# Beyond Birth Control: How Women Navigate Costs, Risks, and Access in the Modern Contraceptive Landscape

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**Abstract**

This study explores the impact of financial and time-related barriers on preventive healthcare utilization, with a focus on contraceptive care as a case study. Leveraging comprehensive claims data from 28 million privately insured individuals, aggregate prescription data from individuals on Medicaid and quasi-experimental variation arising from state-level policy changes, the paper develops a structural demand model that integrates monetary costs, time constraints, and health risks. The findings indicate that reducing financial barriers substantially increases the adoption of effective but high-upfront-cost methods, whereas reducing time costs, such as by expanding access through pharmacies, has limited effects. The paper also contains plans for future work examining heterogeneity in consumer preferences across demographic groups, endogenizing supply and considering a dynamic setting. These insights have important implications for insurance design and healthcare delivery systems, particularly for preventive services requiring regular access.

## 1 Introduction

Understanding how financial and non-financial barriers affect healthcare utilization is crucial for both insurance and healthcare delivery system design. While the Affordable Care Act expanded coverage for many preventive services, significant access barriers remain through time costs and provider availability. This research examines how consumers navigate these constraints, with implications for both insurance benefit design and provider network policies.

The empirical setting of contraceptive care provides a compelling setting for studying these trade-offs for several reasons:

1. Regular preventive care needs with clear health implications
2. Variation in provider types (physicians, nurse practitioners, pharmacists)

3. Rich data on both utilization and health outcomes

4. Natural experiments from state policy changes

5. Clear monetary and time trade-offs in treatment options

This research applies an industrial organization perspective to study market demand for contraceptive products, examining how both financial and non-financial factors (including wait times as well as health risks) influence women's choices across different methods and brands. The analysis will leverage quasi-experimental variation from policy changes to identify key parameters in a structural demand model, enabling evaluation of critical policy questions about future insurance design and market function.

The research addresses three key questions:

1. How do women trade-off between product characteristics (effectiveness, duration, side effects) and access costs (pecuniary and time) when choosing contraceptive methods? How do these preferences vary by age, income, and other demographic factors?

2. How do insurance coverage and policy design affect the distribution of contraceptive choices and subsequent fertility outcomes, assuming demand for sex and children to be constant?

3. How do market conditions influence price competition and innovation incentives when insurance coverage distorts the market? While full supply-side analysis awaits future work, demand estimates can provide initial insights into market power and competitive dynamics in a space with few operating competitors (see Figure 1 in Appendix).

The current project proceeds in two phases. The first phase, which is complete, develops and estimates a static discrete choice model using aggregate Medicaid State Drug Utilization Data. This provides initial evidence on how financial and time costs affect contraceptive choice. The second phase, which is planned, will extend the analysis using individual-level MarketScan claims data and a dynamic framework that accounts for learning and switching behavior.

# 2 Literature Review and Theoretical Framework

This research builds on three complementary literatures in health economics:

## 2.1 Healthcare Utilization and Access Barriers

A substantial literature examines how financial and non-financial barriers affect healthcare utilization. Following seminal work by Acton (1975) and Muurinen (1982), healthcare decisions are modeled as involving both monetary and time investments. Recent work by Richards and Polsky (2015) demonstrates that non-financial barriers remain significant even when services are fully covered. This framework generates testable predictions about how changes in time costs should differentially affect individuals based on their opportunity cost of time.

## 2.2 Product Differentiation and Consumer Choice

I extend standard discrete choice models to incorporate the initial choice of contraceptive method. The model treats contraceptive products (grouped by active ingredients within a method - see Table 1) as differentiated products varying along multiple dimensions: monetary cost, time cost, duration, efficacy, and health risks. Currently, I define a market as a state-year, though I plan to take a more granular approach with micro data. In the future, I plan to develop a dynamic framework, building on Crawford and Shum (2005), allowing me to separate learning effects from cost-related switching behavior.

## 2.3 Provider Markets and Healthcare Access

A growing literature examines how provider market structure affects healthcare access and quality (Gaynor 2016). Recent work has focused on the role of non-physician providers in expanding access (Richards and Polsky 2015). This research contributes by examining how provider market structure interacts with insurance design to affect utilization.

# 3 Data and Empirical Strategy

## 3.1 Data Sources and Sample Construction

The analysis draws on several complementary datasets that together provide a comprehensive view of healthcare utilization patterns and access barriers. The primary data source is the MarketScan Commercial Claims database covering 2015-2017, which includes detailed medical and pharmacy claims for over 28 million unique individuals. This database provides particular advantages for studying healthcare access, offering complete longitudinal histories that reveal both utilization patterns and switching behavior.

Importantly, the claims data include detailed cost-sharing information, allowing us to observe out-of-pocket costs, deductibles, and total payments at the claim level. The data also contain provider identifiers, enabling measurement of geographic access barriers.

To complement the private insurance data, I incorporate the Medicaid State Drug Utilization Data, which provides comprehensive information on prescriptions and spending patterns in the public insurance market (See Table 2. The Medical Expenditure Panel Survey adds nationally representative data on healthcare utilization, costs, and insurance coverage, particularly valuable for constructing outside options and understanding access barriers.

# 4 Current Work: Static Analysis

## 4.1 Empirical Framework

The baseline analysis employs a random coefficients discrete choice model following Berry, Levinsohn, and Pakes (1995). Consumer $i$'s indirect utility from product $j$ in market $t$ is specified as:

$$u_{ijt} = p'_{jt}\alpha_{it} + X'_{jt}\beta_{it} + \xi_{jt} + \epsilon_{ijt} \tag{1}$$

The price term $p_{jt}$ currently captures both monetary costs through out-of-pocket payments, with plans to include time costs measured by distance to providers and wait times. Product characteristics $X_{jt}$ include duration, efficacy, and health risks. The model incorporates unobserved quality through $\xi_{jt}$, which consists of product-specific components ($\xi_j$), time effects ($\xi_t$), and market-specific variation ($\Delta\xi_{jt}$). Product fixed effects are projected onto observable characteristics, including the typical use rate and documented health risks such as depression and venous thromboembolism. The error term $\epsilon_{ijt}$ follows a Type-I Extreme Value distribution, consistent with standard discrete choice modeling approaches. Future work will involve the development of a dynamic model to capture initial choice and adherence.

## 4.2 Identification Strategy

The static model is just identified. To avoid collinearity of the instruments and the product characteristics, there must be cross-market choice set variation and cross-market demographic variation. Variation in the choice set is given by the introduction of new products across time, removal of products across time, and variation in durability for LARCs across time with new FDA approvals. Demographic variation is given by the differing populations between states and across time. Additional sources of variation include variation in Medicaid expansion across states, geographic variation in pharmacy access laws, and differential timing of policy implementation. These sources of variation provide the necessary exogenous changes to identify the causal effects of both financial and time-related barriers to care.

## 4.3 Preliminary Results

The static demand model estimates reveal how different product features affect consumer utility and choice behavior (see Table 3 in Appendix). The price coefficient of -1.000 (SE: 0.410) indicates that a one-dollar increase in price reduces consumer utility by one unit. While the negative effect is statistically significant, the relatively large standard error suggests some uncertainty about the precise magnitude of price sensitivity.

Duration emerges as a crucial factor in contraceptive choice, with a strong positive coefficient of 0.950 (SE: 0.160). This highly significant estimate indicates that consumers strongly prefer longer-acting methods, all else equal. In contrast, the ability of pharmacists to prescribe products shows a small positive but statistically insignificant effect on utility ($\beta = 0.037$, SE: 0.087), suggesting that this access feature may be less central to consumer decision-making.

The model also explores heterogeneity in consumer preferences through random coefficients. The estimated standard deviation for price sensitivity ($\sigma = 0.110$, SE: 0.650) suggests limited variation in how consumers respond to prices, though this heterogeneity is not statistically significant, indicating relatively homogeneous price sensitivity. This is expected, as women on Medicaid have relatively similar incomes due to qualification requirements. As such, their responsiveness to copays may be more homogeneous.

The regression of fixed effects on product characteristics yielded several notable findings that help explain unobserved product quality. Typical use effectiveness shows a positive and

statistically significant coefficient of 0.747 (SE: 0.258, p=0.008), suggesting that products with higher typical use rates tend to have higher fixed effects. This potentially counterintuitive result may reflect greater brand loyalty or perceived quality for certain methods, particularly oral contraceptives, which dominate the market despite lower typical use effectiveness.

The analysis found a negative association between venous thromboembolism (VTE) risk and product fixed effects (coefficient: -0.694, SE: 0.342, p=0.054), indicating that products with higher VTE risk tend to have lower unobserved quality valuations. This marginally significant result aligns with expected consumer preferences for avoiding serious side effects. Interestingly, depression risk showed a positive and significant relationship with product fixed effects (coefficient: 3.663, SE: 1.651, p=0.037). While seemingly counterintuitive, this could reflect omitted variable bias if products with higher depression risk also offer unmeasured benefits, measurement challenges in quantifying depression risk, or correlation with other valued product features not captured in the model.

The capability to treat heavy menstrual bleeding (HMB) showed a positive but statistically insignificant relationship with product fixed effects (coefficient: 3.256, SE: 3.125, p=0.308), suggesting we cannot draw firm conclusions about how this feature relates to unobserved product quality.

### 4.4 Demographic Analysis Plans

Future work in the static model will incorporate demographic heterogeneity through the specification $\begin{pmatrix}\alpha_{it}\\ \beta_{it}\end{pmatrix} = \begin{pmatrix}\bar{\alpha}\\ \bar{\beta}\end{pmatrix} + \Pi D_i + \Sigma\nu_i$, where $D_i$ includes key demographic variables such as income, age, geographic location, and education level. This specification will allow us to understand how different population segments respond to various barriers to care.

## 5 Planned Extensions

### 5.1 Individual Claims Data Analysis

The next phase will utilize MarketScan Commercial Claims data to enhance our understanding through several key dimensions: tracking individual treatment histories, observing switching patterns and accounting for insurance plan characteristics. This rich individual-level data will provide deeper insights into how consumers navigate healthcare choices over time.

### 5.2 Dynamic Model Framework

The dynamic model will extend the current analysis by incorporating forward-looking behavior through the Bellman equation: $V_i(s_{it}) = \max_j\{u_{ijt} + \beta E[V_i(s_{i,t+1})|j, s_{it}]\}$. The state space $s_{it}$ encompasses the current method, experience with different methods, accumulated side effects, and provider relationships, allowing for a comprehensive analysis of healthcare decision-making over time.

## 5.3 Dynamic Identification

My identification strategy addresses several challenges inherent in healthcare demand estimation. Selection bias arises because individuals choose insurance plans partly based on unobserved health needs, and treatment choices may reflect private information about health risks. We address this through within-plan variation and panel data controls for individual health status.

The estimation leverages multiple sources of variation:

1. Geographic variation from state-level policy changes
2. Insurance design variation from within-plan differences
3. Time series variation from entry of new options
4. Demographic variation across markets

## 5.4 Supply Side Analysis

To complement the demand-side analysis, I plan to incorporate supply-side behavior and market structure into the theoretical framework. The contraceptive market exhibits several features that make supply-side analysis particularly important. While the market includes both branded and generic products, competition occurs primarily through product differentiation rather than price. Different hormonal formulations and delivery mechanisms create distinct submarkets with varying degrees of competition. Additionally, the presence of long-term contracts between manufacturers and pharmacy benefit managers (PBMs) suggests that static price competition models may be insufficient. The supply-side analysis will proceed in several stages. First, I will document basic facts about market structure, including concentration among manufacturers and patterns of entry and exit. Second, I will develop a theoretical framework modeling multi-product firms competing in a differentiated product market, incorporating the role of PBMs as intermediaries affecting final prices. The model will explicitly account for innovation decisions regarding both new products and delivery mechanisms.

## 5.5 Market Competition

While full supply-side analysis awaits future work, the demand estimates can provide initial insights into competitive dynamics. By examining patterns in markups and simulating demand shift effects on prices, I can examine whether predicted changes are consistent with competitive models (Bresnahan, 1987). This analysis will be particularly valuable for understanding why certain market segments (e.g., the contraceptive implant) have seen limited innovation and clinical trials to increase the efficacy period.

# 6 Policy Counterfactuals and Implications

# 7 Policy Counterfactuals

The estimated demand model enables evaluation of three key policy scenarios:

## 7.1 Insurance Design

Analysis of how varying levels of cost-sharing across methods affects both method selection and fertility across demographic groups. This includes examining coverage changes for provider visits and insertion costs.

## 7.2 Time Costs

Evaluation of how pharmacy access laws, geographic (travel times) and wait time barriers affect utilization, with particular attention to differential impacts across socioeconomic groups.

For each counterfactual scenario, I will estimate changes in method choice and adherence patterns, with particular attention to heterogeneous effects across age groups and socioeconomic status. The analysis will project fertility impacts through changes in contraceptive failure rates, assuming demand for sex and children to be constant.

## 7.3 Policy Implications

This research informs several key policy debates beyond contraceptive access. The analysis of consumer trade-offs between provider types and access points has implications for the optimal design of healthcare delivery systems, shedding light on when non-physician providers can effectively expand access and how provider market structure affects utilization. The findings on time and monetary costs provide insights for insurance design more broadly, particularly for preventive services where regular access is crucial. These results will help inform coverage requirements across various healthcare contexts. The methodological framework developed here can be applied to other markets where consumers face similar constraints in accessing care.

# 8 Conclusion and Future Work

This research provides important insights for health policy by demonstrating how consumers navigate financial and non-financial barriers to care. The findings highlight the complex interplay between insurance benefit design and healthcare delivery systems, suggesting that policy interventions must consider both monetary and time costs to effectively expand access to preventive care. While financial barriers appear to be the primary constraint for many consumers, particularly for high-value preventive services, the heterogeneity in responses to time costs suggests the importance of targeted interventions that account for geographic and demographic differences.

Several promising directions for future research emerge from this work. Deeper investigation of provider market structure effects could inform policies around healthcare delivery system design. Additionally, applying this methodological framework to other preventive services could yield insights about the generalizability of these findings across healthcare contexts.

The results of this research have immediate implications for current policy debates around healthcare access and insurance design. The finding that financial barriers has large effects on the utilization of high-value preventive care supports arguments for value-based insurance design. Similarly, the future evidence on geographic heterogeneity in responses to provider network expansion could inform targeted approaches to improving healthcare access in underserved areas.

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# A Figures and Tables

| | Frequency | Typical Use Rate | RR VTE | RR Depression | FDA-Approved Methods | How to get it | Ease of stopping | Max Annual Cost |
|---|---|---|---|---|---|---|---|---|
| **Short-term methods** | | | | | | | | |
| *Combination pill* | Daily | 7% | 2.89 | 1.23 | Generics available | Pharmacy | High | $600 |
| *Progestin-Only* | Daily | 7% | 1.0 | 1.34 | Generics available | Pharmacy | High | $600 |
| *Patch* | Weekly | 7% | 8.0 | 2.0 | Twirla, Xulane (generic) | Pharmacy | High | $600 |
| *Extended Use Pill* | Daily | 7% | 2.89 | 1.23 | Generics available | Pharmacy | High | $600 |
| *Ring* | Monthly | 7% | 6.5 | 1.6 | Annovera, NuvaRing, EluRyng (generic) | Pharmacy | High | $2,200 |
| *Injection* | 3-months | 0.4% | 3.0 | 2.7 | Generics available | Doctor Visit | High | $600 |
| **LARCs** | | | | | | | | |
| *Implant* | 3 years | 0.05% | 2.0 | 2.1 | Nexplanon | Doctor Visit | Medium | $2,200 |
| *Hormonal IUD* | 3-8 years | 0.1-0.4% | 1.0 | 1.4 | Mirena/Skyla/Liletta/Kyleena | Doctor Visit | Medium | $1,300 |
| *Copper IUD* | 10 years | 0.8% | 1.0 | 1.0 | Paragard | Doctor Visit | Medium | $1,000 |

Table 1: Characteristics of Contraceptive Methods

Source: FDA Birth Control Guide, Venator and Pennington 2023, Combined Hormonal Contraception and the Risk of Venous Thromboembolism: A Guideline 2016, and Skovlund 2016

Note: Typical Use Rate refers to the failure rate of each method in a year under typical circumstances, including incorrect or inconsistent use. The abbreviation RR represents the statistical term "Relative Risk," or the ratio of the probability of an event occurring in the exposed group compared to the unexposed group of a treatment. VTE stands for Venous Thromboembolism. Annual costs reflect the price of 12 months of short-term methods and the entire cost of the long-term methods (since these costs are occurred in the first year regardless of use time).

Table 2: Summary Statistics for Methods with Standard Deviations

| **Method** | **Mean Copay** | **Shares (%)** |
|---|---|---|
| Combination Pill | 205.98 | 11.14 |
| | (100.45) | |
| Continuous Use Pill | 184.89 | 0.44 |
| | (97.17) | |
| Copper IUD | 60.16 | 1.23 |
| | (64.13) | |
| Hormonal IUD | 59.20 | 7.63 |
| | (60.21) | |
| Implant | 54.84 | 3.32 |
| | (40.01) | |
| Patch | 60.63 | 0.40 |
| | (69.45) | |
| Progestin Only Pill | 237.08 | 1.05 |
| | (103.73) | |
| Ring | 65.43 | 0.54 |
| | (92.25) | |
| Shot | 347.48 | 0.57 |
| | (214.23) | |

Source: Medicaid State Drug Utilization Data and Medical Expenditure Panel Survey

Note: Copays are in USD and reflect both the cost of the prescription itself and the cost of the service provided (ex. copay for an office visit and prescription) for one year. Market shares are calculated as the percent of women aged 18-45 on Medicaid using a given method, where prescriptions are annualized.

Table 3: Estimation and Regression Results for Active Ingredients and Key Characteristics

| **Category** | **Component/Characteristic** | **Coefficient** | **Std. Error** | **t-stat** |
|---|---|---|---|---|
| Mean Preferences ($\beta$) | Price | -1.000** | 0.410 | -2.439 |
| | Pharmacist | 0.037 | 0.087 | 0.425 |
| | Duration | 0.950*** | 0.160 | 5.938 |
| Random Coefficients ($\Sigma$) | Price | 0.110 | 0.650 | 0.169 |
| Key Characteristics | HMB | 3.256 | 3.125 | 1.042 |
| | Typical Use | 0.747*** | 0.258 | 2.897 |
| | VTE Risk | -0.694* | 0.342 | -2.026 |
| | Depression Risk | 3.663** | 1.651 | 2.219 |

Note: Significant results are marked as follows: *** ($p \leq 0.01$), ** ($p \leq 0.05$), * ($p \leq 0.10$).

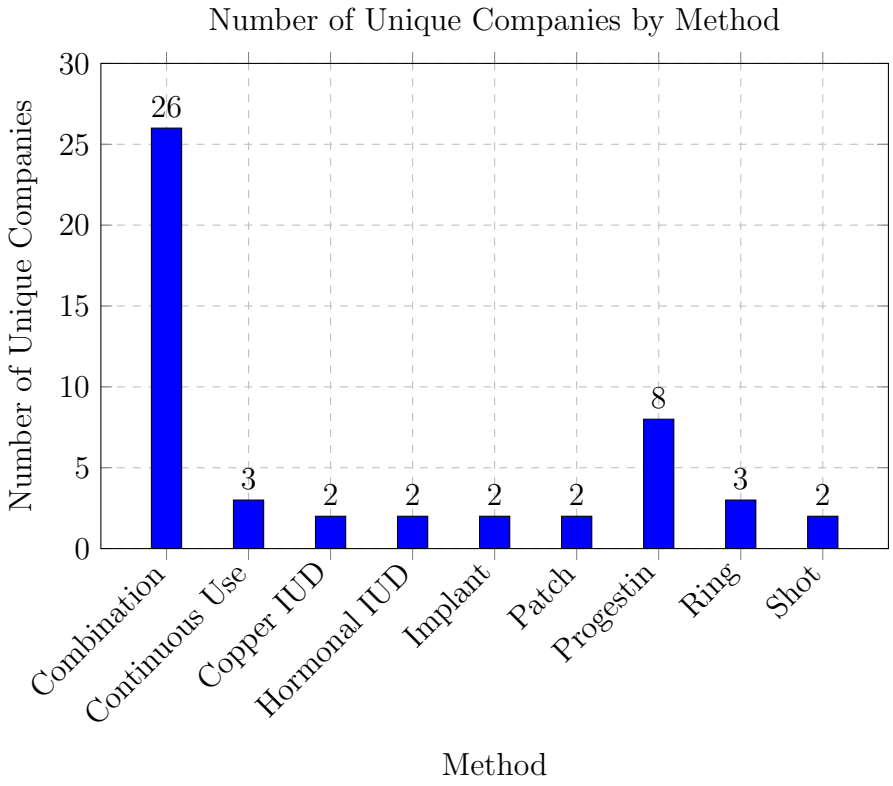



Figure 1: Unique Companies by Method
Source: Medicaid State Drug Utilization Data
Note: Numbers above the bar represent the number of unique Companies producing contraceptives in that category across the entire dataset. For example - while there has only ever been one producer of the Copper IUD at a time, due to a sale of the product, there have been two distinct companies owning the product in the entire dataset.