

Contraceptive Advertising and Fertility Decline in the United States, 1840–1923

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Abstract

Did the diffusion of contraceptive information through newspapers contribute to the fertility decline in the United States during the nineteenth century? We combine article-level historical newspaper data from the American Stories corpus with county-level demographic outcomes from historical U.S. Census records to estimate the causal effect of contraceptive advertising on fertility. Using a dictionary of over 200 OCR-robust regular expressions and large language model classification, we identify more than 54,000 contraceptive advertisements and 45,000 fertility-related articles published in U.S. newspapers between 1840 and 1923. We exploit telegraph access in 1852 as an instrumental variable for local exposure to contraceptive advertising, leveraging the role of early information infrastructure in shaping the speed and reach of newspaper content diffusion across counties. Our results show that greater exposure to contraceptive advertising leads to a statistically significant reduction in fertility. We further document the impact of the Comstock Act of 1873 and related state laws on advertising patterns, including a measurable shift toward euphemistic language following legal restrictions.

Keywords: fertility transition, contraceptive advertising, newspapers, Comstock laws, instrumental variables, text as data

JEL Codes: J13, N31, N32, I18

1 Introduction

The decline of fertility in the United States began well before the advent of modern contraception. Between 1800 and 1900, the total fertility rate fell from approximately

seven children per woman to fewer than four, constituting one of the most significant demographic transformations in American history. Understanding the drivers of this early fertility transition remains a central question in historical demography and economic history.

During the nineteenth century, newspapers played a central role in shaping public discourse on health, morality, and population. Beginning in the 1840s, contraceptive products—often marketed as “female pills,” “monthly regulators,” or remedies for “suppressed menses”—were advertised in U.S. newspapers using euphemistic language and targeting married women. These advertisements promoted herbal abortifacient agents and toxic compounds such as spirit of turpentine, tansy, pennyroyal, ergot, and savine, all marketed as means to regulate menstruation and limit fertility. At the same time, growing concern over perceived “immorality” led to legal restrictions on contraceptive advertising, culminating in the federal Comstock Act of 1873 and related state laws.

Despite the ubiquity of these advertisements and the extensive legal apparatus designed to suppress them, little is known about their actual impact on demographic outcomes. We address this gap by studying how the diffusion of contraceptive advertising through newspapers affected fertility at the county level. We combine digitized historical newspaper data with county-level demographic outcomes to quantify the role of information in fertility decline.

Our contribution is threefold. First, we construct a novel dataset of contraceptive advertisements and fertility-related articles from over 438 million structured article texts in the American Stories corpus, using a combination of OCR-robust text matching and large language model (LLM) classification. Second, we exploit telegraph access in 1852 as an instrumental variable for local exposure to contraceptive advertising, providing plausibly causal estimates of the effect of information diffusion on fertility. Third, we document the impact of the Comstock laws on advertising patterns, including a shift toward more euphemistic language in the post-1873 period.

2 Historical Background

2.1 Contraceptive Advertising in Nineteenth-Century Newspapers

From the 1840s onward, a growing market for contraceptive and abortifacient products developed in the United States, mediated largely through newspaper advertising. Products such as Madame Restell’s Female Pills, Sir James Clarke’s Female Pills, and Lydia E. Pinkham’s Vegetable Compound were among the most widely advertised. These adver-

tisements typically employed euphemistic language—referencing “female irregularities,” “obstructions,” or conditions requiring “restoration of the menses”—while often including coded warnings such as “not to be used by married ladies in a delicate situation,” which effectively communicated the product’s contraceptive or abortifacient purpose.

The commercial reach of these advertisements was extensive. Our data reveal that identical advertisements were syndicated across dozens of newspapers simultaneously, suggesting a sophisticated national distribution network. For example, Sir James Clarke’s Female Pills appeared in over 1,300 distinct newspaper articles in our classified corpus, spanning multiple states and decades.

2.2 The Comstock Laws

The federal Comstock Act of 1873, championed by anti-vice crusader Anthony Comstock, empowered postal authorities to restrict and prosecute the distribution of contraceptive and abortion-related materials. Because federal authority was limited to interstate commerce, the Comstock Act did not ban intrastate trade directly but encouraged states to enact similar legislation. By the early twentieth century, 28 states had adopted laws restricting the advertising of contraceptive products ([Bailey, 2010](#)).

The timing and stringency of state-level Comstock laws varied considerably. The earliest state restrictions appeared in New York as early as 1868, predating the federal act by five years. The latest adoptions occurred in the 1930s and 1940s. Crucially, not all state laws included explicit advertising bans; some focused solely on distribution of materials. This variation in both timing and scope provides a useful source of identifying variation for our empirical analysis.

2.3 The Fertility Transition

The decline of American fertility during the nineteenth century is well documented but incompletely understood. While the diffusion of modern contraceptive methods is typically invoked to explain twentieth-century fertility decline, the earlier transition preceded the availability of reliable modern contraception. Cultural factors ([Beach and Hanlon, 2023](#)), economic change, and the diffusion of information about fertility control have all been proposed as contributing mechanisms. Our study speaks directly to the information channel, asking whether greater access to contraceptive advertising—a tangible, measurable form of fertility-related information—affected reproductive behavior.

3 Data

3.1 Newspaper Data: American Stories

We use article-level historical newspaper data from American Stories (Dell et al., 2023), which processes the Library of Congress’s Chronicling America archive using state-of-the-art computer vision and OCR methods. The corpus comprises approximately 438 million structured article texts from digitized U.S. newspapers. The data include publication date, newspaper identifiers (LCCN), page information, article bounding boxes, and full OCR text. Newspaper locations are resolved to city, county, and state levels, enabling aggregation to fine-grained geographic units.

We restrict the analysis to U.S. newspapers published between 1840 and 1923, the period of comprehensive coverage in Chronicling America. Over this period, the number of available articles grows from approximately 640,000 per year in the 1840s to over 9 million per year by 1910, reflecting both the expansion of the American press and the digitization coverage of Chronicling America.

3.2 Selecting and Classifying Documents

Our document selection and classification proceeds in three stages.

Stage 1: Keyword-based selection. We construct a dictionary of over 200 OCR-robust regular expressions designed to capture terms related to contraception, abortion, fertility control, and population discourse. The patterns account for historical spelling variation and common OCR transcription errors in nineteenth-century text (e.g., long-s misread as “f,” “rn” misread as “m,” digit-letter confusion). The dictionary captures both commercial advertising language (“female pills,” “monthly regulators,” “suppressed menses”) and public discourse terms (“birth control,” “race suicide,” “Malthusian”). Applying these patterns to the full American Stories corpus yields approximately 15.3 million initial matches, which we filter to 208,423 candidate documents.

Stage 2: OCR correction. OCR errors in full article text are corrected using a large language model (Qwen-8B) prior to classification and analysis.

Stage 3: LLM classification. From the 208,423 keyword-selected documents, we use a large language model (ChatGPT) to classify each document into one of three categories:

- **ADS_REPRO** (52%): Advertisements for reproductive remedies, including contraceptives, abortifacients, and “female pills.”
- **ART** (22%): Articles about human population, reproduction, fertility rates, birth control movements, eugenics, census data, or abortion trials.

- **OTHER** (26%): Content unrelated to human reproduction, including veterinary references, metaphorical uses of matched terms, and miscellaneous advertisements.

The classification uses zero-temperature prompting with domain-specific few-shot examples tailored to historical medical terminology and euphemistic language. We employ multiple LLM providers (OpenAI GPT and Google Gemini) for cross-validation.

3.3 Fertility Outcomes

Fertility outcomes are derived from historical U.S. Census data accessed through IPUMS (census years 1850, 1860, 1880, 1900, 1910, and 1920). IPUMS provides harmonized microdata and aggregates, ensuring consistency across census waves. We construct county-level child-women ratios (CWR)—defined as the number of children aged 0–4 per 1,000 women aged 15–49—as our primary measure of recent fertility. County-level measures are constructed from age- and sex-specific population counts, with linear interpolation between census years. Census data are linked to newspaper and institutional datasets using IPUMS geographic identifiers.

3.4 Telegraph Data

We collect data on telegraph access across U.S. cities in 1852, based on historical records of telegraph lines and stations. Cities with telegraph access are geocoded and spatially joined to county boundaries, creating a binary indicator of whether a county contained a telegraph-connected city in 1852. This variable serves as our instrumental variable for contraceptive advertising exposure.

3.5 Comstock Laws

We compile a state-level dataset of Comstock law adoption dates and provisions. For each state, we record the year of law enactment (ranging from 1835 in Delaware to 1943 in Arkansas) and whether the law included an explicit advertising ban. The federal Comstock Act of 1873 serves as a common treatment for all states, while state-level variation provides additional identifying variation.

4 Empirical Strategy

4.1 Baseline Specification

Our baseline specification estimates the relationship between county-level exposure to contraceptive advertising and fertility using a two-way fixed effects model:

$$CWR_{ct} = \alpha + \beta \cdot \text{Ads}_{ct} + \mathbf{X}_{ct}'\Gamma + \delta_c + \gamma_t + \varepsilon_{ct} \quad (1)$$

where CWR_{ct} is the child-women ratio in county c at time t , Ads_{ct} measures contraceptive advertising exposure (either as a count or binary indicator), $\mathbf{X}_{ct}$ includes time-varying controls (log population, number of active newspapers), δ_c are county fixed effects, and γ_t are year fixed effects. Standard errors are clustered at the county level.

4.2 Instrumental Variable Strategy

The key identification challenge is that contraceptive advertising exposure is likely endogenous: counties with stronger preferences for fertility limitation may both demand more contraceptive information and experience faster fertility decline. To address this, we instrument local exposure to contraceptive advertising using telegraph access in 1852 (Wang, 2025).

The logic of the instrument is as follows. Telegraph connectivity in the early 1850s shaped the speed and reach of information diffusion across counties, increasing the capacity of local newspapers to circulate syndicated content, including advertisements. However, telegraph infrastructure in 1852 plausibly did not affect fertility directly, except through information channels—it preceded the major period of contraceptive advertising by over a decade and was driven by commercial and military considerations orthogonal to reproductive preferences.

The first-stage equation is:

$$\text{Ads}_{ct} = \pi_0 + \pi_1 \cdot \text{Telegraph}_{c,1852} + \mathbf{X}_{ct}'\Pi + \delta_c + \gamma_t + \nu_{ct} \quad (2)$$

We also exploit time variation by interacting telegraph access with a post-1868 indicator (the year of transcontinental telegraph completion), which strengthens the first stage considerably.

4.3 Difference-in-Differences: Comstock Laws

To examine the impact of advertising restrictions on the supply of contraceptive information, we estimate difference-in-differences models exploiting the staggered adoption of state-level Comstock laws. We employ both standard two-way fixed effects and recent robust estimators designed for staggered treatment settings, including the Sun and Abraham (2021) and Callaway and Sant’Anna (2021) approaches. Event-study specifications allow us to assess pre-trends and dynamic treatment effects.

5 Preliminary Results

5.1 Descriptive Patterns

Our classified corpus reveals a rich landscape of contraceptive advertising in nineteenth-century America. Advertisements for reproductive products account for 52% of all fertility-related newspaper content, with articles on population and birth control comprising 22% and unrelated content 26%.

The temporal distribution of advertisements shows a marked increase through the 1860s and early 1870s, followed by a decline after the federal Comstock Act of 1873. However, the decline is neither immediate nor complete: advertisements persist in substantial numbers through the end of our study period, often employing increasingly euphemistic language. We document a statistically significant shift in the frequency of specific euphemisms after 1873. Terms such as “French goods” and “family limitation” decline in relative frequency, while more opaque terms like “female complaints,” “private diseases,” and “monthly regulators” increase, suggesting that advertisers adapted their language to navigate legal restrictions.

Geographically, advertisements are concentrated in urban centers along the Eastern seaboard—particularly in New York, Washington D.C., and Boston—but diffuse progressively westward over the study period. The tracking of specific advertisers, such as Madame Restell (Ann Trow, 1812–1878), reveals clear spatial diffusion patterns consistent with the expansion of newspaper distribution networks.

5.2 The Impact of Comstock Laws on Advertising

Our difference-in-differences estimates show that state-level Comstock laws with explicit advertising bans reduced the volume of contraceptive advertising. The event-study estimates suggest a decline beginning around the time of law adoption, though we note the importance of pre-trend testing given the staggered nature of treatment. Robust estimators accounting for treatment effect heterogeneity ([Sun and Abraham, 2021](#); [Callaway and Sant’Anna, 2021](#)) confirm the qualitative pattern.

5.3 The Effect of Advertising on Fertility

Our instrumental variable estimates indicate that greater exposure to contraceptive advertising leads to a statistically significant reduction in fertility, as measured by the child-women ratio. The first-stage relationship between telegraph access in 1852 and subsequent contraceptive advertising is strong, with first-stage F-statistics ranging from 155 to 433 across specifications. The time-varying specification—interacting telegraph access

with a post-1868 indicator—yields particularly strong first-stage results ($F = 432.84$), consistent with the hypothesis that telegraph infrastructure amplified information diffusion over time.

The IV estimates are larger in magnitude than OLS estimates, consistent with either attenuation bias from measurement error in the OLS specification or local average treatment effects among complier counties whose advertising exposure was most affected by telegraph infrastructure.

6 Work in Progress

Several extensions and robustness checks are underway. First, we are cross-validating the LLM classifications with human expert review to ensure accuracy of the three-way classification. Second, we are inspecting samples both within and outside the initial keyword selection to detect misclassified or missed advertisements. Third, we plan to explore the content of advertisements to understand the geographical distribution of specific products and brands. Fourth, we are considering alternative indirect measures of fertility, including the Own Children Method ([Cho et al., 1986](#)) and indirect total fertility rate estimation ([Hauer and Schmertmann, 2020](#)). Fifth, a companion paper will examine the textual content of fertility-related articles (excluding advertisements) in greater detail, using topic modeling and embedding-based analysis to characterize public discourse on reproduction and population during this period. Finally, we plan to explore alternative exogenous shocks related to newspaper diffusion following the approach of [Beach and Hanlon \(2023\)](#).

7 Conclusion

This paper presents novel evidence on the role of information diffusion in the American fertility transition. By combining large-scale computational text analysis of historical newspapers with county-level demographic data and an instrumental variable strategy based on telegraph infrastructure, we provide plausibly causal estimates of the effect of contraceptive advertising on fertility decline. Our findings suggest that the diffusion of fertility-related information through newspapers was a meaningful contributor to the nineteenth-century fertility transition, and that legal restrictions on advertising—while reducing the volume of explicit contraceptive content—prompted adaptation rather than elimination of the market for reproductive information.

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