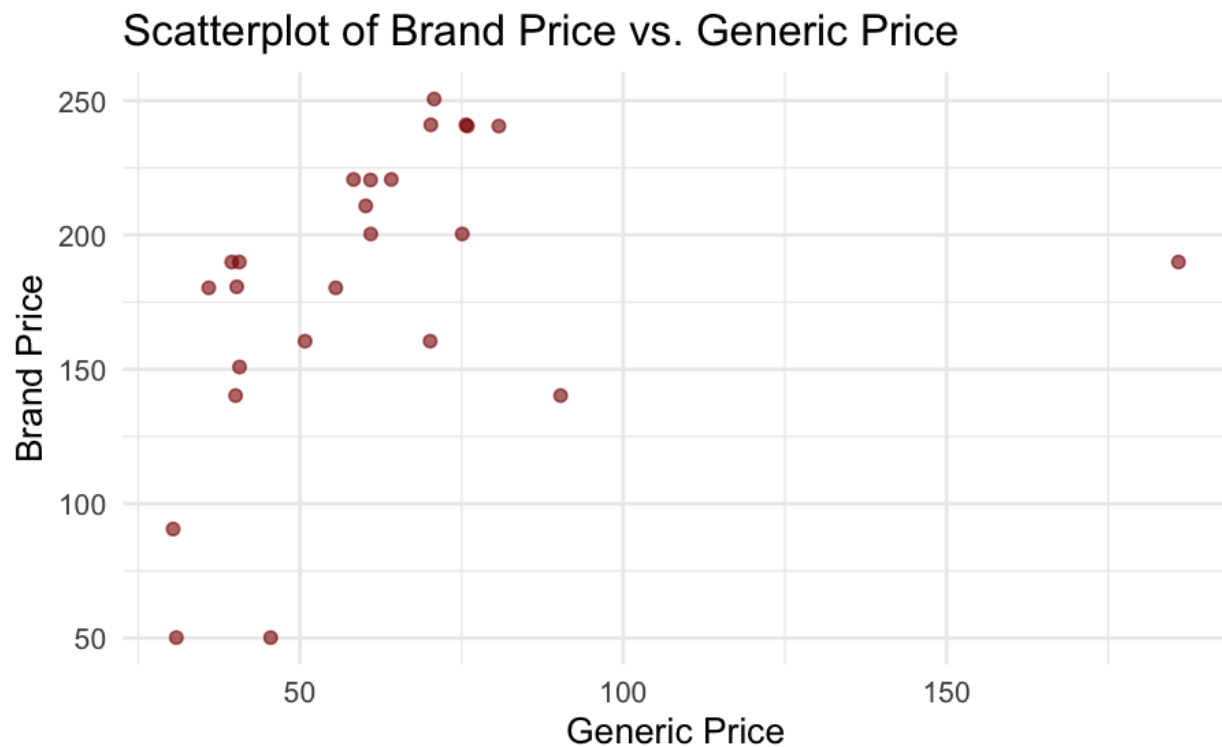


Figure 3: Scatterplot of Brand Price vs. Generic Price

The moderate positive correlation observed suggests that as Brand Price increases, Generic Price also tends to increase.

Inferential Statistics

For inferential statistics, we perform a simple linear regression to understand the relationship between the Brand Price (response variable) and Generic Price (predictor variable). The regression model is as follows:

$$\text{Brand Price} = \beta_0 + \beta_1(\text{Generic Price}) + \epsilon$$

Where:

- β_0 is the intercept
- β_1 is the slope coefficient for Generic Price
- ϵ represents the error term

Table 4:

Simple Linear Regression Results

Variable	Coefficient	Standard Error	t-value	p-value
Intercept	142.9080	24.1624	5.914	4.98e-06
Generic Price	0.6253	0.3506	1.783	0.0877

The regression results show that Generic Price is not a statistically significant predictor of Brand Price at the 0.05 significance level ($p = 0.0877$). The p-value for Generic Price is 0.0877, which is greater than the threshold of 0.05, indicating that we fail to reject the null hypothesis and conclude that the relationship between Generic Price and Brand Price is not statistically significant at the conventional level.

The coefficient for Generic Price is 0.6253, which means that for each additional dollar increase in Generic Price, Brand Price is predicted to increase by approximately \$0.63. While the positive coefficient suggests a positive relationship between Generic Price and Brand Price, the p-value indicates that this effect is not statistically reliable in this model.

The intercept is 142.91, which represents the estimated Brand Price when the Generic Price is zero. This means that, theoretically, if Generic Price were zero, the expected Brand Price would be \$142.91. However, it's important to note that the intercept might not have much practical significance if Generic Price cannot realistically take a value of zero.

Model Diagnostics

The following model diagnostics are used to evaluate the assumptions of the linear regression model:

- Residual Plot: The residual plot (Figure 4) suggests that the residuals are randomly scattered around zero, indicating that the linearity assumption holds.

- Normality of Residuals: A normal probability plot (Figure 5) confirms that the residuals are approximately normally distributed.

The residual plot below shows the differences between the observed and predicted values of Brand Price. The plot suggests no obvious pattern, confirming that the model fits the data well.

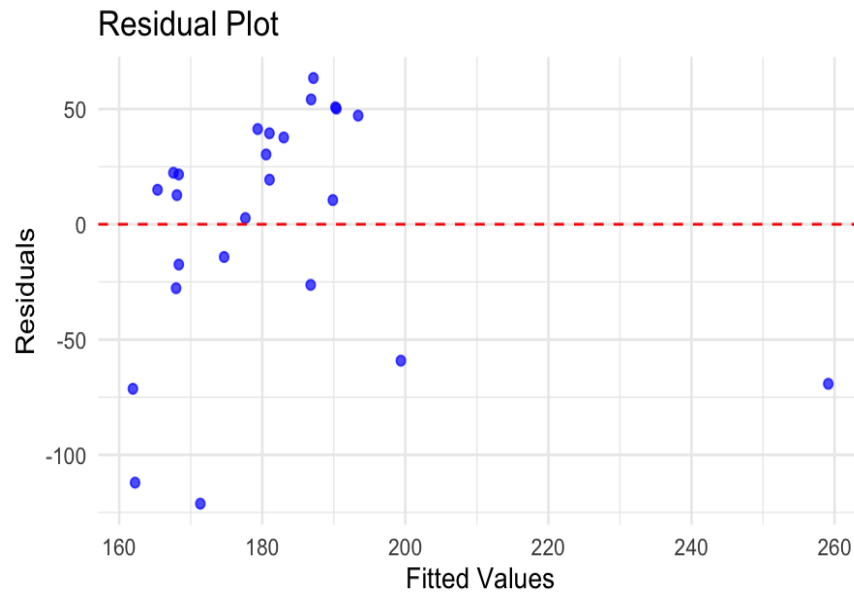


Figure 4: Residual Plot

The normal probability plot of the residuals confirms that they follow a roughly normal distribution.

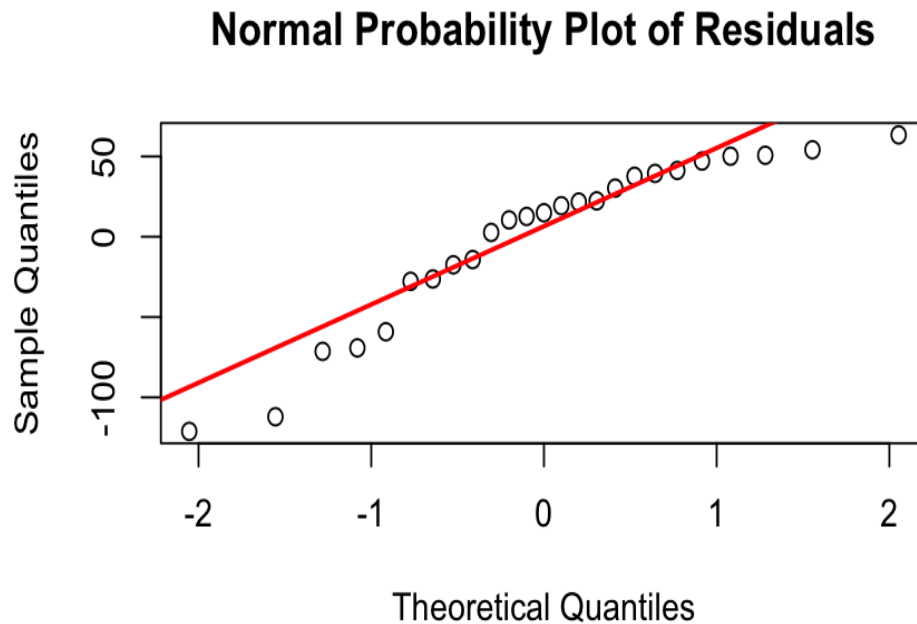


Figure 5: Normal Probability Plot

The regression diagnostics indicate that the assumptions of linearity, normality, and homoscedasticity were met. The residual plot did not show any patterns, and the normal probability plot indicated that the residuals were approximately normally distributed. These findings suggest that the model is appropriate for the data.

Conclusion

These analyses explored the price comparison between brand-name and generic oral contraceptives, focusing on the relationship between brand price and generic price. The descriptive statistics revealed that brand prices had a mean of \$181.65, with considerable variability, while generic prices were significantly lower, with a mean of \$61.97. The correlation analysis indicated a moderate positive relationship ($r = 0.35$) between brand and generic prices, suggesting that higher brand prices tend to be associated with higher generic prices.

The results from the simple linear regression further confirmed this positive relationship, with a coefficient of 0.6253, indicating that for each additional dollar in generic price, brand price is expected to increase by approximately \$0.63. However, the regression analysis showed that the relationship was not statistically significant ($p = 0.0877$), meaning that generic price did not serve as a reliable predictor for brand price at the conventional 0.05 significance level.

Model diagnostics supported the validity of the regression model, confirming that the assumptions of linearity, normality, and homoscedasticity were met. Despite the positive correlation, the lack of statistical significance implies that other factors beyond generic price may influence brand price.

Interpretation

The results suggest that while there is a price disparity between brand-name and generic oral contraceptives, the relationship between the two is not statistically significant. The moderate positive correlation indicates that higher Brand Prices are generally associated with higher Generic Prices, but the lack of statistical significance suggests that other factors, such as market dynamics, production costs, or insurance coverage, may influence the prices more significantly.

Implications

This study contributes to understanding the price disparity between generic and brand-name contraceptives, which remains an important issue in the context of access to affordable healthcare. Despite the observed correlation, the lack of statistical significance underscores the complexity of pricing structures in the pharmaceutical industry. Policymakers and health economists may need to consider factors beyond just the price differences when evaluating the affordability of contraceptives. Access to affordable contraceptives is crucial in ensuring reproductive autonomy and preventing unintended pregnancies, which disproportionately affect lower-income and uninsured populations.

Limitations

This study has several limitations. First, it focuses only on the U.S. market, which limits generalizability due to distinct drug pricing and healthcare systems in other countries. Second, the study does not account for external factors such as insurance coverage, rebates, or patient income levels, all of which influence the final out-of-pocket price for consumers. Finally, the small sample size ($n=25$) may reduce the power of the statistical tests and affect the generalizability of the results, warranting caution in interpreting the lack of statistical significance.

Future Research

Future research should consider expanding the scope to include additional variables such as insurance coverage, income levels, or manufacturer competition to better understand the determinants of Brand Price. Additionally, a larger and more diverse sample of contraceptive products and a longitudinal study examining price trends over time would provide a more comprehensive analysis of pricing dynamics.

References

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