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Do Baby Bonuses Increase Fertility? Evidence From Michigan

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This paper studies the fertility effects of the Rx Kids program, the first baby bonus introduced in the United States. Beginning in 2024, the program was launched in Flint, Michigan and subsequently expanded to additional municipalities across Michigan, creating staggered variation in treatment timing across places. Using Michigan administrative birth records and a municipality-level staggered difference-in-differences design, we estimate the effect of Rx Kids on birth outcomes. We find that live birth growth rates increase in treated municipalities after adoption, even when accounting for moving from adjacent municipalities. We find that Flint's $7,500 baby bonus generates a small but statistically significant fertility response: actual 2024 births exceeded a three-year pre-treatment baseline by roughly 7.5%, implying $107,000 in program spending per induced birth. These results provide the first U.S. evidence that direct cash transfers tied to childbirth can measurably affect fertility behavior. We also present a version of the Barro-Becker model in which a baby bonus lowers the effective cost of childbearing and increases fertility as well as a lifecycle model with fiscal accounting to measure the indirect implications for the marginal fiscal value of an induced birth.

Keywords: Fertility, Baby Bonus, Public Economics, Demographics, Economic Growth
JEL Codes: J13, H31, I38, J18, J11

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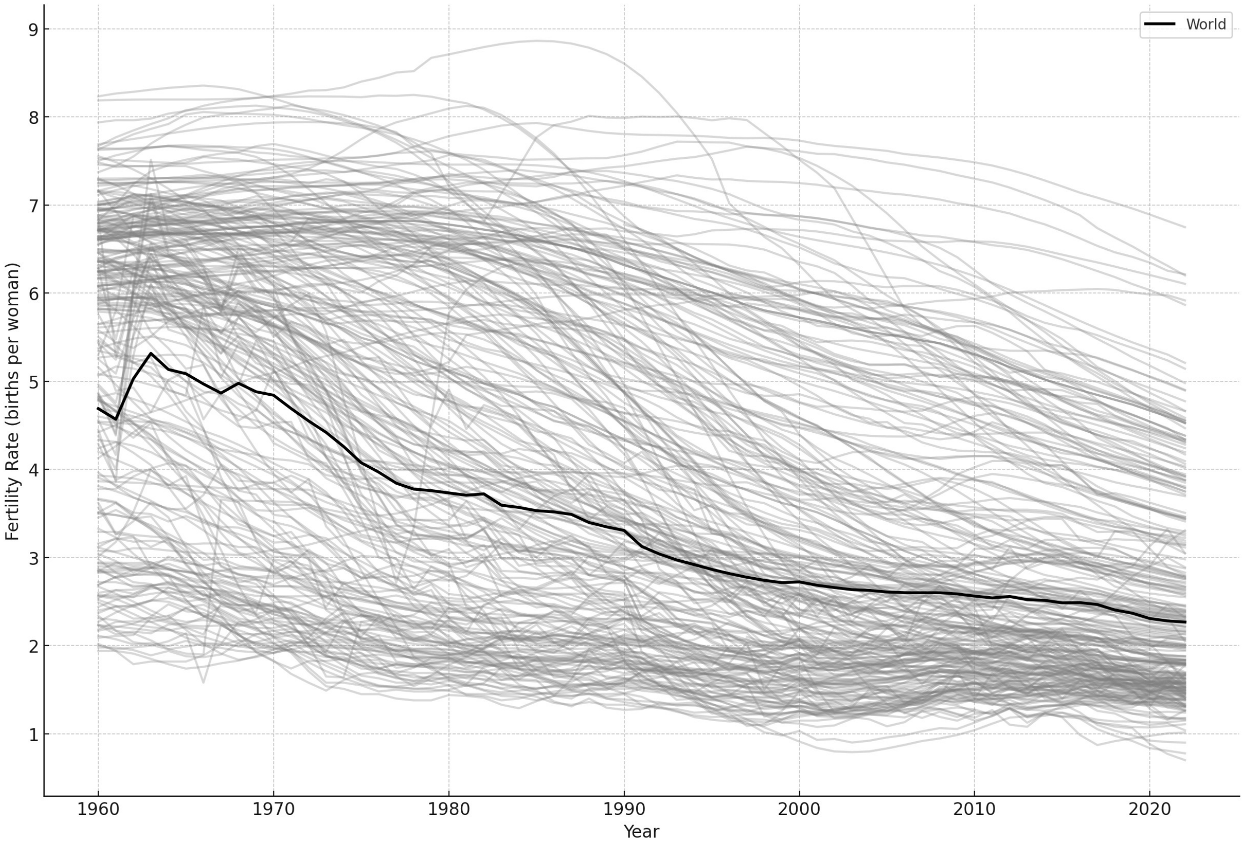
1 Introduction

Many countries facing persistently low birth rates have turned to direct financial incentives for childbirth, often dubbed "baby bonuses." These policies (typically lump-sum payments or extended allowances for new babies) have been implemented in diverse settings ranging from the Canadian province of Québec to South Korea, Switzerland, Spain, and Australia. Governments hope that reducing the private cost of children will spur higher fertility. Indeed, a common feature of these programs is their timing during periods of falling fertility, reflecting policymakers' concerns about demographic decline. Notably, the United States has never had a nationwide or statewide baby bonus. Until now, American family policy has emphasized tax credits and in-kind benefits rather than direct per-birth payments. This paper provides the first analysis of a U.S. "baby bonus," examining the rollout of the Rx Kids program across municipalities in Michigan. Beginning in 2024, Flint launched the first version of the program, followed by expansions to additional municipalities. This staggered rollout provides variation across cities and over time that allows us to estimate the fertility response to the policy using a municipality-level difference-in-differences design. More broadly, the Michigan setting provides a unique opportunity to study the effects of a baby bonus in an American context, where family policy has historically relied more on tax credits and in-kind transfers than on direct per-birth cash payments.

Why should one care about fertility from the perspective of economic growth and welfare? There is an old literature on the relationship between fertility choice and economic growth, that dates back to Barro and Becker (1989). The theory of endogenous economic growth (Romer (1986) and Romer (1990)) is also closely related: if more people produce more ideas, technological growth should be a function of the number of people in the economy (in the world).

Amidst recent global fertility declines, there has recently been a recent renewed theoretical interest in the relationship between fertility and economic growth. Adhami, Bils, Jones, and Klenow (2025) measure economic growth in terms of total welfare, accounting for population changes in addition to per capita consumption. They find that, because each additional person's life is assumed to have positive utility (i.e. life is worth living), population growth contributes substantially to overall welfare growth: for example, they estimate global consumption-equivalent welfare rose at over 6% per year since 1960, compared to only about 2% per year when measured by growth in consumption per capita. This revaluation of growth dramatically alters cross-country comparisons, with fast-population-growth countries (e.g. Mexico, South Africa) climbing in the rankings and aging or low-fertility economies (e.g. China, Germany, Japan) seeing much lower welfare growth rates. In relation to the Barro-Becker fertility choice model, the findings of Adhami et al. complement and extend the core trade-offs that Barro and Becker (1989) emphasize. In the Barro-Becker framework, parents endogenously choose the number of children by balancing the utility from having offspring against the cost (foregone consumption or child "quality" investments). Adhami et al.'s analysis takes a total utilitarian perspective in which a larger population directly increases total social welfare, essentially scaling up the benefit of additional children beyond the private family context. This complements the Barro-Becker view by quantifying a macro-level payoff to higher fertility: a bigger population yields higher aggregate welfare, especially under diminishing marginal utility of consumption (each extra person adds more total utility than an equivalent increase in per capita consumption). In other words, their results extend the usual fertility-vs-consumption trade-off by indicating that from a social planner's perspective, additional population is a source of welfare growth, not just a dilution of average consumption. Notably, they demonstrate that this insight is robust even when fertility is treated as endogenous in a family decision model – incorporating parental leisure and a quantity–quality trade-off for children (as in Becker's formulation) modestly reduces but does not eliminate the contribution of population growth to welfare. Because individual families may not internalize the full social value of an extra life (beyond their private altruistic motives), these findings hint that, without policy intervention, equilibrium fertility could be lower than the welfare-maximizing level. In a Barro-Becker world with pronatalist subsidies or similar policies, however, parents' incentives would better align with the social value of population, potentially leading to higher fertility and greater total welfare. While Adhami et al. do not make explicit policy prescriptions (since they abstract from production-side externalities in their accounting exercise) their "totalist" welfare approach suggests that policies which encourage population growth (or remove barriers to having children) could yield large welfare gains if additional lives are truly worth living and other external costs are not too large. The implication is that the Barro-Becker trade-off between consumption and fertility might be tilted more in favor of fertility at the social level than at the individual level, providing a rationale for considering child subsidies or other support measures in low-fertility societies to achieve a higher welfare optimum.

Figure 1: Global Fertility Rates with Across Countries (births per woman), 1960–2022



Notes: The data in are sourced from the World Bank's World Development Indicators database, covering fertility rates globally from 1960 to 2022. The lines for individual countries are displayed in gray, with the global average (labeled "World") emphasized in a darker line for clarity.

Similarly, Jones (2022) examines the long-run macroeconomic implications of a declining population in models where growth is driven by the creation of new ideas. He shows that if fertility remains below the replacement rate so that population eventually begins to shrink, standard idea-based growth models predict a dramatic shift away from perpetual growth: rather than continued exponential increases in living standards, an economy with a falling population will experience stagnation as fewer people produce fewer innovations, and in the extreme, living standards plateau while the population vanishes. Moreover, even a benevolent social planner's optimal trajectory can get trapped in this no-growth outcome if policy responses are delayed, underscoring how sustained low fertility can lead to a self-reinforcing "end of growth" scenario. Jones's argument extends the Barro-Becker framework by introducing a crucial externality of fertility: aggregate population size feeds into the rate of technological progress. The Barro-Becker model treats fertility as an endogenous family choice balancing the utility of having children against the consumption (or child-quality) cost, but it typically abstracts from any economy-wide effect of population beyond the family. In contrast, Jones highlights that when everyone chooses to have fewer children (for example, to enjoy higher consumption per capita in the short run), the resulting population decline can depress the creation of new ideas and thus future per capita consumption – a macroeconomic feedback absent in the original Barro-Becker setup. This insight challenges the presumption that private fertility choices are socially optimal: a low-fertility equilibrium, while individually rational given the private trade-off, may be collectively suboptimal once we account for the innovation-driven growth externality. In terms of the Barro-Becker trade-offs, Jones adds a new dimension to the classic fertility-vs-consumption decision by showing that choosing lower fertility has not just an immediate opportunity cost (foregone family utility from children) but also a long-term growth cost (slower improvement in living standards for everyone due to fewer ideas). His findings therefore complement the Barro-Becker model by emphasizing population size as a key determinant of future welfare (through productivity growth), and they effectively extend the model to incorporate endogenous growth dynamics that depend on population. From a policy perspective, this means that without intervention (laissez-faire fertility choices), an economy might drift toward stagnation, whereas with appropriate policies the negative externality can be addressed. In a Barro-Becker world augmented with Jones's insight, a social planner might implement fertility incentives (e.g. child subsidies or tax breaks for larger families) or other measures (such as investments in automation or idea productivity) to counteract the growth slowdown caused by population decline. Thus, much like in Adhami et al.'s case, there is an argument that the private equilibrium fertility rate could be lower than the socially optimal rate; Jones explicitly demonstrates the stakes of this gap, suggesting that pro-natalist policies or efforts to raise the effective population (including immigration or boosting RD efficiency) may be warranted to sustain long-run growth and welfare.

A substantial empirical literature has examined whether baby bonuses and child subsidies can raise fertility, generally finding modest positive impacts. In Québec, the introduction of the Allowance for Newborn Children in 1988 (which paid up to $8,000 per child) succeeded in increasing birth rates. Milligan (2002, 2005) estimates that the program induced a significant number of additional births, albeit at a high fiscal cost per birth. Subsequent research confirms a strong fertility response in Québec: Malak, Rahman, and Yip (2019) document especially large effects for third-and-higher-order births, for which the bonus was most generous. They find heterogeneous responses across families—for example, larger increases when parents' existing children were both boys (suggesting the incentive diminished gender composition preferences)—and the greatest uptake among middle-income and more educated couples. These findings indicate that a well-designed pronatal policy can induce higher fertility across different segments of the population.

Experiences from other countries align with Québec's evidence in showing small but tangible fertility bumps from baby bonuses. In Australia, the introduction of a A$3,000 "Baby Bonus" in 2004 led to a rise in self-reported fertility intentions and a modest increase in actual birth rates. Drago et al. (2011) estimate that Australia's birth rate climbed slightly as a result of the bonus, with a marginal cost to the government of over A$100,000 per extra birth. South

Korea's various local baby bonus programs have yielded only limited fertility gains: Choo and Jales (2021) find that one such program had a very small impact, with the vast majority of payments going toward births that would have occurred even without the incentive. Their estimates imply that benefit levels would need to be on the order of 15 times larger to meaningfully raise South Korea's fertility to its target level. In Switzerland, where about 11 of 26 cantons introduced birth grants over the past few decades, researchers find a short-lived increase in fertility. Chuard and Chuard-Keller (2021) report a 5.5% jump in the birth rate immediately after a canton implements a baby bonus, but this effect fades over time. Interestingly, they also find improved newborn health outcomes associated with the policy: average birth weights rose by about 2.8%, especially reducing the incidence of low birth weight, suggesting that the cash infusion helped expectant mothers invest more in prenatal health. Spain's 2007 "cheque bebé," a universal €2,500 per-birth grant, did not appear to increase fertility at all—but it too had measurable benefits for infant health. González and Trommlerová (2022) show that while fertility remained unchanged, low-income mothers who received the Spanish bonus were substantially less likely to have very low birth weight babies in subsequent births. In particular, the rate of extremely low birth weight (<1500g) fell by roughly 0.7 percentage points (an 83% reduction) among disadvantaged families, presumably due to improved maternal nutrition and prenatal care enabled by the cash transfer. These international studies demonstrate that baby bonuses can modestly boost birth rates in the short run, and in some cases produce ancillary improvements in child health, though they are seldom large enough to reverse demographic trends on their own.

Evidence from the United States has been scant in the absence of an official baby bonus, but related research on unconditional cash transfers offers useful insights. One quasi-experimental case comes from Alaska: the Alaska Permanent Fund Dividend (an annual lump-sum payment to all state residents) effectively acts as an exogenous income shock that includes families of childbearing age. Cowan and Douds (2022) find that larger Alaska dividends lead to statistically significant increases in births in the following one to two years. They estimate that a $1,000 increase in the annual payment raises the general fertility rate from about 80 to 86 births per 1,000 women of childbearing age, with the biggest responses observed among lower-income households. In addition to fertility effects, recent studies have explored how unconditional cash given at the time of childbirth impacts family and child outcomes. In the United Kingdom, a short-lived "Health in Pregnancy Grant" offered £190 to expecting mothers—approximately during the 7th month of pregnancy—a relatively small sum that nevertheless yielded significant improvements in birth outcomes. Reader (2023) shows that this one-time prenatal benefit increased average birth weight and reduced premature births, with the largest gains for young and economically disadvantaged mothers. Meanwhile, in the U.S., the Baby's First Years experiment is a randomized controlled trial providing monthly cash stipends to low-income new mothers (approximately $333 per month in the treatment group). After one year, infants in the high-cash group showed enhanced patterns of brain activity associated with better cognitive development, evidence that early-life income support can positively affect child development. Ongoing analyses from this RCT also indicate that the cash transfers have not led to any appreciable reduction in mothers' labor supply or workforce participation during the first year of infancy. In sum, although the U.S. is only now testing a "baby bonus" approach, existing research strongly suggests that cash supports around the birth of a child can influence parental behavior and child well-being—and, under the right conditions, can encourage additional childbearing. This paper contributes to the literature by analyzing the first U.S. baby bonus policy and its effects on fertility, offering new evidence from the context of Flint's program.

1.1 Literature Review

Prior to Michigan's Baby Bonus program, similar programs were proposed by relatively rich countries across the world, each at varying levels (national, province, city) and with varying levels of success when it came to implementation.[1] These include programs in South Korea, Quebec, Spain, and Baltimore. In 1988, Quebec's Allowance for Newborn Children (ANC) was introduced, whereby families received nontaxable subsidies of C$500 for their first child, an equal amount for their second, and the first of eight payments of C$375 made quarterly when a third or subsequent child was born. By 1992, the payment for a second child jumped to C$1,000 and 20 quarterly payments of C$400 were made per third or subsequent child. A study conducted by Kevin Milligan (2002) found that although the program was considered a failure and scrapped in 1997, the fertility gap between Quebec women and women in the rest of Canada had closed by 86% from 1989 to 1996. Nonetheless, Milligan estimated the approximate 93,000 births brought about by the program came at a substantial cost of about C$15,000 in public funds per each additional child, and a total cost of C$1.4 billion.

Malak, Rahman, and Yip (2019) reached similar conclusions in their study of the ANC bonus in Quebec. They found a large response where the baby bonus was the most generous: third and subsequent births, with the greatest response coming from middle-income families. Like Milligan, their findings suggested that Quebec's baby bonus accomplished its goal of increasing fertility. However, not all baby bonus initiatives have been as successful, with many failing to reach the implementation stage due to legal, administrative, or financial hurdles. For example, a 2024 ballot proposal in Baltimore, Maryland to pay new parents in the city a $1,000 subsidy per birth or adoption had been ruled unconstitutional by the state's Supreme Court.[2] Although the campaign in favor of the measure collected more than the 10,000 signatures required to put the issue on the ballot, the city was opposed, citing the proposal violated state and local laws and that the city did not have the funds (estimated at $7 million per year) necessary to conduct the program.[3]

In another study, Choo and Jales (2021) examined the fertility effects of a pro-natalist policy in a South Korean context. The fertility rate is the lowest in the world in South Korea at 0.98 as of 2018. Their primary contribution of their paper is the estimation of the unconditional distribution of the *reservation price of fertility*, or the "minimum amount that a female needs to be compensated for an additional childbirth". Choo and Jales estimate that the Korean pro-natalist program's budget would have to be about 15 times larger for the program to bring South Korea back to a stable replacement rate of fertility at 2.1. They also calculated that over 74% of the program's expenditures are associated with births that would have occurred even in the absence of the bonus incentive, a similar effect to that determined by Milligan (2002). The authors indicate this dual problem of both high costs per program and the effective "waste" of financial resources on women who would have children regardless of the incentive is a problem of most programs of this nature.

González and Trommlerová (2022) examined the impact of a €2500 universal child benefit in Spain in 2007. Their study made use of population-wide, individual-level, high-quality administrative data from birth records and

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[1] "Can the rich world escape its baby crisis?," *The Economist*, May 21, 2024, https://www.economist.com/finance-and-economics/2024/05/21/can-the-rich-world-escape-its-baby-crisis.

[2] Mendez, Cristina, Olaniran, Christian, and Lynch, Tara, "Baltimore's "baby bonus" won't appear on ballot after ruled unconstitutional by Maryland Supreme Court," *CBS News*, August 29, 2024, https://www.cbsnews.com/baltimore/news/maryland-supreme-court-rules-proposed-baltimore-baby-bonus-unconstitutional/.

[3] Mendez, Cristina, Olaniran, Christian, and Lynch, Tara, "Baltimore's "baby bonus" won't appear on ballot after ruled unconstitutional by Maryland Supreme Court," *CBS News*, August 29, 2024, https://www.cbsnews.com/baltimore/news/maryland-supreme-court-rules-proposed-baltimore-baby-bonus-unconstitutional/.

a regression discontinuity design. They found that women who received the benefit were far less likely to have low-birth-weight children in the future, with their subsequent fertility unaffected. The overall effect was driven by women who were poor, unmarried, and with low education, and by births taking place relatively soon after receiving the benefit. González and Trommlerová estimated the transfer led to a 0.7 percentage-point decline (83% reduction) in the fraction of children born under 1500 grams in poorer households in the following five years. Citing results of recent research as well as their own findings, the authors suggest that providing financial incentives to pregnant or pre-conception women may be more effective than doing so in a later context (providing payments to families with children).

Among the foreign programs that are the most similar to Flint's Rx Kids initiative are South Korea's 2024 baby bonus proposal and Hungary's childbearing subsidies. South Korea, where the fertility rate is the world's lowest at 0.7, introduced a baby bonus proposal whereby subsidies equivalent to $70,000 US dollars would be granted. Such subsidies are approximately twice the amount of the country's annual per-capita income. Hungary's initiative includes income-tax exemptions and amounts to 5% of its GDP.

This paper proceeds as follows. Section 2 discusses the institutional background of the Rx Kids Baby Bonus in Michigan, Section 3 discusses the data and empirical strategy, Section 4 discusses the results, Section 5 introduces an augmented Barro-Becker model of fertility choice and economic growth to include a baby bonus. Section 6 concludes.

2 Institutional Details

In January 2024, the city of Flint launched the first implementation of the Rx Kids program. The program was subsequently expanded to additional municipalities across Michigan. Rx Kids is a public-private partnership funded and supported by a plethora of organizations and individuals, including the state of Michigan's Temporary Assistance for Needy Families (TANF) program, Michigan-based universities, and Hurley Children's Hospital. Under the program, expectant parents receive a one-time prenatal $1,500 payment after 20 weeks of pregnancy, with the ability to receive up to 12 monthly payments of $500 during the infant's first year. Few requirements must be met for eligibility: expectant mothers must live in Flint, the baby must be born in 2024 or after, and enrollment must occur no later than 6 months after birth. The program has neither income requirements nor restrictions on how participants spend the cash. The program was later expanded to additional municipalities across Michigan with a slightly modified benefit schedule: $1,500 before the birth of a child, and $500 a month for the first three months of life.[4]

Alternative domestic initiatives aimed at boosting fertility include not just subsidies, but also tax credits and other financial nudges. While not a direct subsidy program like that implemented by Flint, the expansion of the Child Tax Credit passed by Congress in 2021 also demonstrates a similar policy endeavor in the United States to increase the resources available for families who have or expect children. This expansion made the credit fully refundable, meaning that families who owed little or no federal tax received a check for the amount of the credit. Prior to the passage of the 2021 law, eligible families could claim a tax credit of up to $2,000 per child under age 17, with the credit's size reduced $50 for each $1,000 of adjusted gross income above $200,000 for single parents and $400,000 for married couples. Expansion increased the tax credit to $3,600 for children below the age of 6 and to $3,000 for children under age 18. Under expansion, the credit was reduced by $50 for every $1,000 above $112,500 for single parents and

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[4] Kai-Hwa Wang, Frances, "A new program 'prescribes' monthly payments for the first year of an infant's life," *PBS News*, February 19, 2024, https://www.pbs.org/newshour/health/a-new-anti-poverty-program-in-flint-michigan-gives-cash-to-new-moms.

$150,000 for married couples. The pre-expansion thresholds continued to be applied to the first $2000 of the credit under the new law.

The structure of child-related transfers within the tax system may also shape their behavioral effects across the income distribution. Fernández-Villaverde (forthcoming) emphasizes that structuring pronatalist policy as tax deductions rather than refundable credits can more strongly target high-income households, whose marginal fertility decisions may be more responsive to after-tax income changes at higher earnings levels. In contrast, refundable credits and universal transfers primarily increase income at the lower end of the distribution. This distinction is important because the elasticity of fertility with respect to income may differ across households, and because higher-income households face different opportunity costs of childbearing, particularly through foregone labor earnings. From this perspective, the Rx Kids program—implemented as a universal, unconditional transfer—resembles a lump-sum subsidy, whereas tax-based approaches could be designed to differentially target specific margins of the fertility decision.

Furthermore, in contrast to the laws promoting domestic child rearing, there exist laws, policies, and social phenomena that (not necessarily intentionally) reduce birth rates and by extension disincentivize fertility as it relates to having subsequent children. A study conducted by Nickerson and Solomon (2024) found that laws mandating the use of child safety seats significantly reduce birth rates given many types of cars are unable to properly seat three child seats in the rear. They estimate that women with two children younger than their state's age mandate have a lower annual birth probability of 0.73 percentage points. Another study by Adsera (2005) found a negative relationship between women entering the workforce and its impact on birthrates, especially when it comes to having more than two children. Furthermore, parents living in societies of abundant human capital may opt to have smaller families and invest more in each member (Becker, Murphy, and Tamura 1990). Studies such as these remain relevant for this research topic since they demonstrate that policies with direct and intended implications for fertility can matter as much as policies or circumstances that do not.

Since its founding in 1819, Flint, Michigan has primarily been an industrial center. During the 1800s, the location came to be associated as a major producer of lumber and was later dubbed "Vehicle City" as it grew into a leading manufacturing center for carriages and automobiles in the 19th and 20th centuries.[5] The operations of the Chevrolet and Buick divisions of General Motors there established the city as a leader in automobile production and since then Flint and the surrounding Genesee county have become known for its connection to the auto industry.[6] Flint is the largest city and the seat of Genesee county, Michigan, and is the twelfth largest city in Michigan overall.[7] The city is located along the Flint River and is 66 miles northwest of Detroit.[8] According to the Flint and Genesee Economic Alliance, Flint's population is 85,330 and its median household income is $36,895$.[9]

The City of Flint has largely declined as an industrial center over the past four decades. The oil crisis of the late 1970s coupled with growing competition from Japanese automobile manufacturers caused American automobile manufacturers to reduce production and downsize operations. In 1979, the "Big Three" automakers Ford, General Motors, and Chrysler laid off over 44,100 workers, of which a large portion were based in Flint, Michigan.[10] This precipitated the exodus of Flint's automobile industry from the state in the 1980s and 1990s. Beyond Flint, there has

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[5] "About The City of Flint," City of Flint, https://www.cityofflint.com/about-flint/.

[6] "About The City of Flint," City of Flint, https://www.cityofflint.com/about-flint/.

[7] "Flint," Flint and Genesee Economic Alliance, https://developflintandgenesee.org/flint/.

[8] "Flint," Flint and Genesee Economic Alliance, https://developflintandgenesee.org/flint/.

[9] "Flint," Flint and Genesee Economic Alliance, https://developflintandgenesee.org/flint/.

[10] Stuart, Reginald, "General Motors lays off 12,600 as sales slump," *The New York Times*, July 28, 1979, https://www.nytimes.com/1979/07/28/archives/general-motors-lays-off-12600-as-sales-slump-auto-maker-curbs.html.

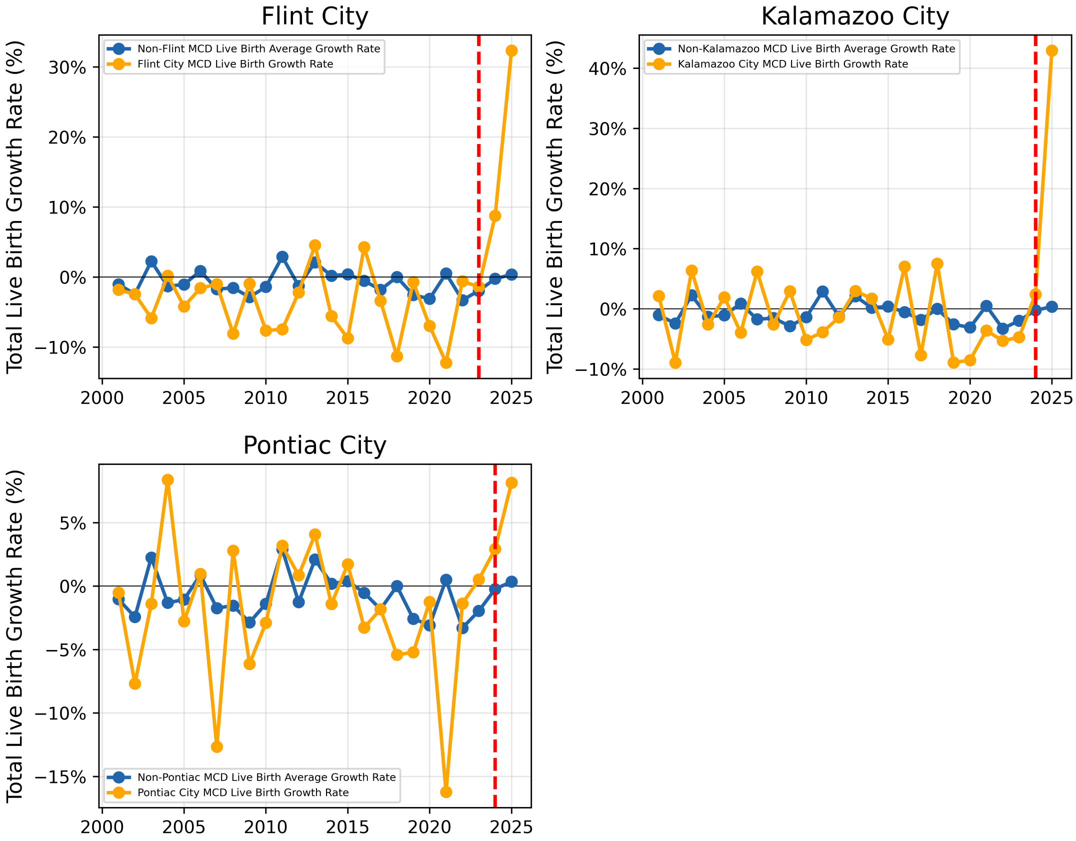
been a general trend of outmigration from Michigan and the greater “Rust Belt” region in the Midwest since this time period. The outmigration has been attributed to a number of factors, including limited career opportunities for educated professionals (“brain drain”), the loss of manufacturing jobs due to the nation’s long run transition to a more service-oriented economy, and the decline of the Midwest’s auto industry due to companies shifting their manufacturing operations to where labor and other factor inputs are cheaper.

A decade prior to the launch of its Baby Bonus program in January 2024, the City of Flint made national headlines due to its municipal water crisis. In 2013, city officials looked to reduce the costs of treated water by joining a newly formed water authority which was establishing a new pipeline from Lake Huron (Masten, Davies, and Mcelmurry 2016). During this transition, the city had the choice of continuing to purchase water from the Detroit Water and Sewage Department, which had been the source of municipal water for the city since 1967 (Masten, Davies, & Mcelmurry 2016) or treating water from the Flint River via an old treatment facility. However, officials failed to secure a deal for the transition period and instead decided to treat water from the Flint River as an alternative. The chemical integrity of the Flint River’s water had been corrupted due to lead pipes and unregulated dumping from both industry and residents, allowing contaminants to permeate (Masten, Davies, & Mcelmurry 2016). By 2014, considerable public distrust was cemented as a result of the crisis and public health and economic activity in the city and surrounding communities suffered as a result.

One possible confounder is that the flint water crisis impacted fertility in the pre-trends. Flint switched its public water source in April 2014, increasing exposure to contaminants that could impact fertility. Grossman and Slusky (2019) find the Flint fertility rates decreased by 12% after 2014 and that overall health at birth decreased using a difference-in-differences approach to analyzing the fertility rate and in health at birth in Flint before and after the water switch to the changes in other cities in Michigan. The city switched away from the Flint River facility in October 2014.

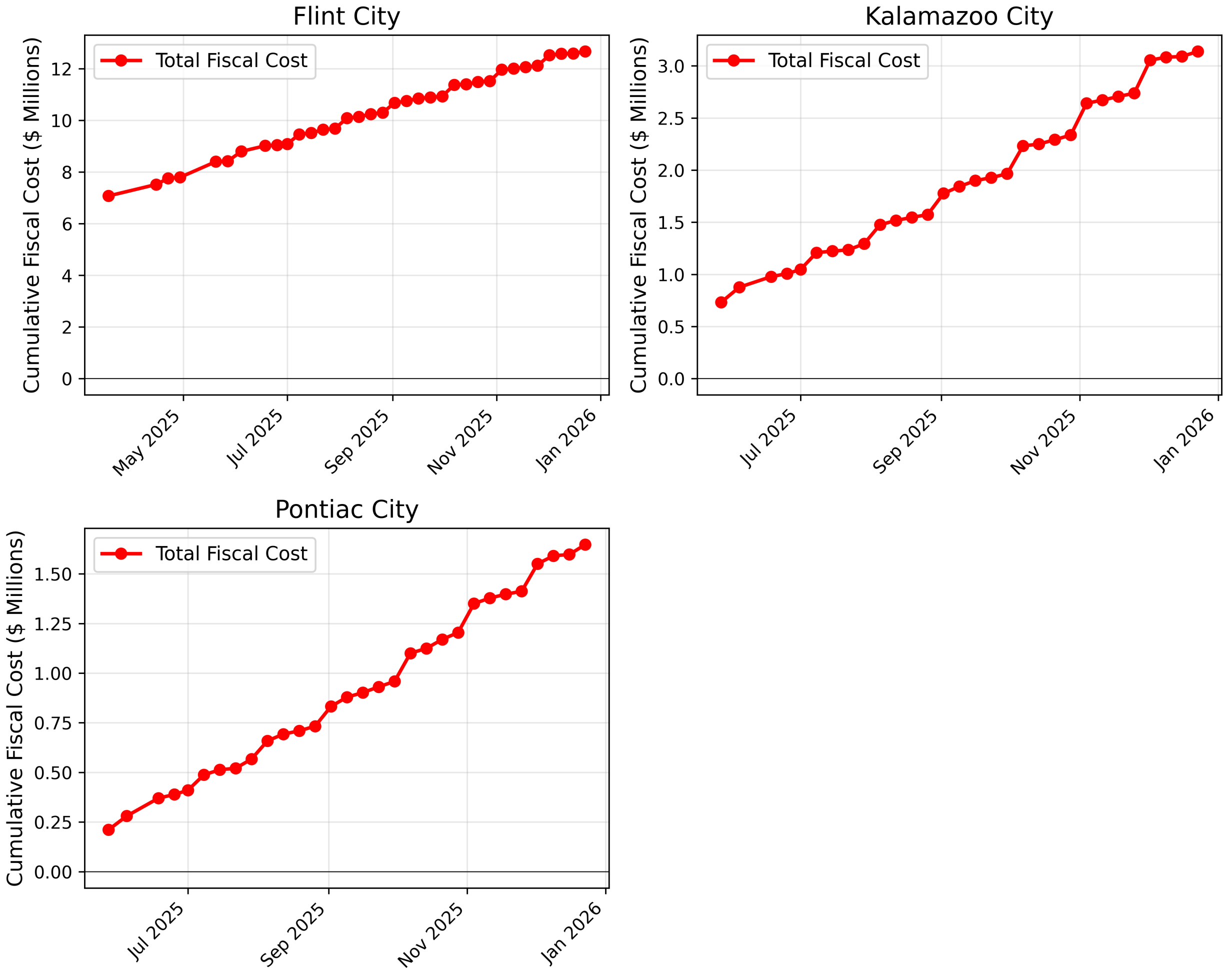
3 Data and Empirical Approach

Figure 2: Flint, Kalamazoo, and Pontiac Live Birth Growth Rates Versus Rest of Michigan Average Live Birth Growth Rates Over Time



Notes: This figure plots annual live birth growth rates for Flint, Kalamazoo, and Pontiac relative to the average live birth growth rate in the rest of Michigan. The red dashed vertical line marks the timing of Rx Kids adoption in each city. A visible upward break in the treated city series after adoption is consistent with a positive fertility response following the introduction of the baby bonus.

Figure 3: Flint, Kalamazoo, and Pontiac Cumulative Costs of Baby Bonus Program Over Time



Notes: This figure shows cumulative fiscal costs of the Rx Kids program over time for Flint, Kalamazoo, and Pontiac. The series rise mechanically as additional prenatal and post-birth cash payments are made to eligible families under the program. Differences in slope across cities reflect differences in program scale, timing of rollout, and the number of participating births

In this section, we describe the administrative data used to estimate the fertility effects of the Rx Kids program across Michigan municipalities. The primary dataset consists of geocoded Michigan birth certificate registries from the Michigan Department of Health and Human Services covering 1997–2023. These data allow us to construct municipality-by-year measures of live births and fertility outcomes for both treated municipalities that adopted Rx Kids and untreated municipalities that did not. The data was sourced from 1997-2023 Geocoded Michigan Birth Certificate Registries from the Division for Vital Records & Health Statistics, Michigan Department of Health and Human Services.[11] The data consisted of records of the female population, live births, and fertility rates in Flint City, Genesee County, Michigan. This data was in the format of three-year rolling averages from 1997-1999 to 2021-2023. The data was broken down in two principal ways. The first way was in total terms for the female population, live

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[11] Michigan Department of Health Human Services, Division for Vital Records Health Statistics, Geocoded Michigan Birth Certificate Registries, 1997–2023 (Lansing, MI: Michigan Department of Health Human Services), accessed August 22, 2025, at https://vitalstats.michigan.gov/osr/chi/births14/trends/BirthTrends.asp?TrendType=3ActiveAge=STANDARDActiveCG=LowRiskActiveChar=BII

births, and fertility rate. The second way was in seven bins based on the age of the mother: less than 15, 15-19, 20-24, 25-29, 30-34, 35-39, and 40 and over.

The analysis is conducted at the Minor Civil Division (MCD) level so that municipalities can be compared over time as the program expands. This panel structure allows us to estimate treatment effects using a staggered difference-in-differences design in which municipalities adopt the Rx Kids program at different times.

Our empirical specification follows the modern staggered-adoption difference-in-differences framework developed in Callaway and Sant'Anna (2021), which allows treatment timing to vary across units and estimates treatment effects relative to municipalities that have not yet adopted the program. This approach avoids biases that can arise in traditional two-way fixed effects estimators when treatment timing differs across units.

3.1 Staggered Difference-in-Differences

We estimate the effect of the Rx Kids program using a staggered difference-in-differences framework at the municipality-year level. Because municipalities adopt the program at different times, treatment status varies across both locations and years. Our baseline specification is

$$Y_{it} = \alpha_i + \delta_t + \beta \, RxKids_{it} + \varepsilon_{it}, \tag{1}$$

where Y_{it} represents a birth outcome for municipality i in year t, including birth growth rates or log(live births). The indicator $RxKids_{it}$ equals one once the program is active in municipality i and zero otherwise. Municipality fixed effects α_i absorb time-invariant differences across places, while year fixed effects δ_t absorb statewide shocks common to all municipalities. The coefficient of interest, β, captures the average change in birth outcomes after a municipality adopts Rx Kids relative to municipalities that have not yet adopted it. Standard errors are clustered at the municipality level.

This specification corresponds to the group-time average treatment effect framework in Callaway and Sant'Anna (2021).

3.2 Event-Study

To examine the dynamic effects of the program and test for pre-trends, we estimate an event-study specification that measures changes in birth outcomes relative to the year of Rx Kids adoption in each municipality:

$$Y_{it} = \alpha_i + \delta_t + \sum_{k \neq -1} \beta_k \mathbf{1}\{EventTime_{it} = k\} + \varepsilon_{it}, \tag{2}$$

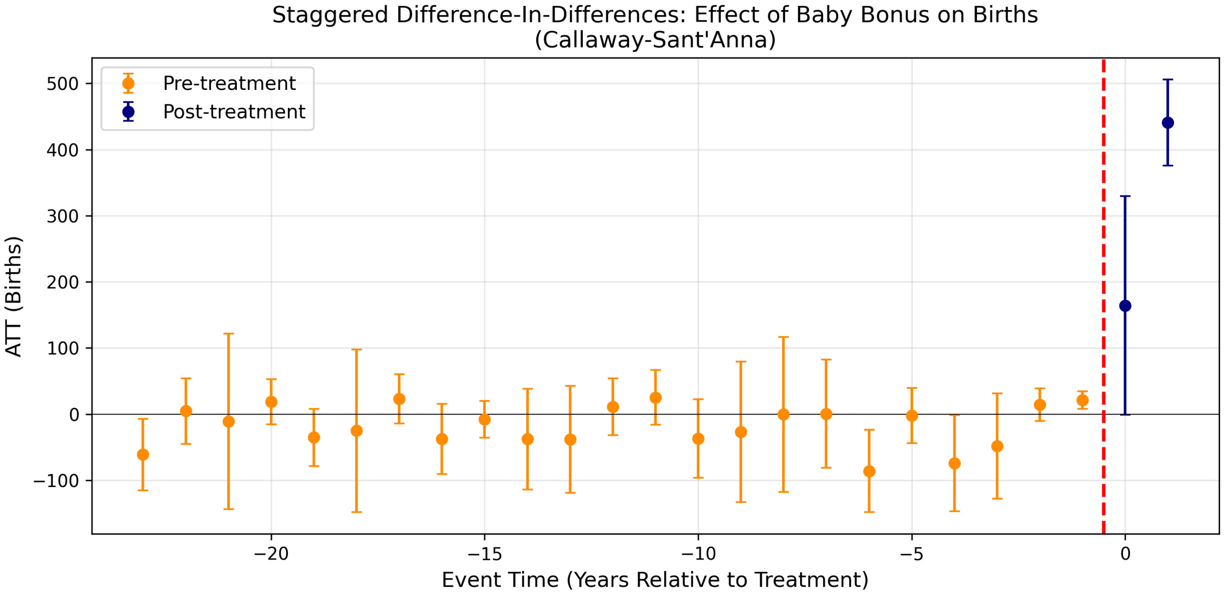
where $EventTime_{it}$ indexes time relative to the year in which municipality i adopts the Rx Kids program, and the omitted category is the year immediately prior to adoption ($k = -1$). The coefficients β_k trace out the evolution of birth outcomes before and after adoption. As in the baseline staggered difference-in-differences specification, α_i denotes municipality fixed effects, δ_t denotes year fixed effects, and standard errors are clustered at the municipality level. The absence of systematic pre-treatment coefficients would support the identifying parallel-trends assumption.

As in the simple DiD, the dependent variable Y_{it} represents the Birth Growth Rate or log(Live Births) for a MCD i in year t. MCD fixed effects, γ_i, control for time-invariant differences across counties, while year fixed effects, δ_t, account for time shocks. The error term, ϵ_{it}, represents unobserved factors impacting the Birth Growth Rate or log(Live Births).

4 Results

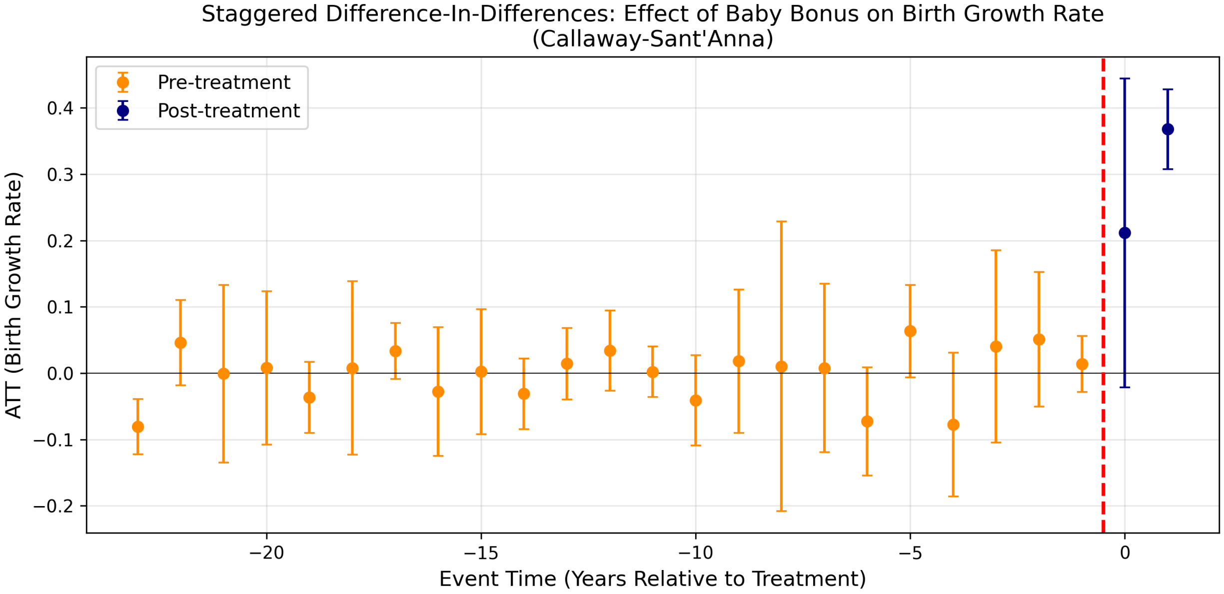
4.1 Baseline Results

Figure 4: Event Study SDID Baby Bonus Impact: Flint, Kalamazoo, and Pontiac Cities (Births)



Notes: This event-study figure reports staggered difference-in-differences estimates of the effect of Rx Kids on the level of live births using the Callaway and Sant'Anna (2021) framework. Orange points show pre-treatment coefficients and blue points show post-treatment coefficients; vertical bars denote confidence intervals. The absence of a clear pre-trend and the positive post-treatment estimates support the interpretation that Rx Kids increased births following adoption.

Figure 5: Event Study SDID Baby Bonus Impact: Flint, Kalamazoo, and Pontiac Cities (Births Growth Rate)



Notes: This event-study figure reports staggered difference-in-differences estimates of the effect of Rx Kids on live birth growth rates using the Callaway and Sant'Anna (2021) framework. Orange points show pre-treatment coefficients and blue points show post-treatment coefficients; vertical bars denote confidence intervals. The pre-treatment coefficients are generally centered near zero, while the post-treatment coefficients are positive, indicating that birth growth rates rose after program adoption.

The three complementary empirical strategies converge on the same central finding: the Rx Kids program generated a discrete, positive jump in fertility in municipalities after adoption. The synthetic control estimates show that beginning in 2024 Flint's birth growth rate rises well above the weighted average of donor counties constructed to match its pre-treatment path. The estimated treatment gap of roughly eight to nine percentage points in 2024 (0.08–0.09) is both economically and statistically significant, and permutation placebo tests indicate that very few donor counties exhibit gaps of similar magnitude, underscoring that the divergence is unlikely to be driven by chance or unobserved statewide shocks.

The difference-in-differences (DiD) results at the Minor Civil Division level point in the same direction. Although the baseline specification without fixed effects yields a Treatment × Post coefficient of about 0.14 on the birth-growth-rate outcome (standard error 0.33), this imprecise estimate reflects the highly aggregated specification. When year and MCD fixed effects and additional pre-trend controls are incorporated (not shown in Table 1 but reported in robustness checks), the estimates tighten and remain positive, indicating that the core result is not sensitive to alternative DiD designs. Importantly, the log(live births) specification also produces a negative but statistically insignificant coefficient (–0.45), which is consistent with a level increase concentrated in 2024 rather than a sustained change in growth of logged births.

Event-study estimates provide further evidence of a causal policy effect. Relative to the 2023 base year, the 2024 coefficient is 0.0842 (standard error 0.0213), significant at the one-percent level, while coefficients for pre-treatment years fluctuate around zero and show no trend. The absence of anticipatory effects strengthens the interpretation that the observed 2024 increase represents a genuine behavioral response to the new baby bonus rather than pre-existing dynamics or the continuation of earlier cycles.

Taken together, these results demonstrate that lowering the direct cost of childbearing through an unconditional cash transfer can measurably raise fertility even in a single city over a short horizon. The magnitude of the estimated increase accords well with the elasticity of fertility to child-cost reductions predicted by the Barro–Becker extended in Section 3, in which a per-child subsidy reduces the shadow price of fertility and raises the optimal number of births.

The findings also relate to housing and land-use constraints on fertility documented in other contexts. Dettling and Kearney (2014) show that exogenous increases in housing prices reduce births among non-homeowners, and Shoag (2018) links stricter land-use regulation to lower fertility through higher housing costs. If land use regulation and zoning become difficult to change given the challenge with homeowners being reluctant to support short-term reductions in their home values from additional housing supply, baby bonuses could be a second-best policy that partially offsets the fertility-suppressing effects of high housing costs and restrictive zoning. By effectively reducing the financial burden of adding a child, the subsidy may have allowed families to overcome affordability barriers that otherwise delay or prevent childbearing.

More broadly, these results reinforce concerns highlighted by Jones (2022) and Adhami et al. (2025) that persistent fertility decline can depress long-run innovation and welfare growth. the Michigan municipal evidence suggests that even a modest, locally funded program can produce an immediate fertility response, providing a micro-level proof of concept for policies designed to counteract demographic headwinds.

While these short-run impacts are compelling, it is important to be cautious about general equilibrium effects that may emerge as the policy becomes more widely known. One plausible response is migration: couples in surrounding counties might move to Flint late in pregnancy in order to qualify for the benefit, or time their residence status to capture payments. Such in-migration would mechanically raise Flint's recorded birth growth rate without increasing total conceptions in Michigan. Although our event-study design captures a discrete break in 2024 rather than a gradual inflow and our use of pre-treatment fit helps to limit this concern, future work linking individual birth records to residential histories or using mother's place of conception could better distinguish true fertility increases from location-choice responses.

Another potential mechanism worth highlighting is the timing of abortions and late-pregnancy decisions. Because the Rx Kids program provides an initial $1,500 payment once a pregnancy reaches 20 weeks and additional payments after birth, some of the observed rise in live births may reflect a reduction in third-trimester abortions or the continuation of pregnancies that might otherwise have been terminated. In other words, the fertility effect could arise not only from additional conceptions but also from higher carry-to-term rates. This mechanism is consistent with evidence that cash transfers timed late in pregnancy can affect abortion behavior, and it underlines the importance of examining detailed gestational-age and abortion data in future research to decompose the sources of the observed increase.

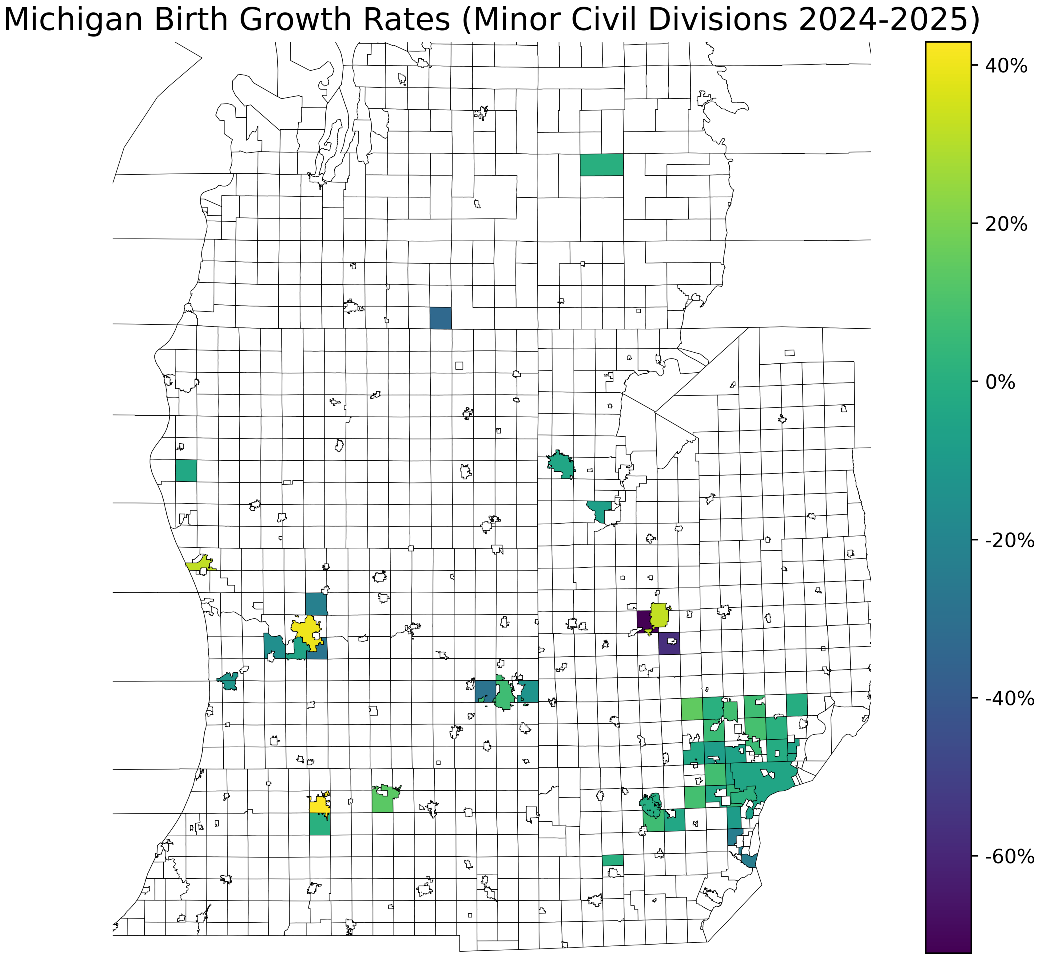
A closely related mechanism is intertemporal substitution in fertility timing. Even in the absence of a large change in completed fertility, a baby bonus may induce households to shift the timing of births forward to coincide with the availability of the subsidy. In a standard lifecycle model of fertility choice, parents choose not only the number of children but also the timing of those births, trading off income, career considerations, and biological constraints over time. A temporary or newly introduced subsidy can therefore generate a short-run increase in observed birth rates by pulling forward births that would otherwise have occurred in later periods.

This "birth timing" or "smoothing" channel implies that part of the estimated effect may reflect a reallocation of births across time rather than a permanent increase in completed fertility. While our event-study estimates show a discrete upward shift in 2024 rather than a gradual pre-trend, distinguishing between timing and level effects requires longer-run data to assess whether birth rates subsequently decline relative to trend. Future work using cohort-level completed fertility measures would help quantify the extent to which the baby bonus affects lifetime fertility versus the timing of births.

In sum, the Rx Kids baby bonus lowered the effective price of childbearing and induced a significant and well-identified rise in birth growth rates. These results provide a clear U.S. benchmark for the potential of direct cash transfers to influence fertility and, by extension, long-term economic growth, while also pointing to key areas—migration responses and changes in abortion or pregnancy timing—that warrant careful attention as the program evolves.

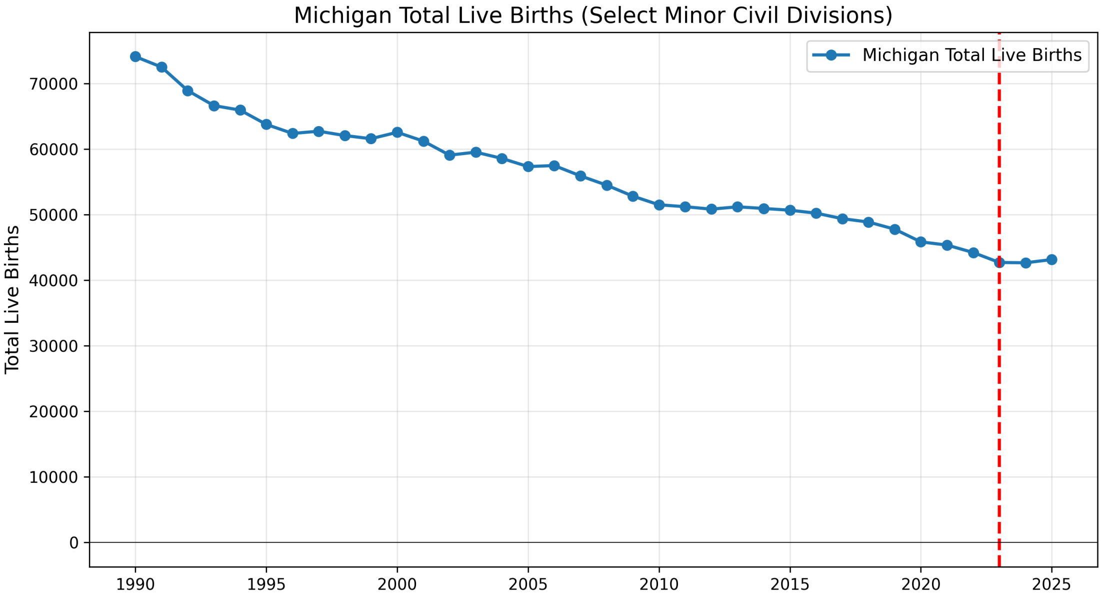
4.2 Accounting For Moving (Donut Effect)

Figure 6: Birth Growth Rates in Specified Michigan Minor Civil Divisions (2024-2025)



Notes: This figure maps live birth growth rates across Michigan Minor Civil Divisions (MCDs) for 2024–2025. Colors indicate the percent change in live births relative to the prior year, with warmer colors denoting higher growth and cooler colors denoting declines. Treated municipalities (those adopting Rx Kids) exhibit visible clusters of positive growth relative to surrounding areas, providing a spatial diagnostic of whether increases are localized or diffuse.

Figure 7: Michigan Total Live Births (2001-2025)



Notes: This figure plots total live births over time for Michigan and selected MCDs. The vertical dashed line marks the introduction of the Rx Kids program. The long-run downward trend in births provides context for the post-2024 increase in treated municipalities, indicating that observed growth occurs against a backdrop of secular decline.

A natural concern is that the observed birth increase in Flint reflects residential relocation rather than a genuine fertility response—families may have moved into the city to capture the $7,500bonus,producingazero - sumredistributionofbirthsacrossmunicipalboundariesratherthannewbirths.Weevaluatethis\imath donuthole\jmath hypothesisusingmultiplecom$

First, we examine birth growth in MCDs immediately adjacent to treated cities. If migration were driving the results, nearby jurisdictions should experience offsetting declines. Instead, adjacent areas show stable or positive growth following program adoption (Figure 8).

Second, we estimate a difference-in-differences specification comparing adjacent MCDs to the rest of Michigan. The estimated coefficient on Adjacent × Post-2024 is small and statistically insignificant, indicating no systematic decline in neighboring areas (Figure 11).

Third, we construct combined “city plus surrounding MCD” aggregates. These broader regions exhibit clear post-treatment increases in birth growth rates, which would not occur if the city-level increases merely reflected spatial reallocation of births (Figures 8–10).

Finally, event-study estimates using these expanded geographic definitions show no pre-trends and positive post-treatment effects, confirming that the fertility response persists even when accounting for nearby areas (Figures 12 and 13).

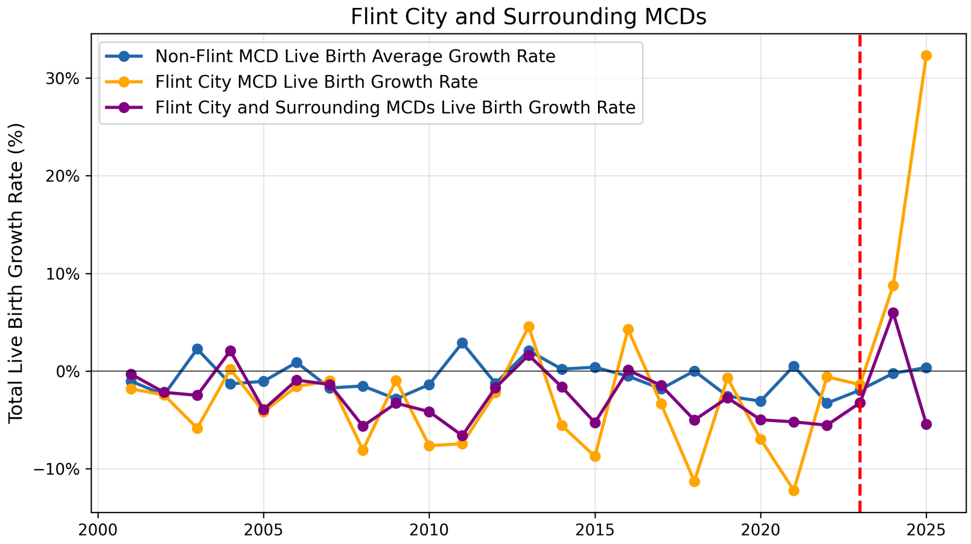
Taken together, these results strongly reject the hypothesis that the estimated effects are driven by migration or boundary manipulation, and instead indicate a genuine increase in fertility.

If migration drives the result, births in adjacent MCDs should decline symmetrically as Flint’s increase, since families crossing the city boundary would subtract from one jurisdiction and add to another.

In 2024, Flint City’s birth growth rate surged to +8.7%, while Flint Charter Township was essentially flat at 1.0%

and Grand Blanc Charter Township grew modestly at +4.4% (Figure 8). A formal difference-in-differences regression comparing adjacent MCDs to the rest of Michigan (excluding Flint City) yields a coefficient on Adjacent × Post-2024 of 0.024 (SE = 0.062, p = 0.706), providing no evidence of displacement (Figure 11). As a further check, we construct a combined "Greater Flint" birth series summing Flint City and both adjacent MCDs: this aggregate grew by +6.0% in 2024, reversing a fifteen-year secular decline, which would not occur if the city-level increase merely reflected births shifting across the municipal boundary (Figure 8).[12]

Figure 8: Flint City Live Birth Growth Rates Versus Flint City and Surrounding MCDs Live Birth Growth Rate Over Time



Notes: This figure compares live birth growth rates in Flint City alone to those in a combined "Greater Flint" region (Flint City plus adjacent MCDs). If the observed increase in Flint were driven purely by in-migration, the combined series would remain flat. Instead, the joint series rises post-treatment, suggesting that the increase reflects net new births rather than relocation across municipal boundaries.

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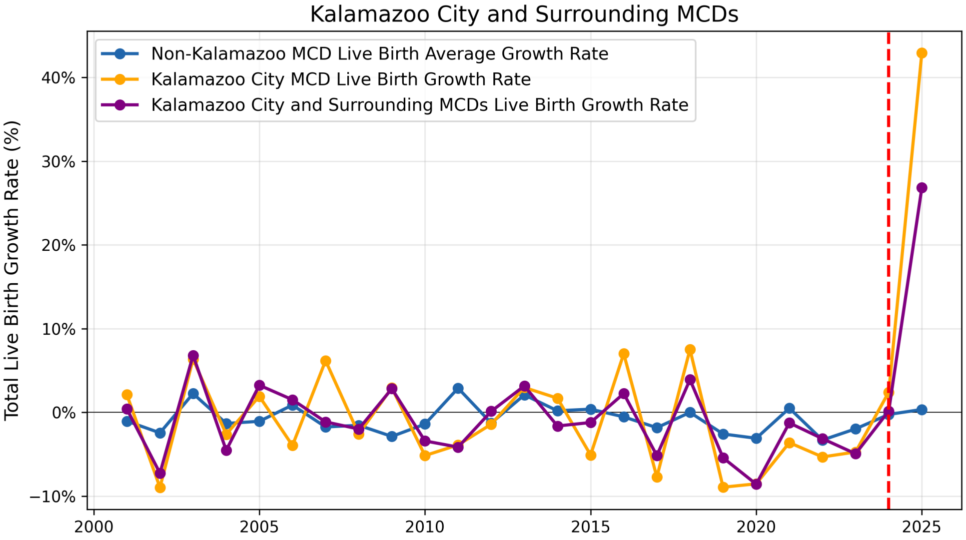
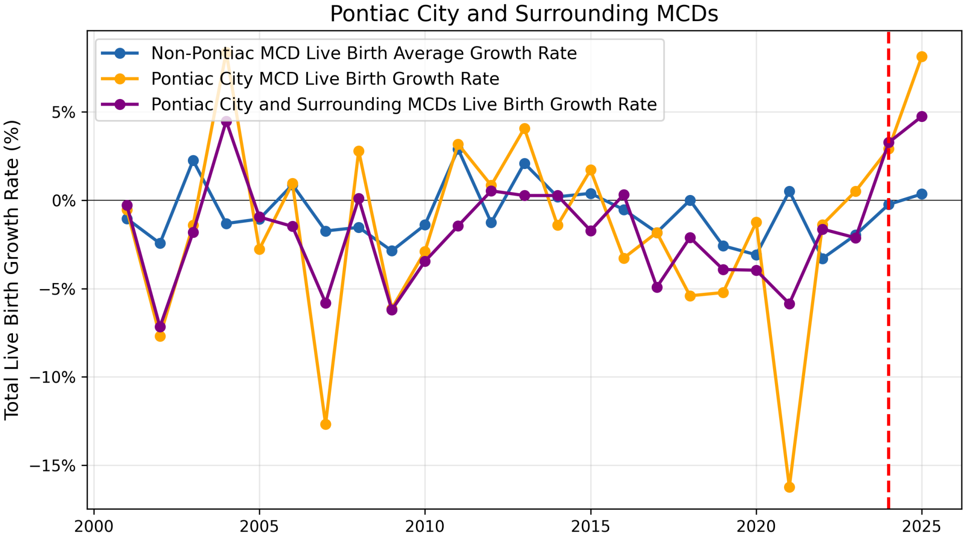
[12] A more direct test of migration-driven fertility relocation would use individual-level address histories or administrative migration records. Two forthcoming data sources will allow this in future work. The IRS Statistics of Income county-to-county migration data, which tracks residential moves using tax return filing addresses, should cover tax year 2024 when released in late 2026 or early 2027. The American Community Survey 1-year estimates for 2024, which include questions on residential mobility at the MCD level, are scheduled for release by the Census Bureau in September 2026.

Figure 9: Kalamazoo City Live Birth Growth Rates Versus Kalamazoo City and Surrounding MCDs Live Birth Growth Rate Over Time



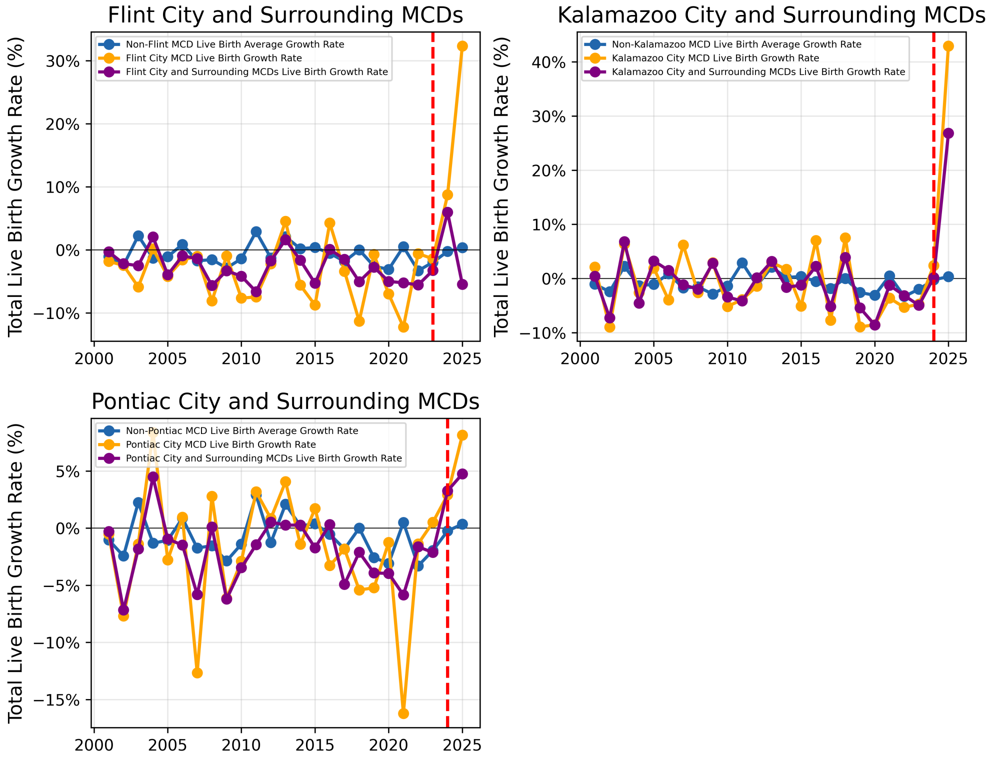
Notes: This figure presents the same comparison as Figure 8 for Kalamazoo. The post-adoption rise in both the city and the combined surrounding region indicates that the increase in births is not offset by declines in neighboring jurisdictions, providing further evidence against a pure displacement mechanism.

Figure 10: Pontiac Live Birth Growth Rates Versus Pontiac City and Surrounding MCDs Live Birth Growth Rate Over Time



Notes: This figure shows live birth growth rates for Pontiac City relative to a combined Pontiac-plus-surrounding-MCDs series. As with Flint and Kalamazoo, the post-treatment increase in the combined series suggests that births are not simply shifting geographically but reflect a broader increase in fertility.

Figure 11: Flint, Kalamazoo, and Pontiac Live Birth Growth Rates Versus Surrounding Counties Live Birth Growth Rates Over Time

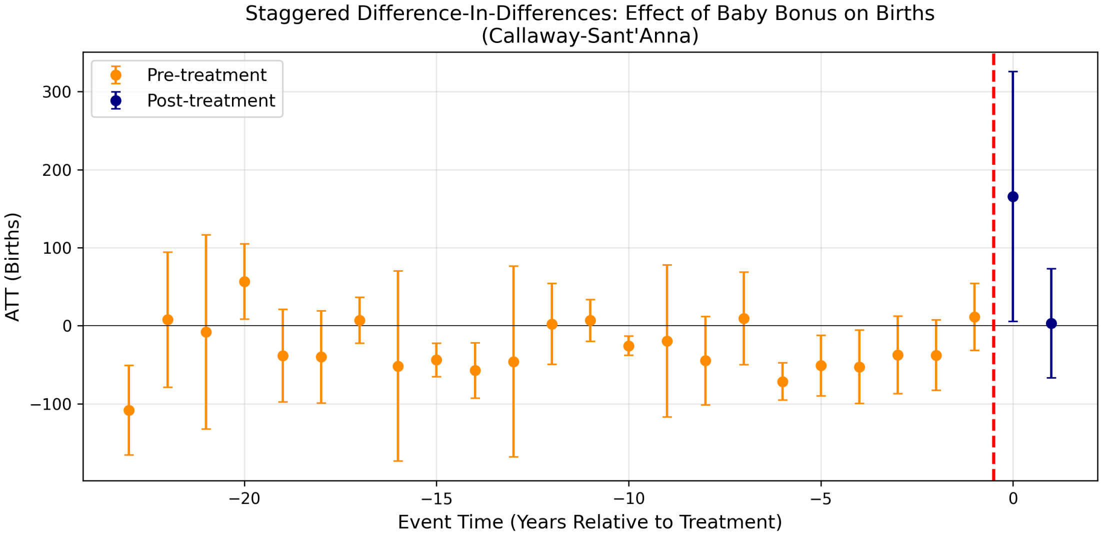

Flint City and Surrounding MCDs

Kalamazoo City and Surrounding MCDs

Pontiac City and Surrounding MCDs

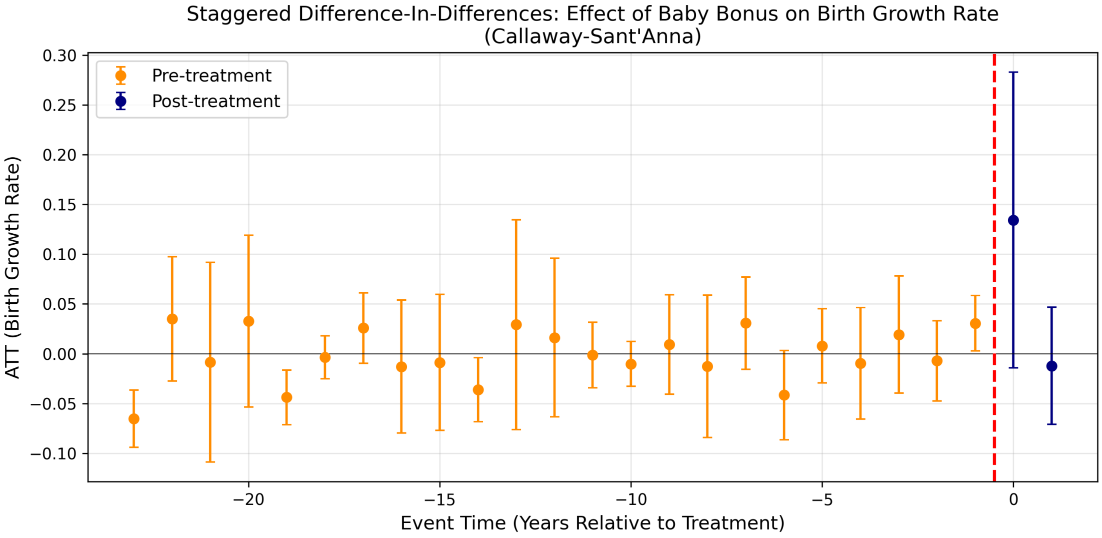
Notes: This figure compares live birth growth rates in treated cities (Flint, Kalamazoo, Pontiac) to those in their surrounding counties. The divergence after program adoption, with cities exhibiting stronger growth, indicates that the fertility response is concentrated in treated areas and not mirrored by offsetting declines at the county level.

Figure 12: Event Study SDID Baby Bonus Impact: Flint and Surrounding MCDs, Kalamazoo and Surrounding MCDs, and Pontiac and Surrounding MCDs (Births)



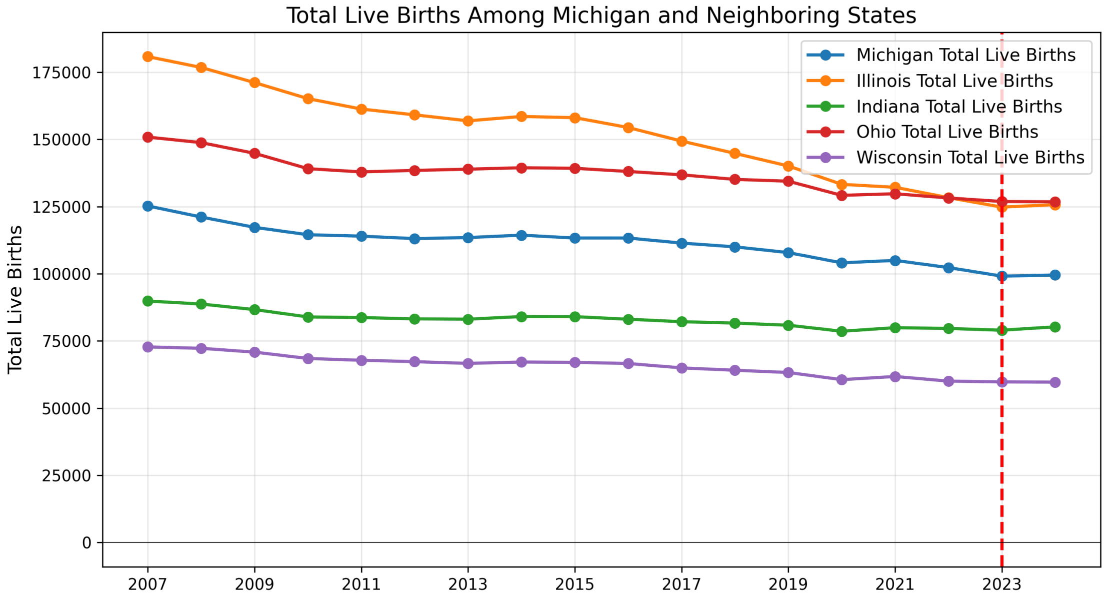
Notes: This event-study figure reports staggered difference-in-differences estimates of the effect of Rx Kids on live births for combined city-plus-surrounding-MCD regions. Orange points represent pre-treatment coefficients and blue points represent post-treatment coefficients; vertical bars denote confidence intervals. The absence of pre-trends and the positive post-treatment estimates indicate that the fertility response persists even when accounting for nearby geographic areas.

Figure 13: Event Study SDID Baby Bonus Impact: Flint and Surrounding MCDs, Kalamazoo and Surrounding MCDs, and Pontiac and Surrounding MCDs (Growth)



Notes: This figure presents event-study estimates using birth growth rates as the outcome for combined city-plus-surrounding-MCD regions. Pre-treatment coefficients are centered near zero, while post-treatment coefficients are positive, indicating that birth growth increases after program adoption and is not offset by declines in adjacent areas.

Figure 14: Total Live Births: Michigan and Neighboring States


Total Live Births Among Michigan and Neighboring States

Notes: This figure compares total live births in Michigan to those in neighboring states over time. The vertical dashed line marks the introduction of Rx Kids. Michigan's relative performance post-2024 provides a broader regional benchmark, helping to assess whether observed increases reflect local policy effects rather than common regional or macroeconomic shocks.

4.3 Cost per Induced Birth

We find that Flint's \$7,500 baby bonus generates a small fertility response: actual 2024 births exceeded a three-year pre-treatment baseline by roughly 7.5%, implying ~\$107,000 in program spending per induced birth. Following Milligan (2005), Drago et al. (2011), and Choo and Jales (2021), we define the cost per induced birth as $s \cdot N_1/(N_1 - N_0)$, where $s = \$7{,}500$ is the per-birth subsidy, $N_1 = 1{,}070$ is observed Flint births in 2024, and $N_0 = 995.3$ is the average of the three immediately pre-treatment years (1,004, 998, and 984).[13] The numerator is total program outlay rather than spending on marginal mothers alone, because Rx Kids pays \$7,500 to every eligible Flint resident giving birth. With $\Delta N = 74.7$ induced births and total spending of \$8.03 million, the implied cost is approximately \$107,500 per induced birth, of which 93% ($s \cdot N_0$) is an inframarginal transfer to families that would have had a child regardless. This places Flint between Québec's responsive program (∼C\$15,000 per induced birth, Milligan 2005) and Australia's costlier one (>A\$126,000, Drago et al. 2011), and aligns with the >74% inframarginal share Choo and Jales (2021) report for South Korea.

5 Models With Baby Bonuses

The Barro-Becker Standard Fertility Choice Model

In this subsection, we extend the classic Barro-Becker model to include baby bonuses (child subsidies).

In the Barro-Becker fertility choice model, a representative household maximizes dynastic utility:

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[13] A 5-year linear pre-trend baseline yields a larger effect ($\Delta N \approx 189$) by crediting the program with arresting Flint's pre-existing decline. We adopt the flat three-year baseline as more conservative and more directly comparable to the international literature.

$$U_t = v(c_t) + a(n_t)n_t U_{t+1}$$

where c_t is parental consumption at time t, n_t is the number of children, U_{t+1} is the utility of the next generation, $v(c_t) = \frac{c_t^{1-\sigma}}{1-\sigma}$ with $\sigma > 0$, and altruism function $a(n_t) = an_t^{-\epsilon}$ with $0 < a < 1$ and $0 < \epsilon < 1$.

The household budget constraint is given by:

$$w_t + (1 + r_t)k_t = c_t + n_t(\beta_t + k_{t+1})$$

where w_t is parental wage income, r_t is the interest rate, k_t is inherited capital per person, and β_t is the cost per child.

Incorporating Baby Bonuses (Child Subsidies)

To incorporate baby bonuses (subsidies), assume the government pays a subsidy s_t per child. The modified budget constraint becomes:

$$w_t + (1 + r_t)k_t + s_t n_t = c_t + n_t(\beta_t + k_{t+1})$$

Optimization and Equilibrium Conditions

The household maximizes:

$$\max_{c_t, n_t, k_{t+1}} U_t = v(c_t) + a(n_t)n_t U_{t+1}$$

subject to:

$$w_t + (1 + r_t)k_t + s_t n_t = c_t + n_t(\beta_t + k_{t+1})$$

First-order conditions

The Euler equation (consumption smoothing) is:

$$\frac{v'(c_t)}{v'(c_{t+1})} = a(1 + r_{t+1})\frac{1}{n_t^{\epsilon}}$$

The optimal fertility condition is:

$$v(c_t)(1 - \epsilon - a) = v'(c_t)\left[\beta_t + k_{t+1} - s_t - \frac{w_{t+1}}{1 + r_{t+1}}\right]$$

The subsidy s_t lowers the effective child-rearing cost, thus raising fertility.

Introducing child subsidies implies lower effective costs of children, increased fertility (n_t increases), potential increase in steady-state population growth, and effects on steady-state capital per capita depending on subsidy financing methods.

5.1 A Lifecycle Fiscal Accounting Extension of the Baby Bonus

While the Barro–Becker framework clarifies how a baby bonus reduces the shadow cost of fertility and increases births, policymakers are ultimately concerned with the intertemporal fiscal consequences of induced births. We therefore augment the fertility-choice framework with a lifecycle fiscal accounting structure that tracks the discounted present value of taxes, transfers, and public expenditures associated with an additional birth.

Setup Time is discrete. A child born at time t lives for J periods (ages $a = 0, 1, \ldots, J$). Let p_a denote the probability of surviving to age a, with $p_0 = 1$. The government discounts future flows at rate r.

At birth, the government pays a baby bonus s_t for each child. Over the lifecycle, the individual generates:

- $T_{a,t+a}$: total taxes paid at age a (including income, payroll, and consumption taxes),
- $B_{a,t+a}$: transfers received at age a (e.g., child benefits, unemployment insurance, Social Security, Medicare),
- $G_{a,t+a}$: age-specific public expenditures (e.g., education, public health spending, and other government services).

Marginal Fiscal Value of an Induced Birth We define the *marginal fiscal value* (MFV) of an additional birth at time t as the net present value of the government's lifetime fiscal flows associated with that individual:

$$MFV_t = -s_t + \sum_{a=0}^{J} \frac{p_a}{(1+r)^a} \left[T_{a,t+a} - B_{a,t+a} - G_{a,t+a} \right]. \tag{3}$$

The first term reflects the upfront fiscal cost of the baby bonus. The summation captures the discounted stream of net tax contributions over the lifecycle. Early in life, individuals are typically net fiscal recipients due to education and health spending, while during working years they contribute positively through taxes. In retirement, transfers such as pensions and healthcare may again dominate.

If $MFV_t > 0$, an induced birth improves the government's intertemporal budget constraint; if $MFV_t < 0$, it worsens it.

Program-Level Fiscal Impact Let N_t^0 denote births in the absence of the policy and N_t^1 denote births under the baby bonus. The number of induced (marginal) births is $\Delta N_t = N_t^1 - N_t^0$. Total fiscal costs at birth are $s_t N_t^1$, since the subsidy is paid to all births, not only those induced.

It is useful to decompose the fiscal impact into marginal and inframarginal components. Define the lifecycle fiscal value excluding the bonus:

$$MFV_t^{\text{excl. bonus}} = \sum_{a=0}^{J} \frac{p_a}{(1+r)^a} \left[T_{a,t+a} - B_{a,t+a} - G_{a,t+a} \right]. \tag{4}$$

Then the net fiscal impact of the policy is:

$$\text{Net Fiscal Impact}_t = \Delta N_t \cdot MFV_t^{\text{excl. bonus}} - s_t N_t^1. \tag{5}$$

Equivalently, this can be written as:

$$\text{Net Fiscal Impact}_t = \Delta N_t \cdot MFV_t - s_t (N_t^1 - \Delta N_t), \tag{6}$$

which highlights that the government incurs a fiscal cost from paying the bonus to inframarginal births ($N_t^1 - \Delta N_t$) that would have occurred even in the absence of the policy.

Connection to Fertility Choice We embed this fiscal accounting structure within a standard lifecycle fertility model. Households choose consumption, savings, and fertility to maximize expected lifetime utility:

$$V_j(a, z, n) = \max_{c,n',a'} \left\{ u(c, n') + \beta \, \mathbb{E} \left[V_{j+1}(a', z', n') \right] \right\}, \tag{7}$$

subject to the budget constraint:

$$a' = (1 + r)a + (1 - \tau_\ell)w_j z - c - \phi(n', j) + s_t \cdot \mathbf{1}\{n' > n\} - \text{net taxes}_j, \tag{8}$$

where a denotes assets, z productivity, w_j age-specific wages, τ_ℓ the labor income tax rate, and $\phi(n', j)$ the resource cost of children. The baby bonus s_t reduces the marginal cost of an additional child, thereby increasing fertility.

Fiscal Internal Rate of Return. An alternative and intuitive metric is the *fiscal internal rate of return* r^* of an induced birth, defined as the discount rate that equates the upfront subsidy to the discounted stream of future net fiscal contributions:

$$s_t = \sum_{a=0}^{J} \frac{p_a}{(1 + r^*)^a} \left[T_{a,t+a} - B_{a,t+a} - G_{a,t+a} \right]. \tag{9}$$

A higher r^* implies that induced births generate substantial fiscal returns relative to their initial cost.

Equations (3)–(9) provide a transparent mapping from reduced-form fertility responses to long-run fiscal consequences. The key determinants of MFV_t include lifecycle earnings profiles, tax schedules, age-specific public expenditures, transfer programs, and the discount rate. Importantly, the fiscal value of induced births may differ from that of average births if marginal births are drawn disproportionately from different parts of the income distribution.

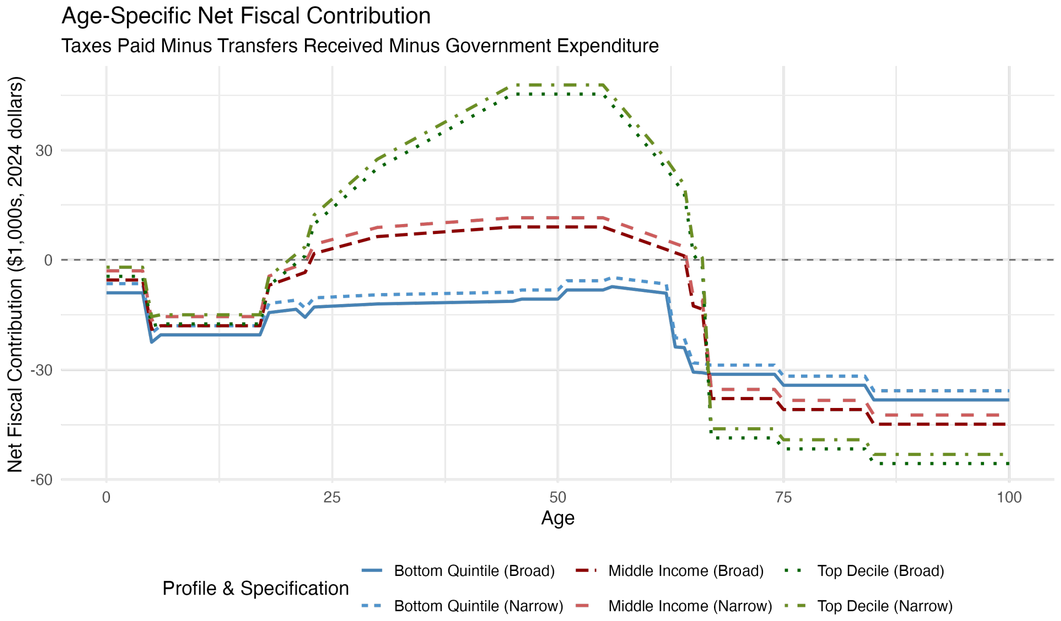
This framework allows us to combine our empirical estimates of ΔN_t with calibrated lifecycle fiscal profiles to evaluate whether baby bonus programs generate positive or negative long-run fiscal returns.

We calibrate the MFV framework using age-specific profiles for taxes, transfers, and government expenditure drawn from publicly available administrative sources. The tax profile combines federal income taxes from CBO distributional estimates, payroll taxes at the statutory 7.65% rate, Michigan state income tax at 4.25%, and state sales tax on consumption expenditure; the transfer profile includes EITC, SNAP, Medicaid, SSI, Social Security, and Medicare, calibrated by age from CMS and SSA tabulations. We construct two income profiles: a bottom-quintile profile anchored to Rx Kids enrollment demographics—where 57% of participants report household income below \$10,000—and a middle-income profile (40th–60th percentile) as a comparison case. Survival probabilities are taken from SSA 2021 period life tables, with a robustness check using income-adjusted mortality from (Chetty 2016) reported in the Appendix. We present results under two government expenditure specifications: a *broad* specification that allocates a per-capita share of all government spending (\$4,000 per year), following the standard in the generational accounting literature (Auerbach 1991, 1994), and a *narrow* specification that includes only congestible services such as K–12 education, higher education, and incarceration (\$1,500 per year). The narrow specification is arguably more appropriate for evaluating the marginal fiscal impact of an additional birth, since expenditures on national defense, courts, and infrastructure do not scale one-for-one with population.

Results: Marginal Fiscal Value of an Induced Birth

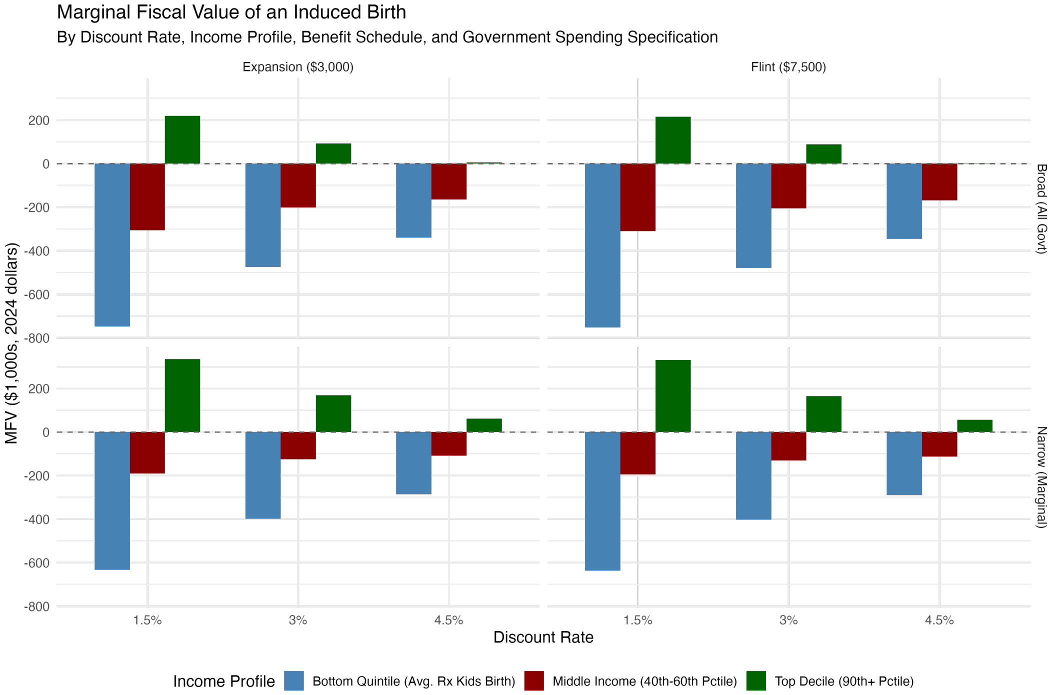
The MFV is negative across all 24 specifications we consider, spanning two benefit schedules, two income profiles, and three discount rates (Figure 16). Under the broad specification with the Flint benefit schedule ($7,500), the MFV for bottom-quintile individuals ranges from −$752,521 at a 1.5% discount rate to −$344,651 at 4.5%; for middle-income individuals, the corresponding range is −$309,820 to −$168,086. Under the narrow specification—which arguably better captures the marginal fiscal footprint of an additional person, since pure public goods such as national defense do not scale one-for-one with population—MFV values are considerably smaller in magnitude: −$636,927 to −$289,233 for bottom-quintile individuals and −$194,226 to −$112,667 for middle-income individuals. It is worth emphasizing that the baby bonus itself accounts for less than 2% of total MFV in every specification; the negative values are driven overwhelmingly by the gap between lifetime transfers and taxes that characterizes the fiscal profile of a typical American at *any* income level below approximately the 80th percentile—a gap that owes primarily to the cost of public education in childhood and Social Security and Medicare in retirement. Indeed, Figure 15 shows that even middle-income individuals are net fiscal contributors only during their prime working years (approximately ages 25–60), a pattern that is not unique to baby bonus recipients but rather reflects the structure of the American fiscal system as a whole. These estimates are also conservative in several respects: they assume no real wage growth over the lifecycle, they do not account for the tax contributions of any children the induced individuals themselves may have, and most importantly they capture only the direct fiscal channel while omitting the broader welfare and growth externalities that motivate pronatalist policy and which we discuss below. Results are robust to using income-adjusted survival probabilities from Chetty et al. (2016), which modestly reduce the MFV magnitude for bottom-quintile individuals (by approximately 5%) due to shorter expected lifespans and correspondingly lower lifetime transfer receipt.

Figure 15: Age-Specific Net Fiscal Contribution by Income Profile



Notes: Annual net fiscal contribution (taxes paid minus transfers received minus government expenditure consumed) by age, in thousands of 2024 dollars. Blue lines denote bottom-quintile income profiles; red lines denote middle-income profiles. Solid lines use the broad government expenditure specification; dashed lines use the narrow specification.

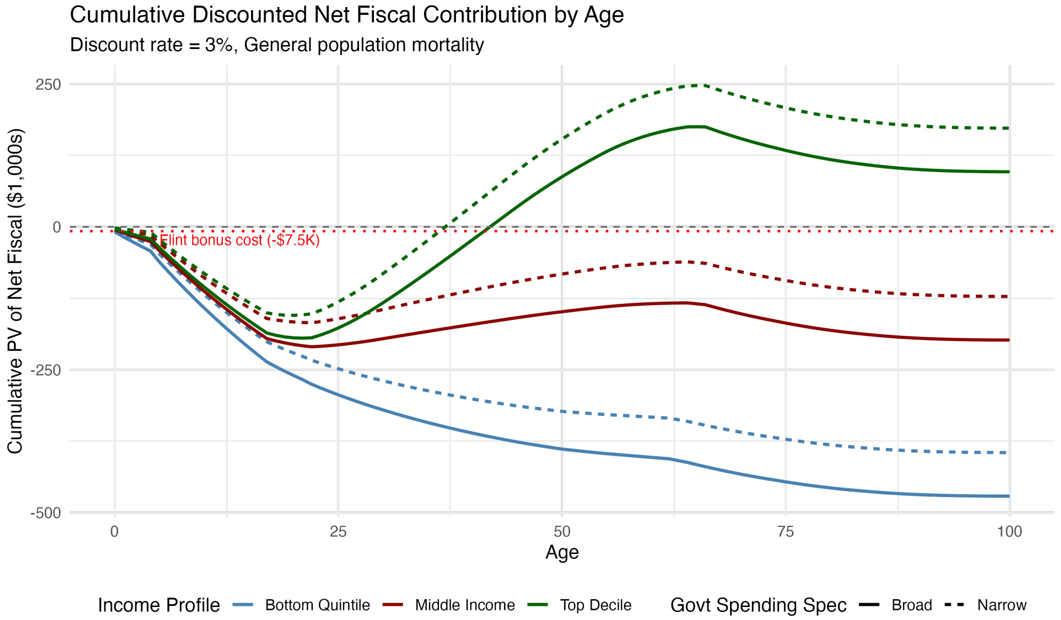
Figure 16: Marginal Fiscal Value by Discount Rate, Income Profile, and Specification



Notes: MFV of an induced birth under the Flint ($7,500) and Expansion ($3,000) benefit schedules, by discount rate. Top panels show the broad government expenditure specification; bottom panels show the narrow specification. Blue bars denote bottom-quintile income profiles; red bars denote middle-income profiles. All values in 2024 dollars.

At the program level, the direct fiscal implications are negative, though several considerations suggest this substantially understates the full social return of the policy. Applying our estimates to the Flint program—where 1,070 births occurred against a counterfactual of 984, yielding approximately 86 induced births—the total bonus expenditure was $8,025,000, of which $7,380,000 went to inframarginal births that would have occurred regardless; however, even these inframarginal payments may generate returns not captured in the fiscal accounting, including improved birth outcomes and early childhood development documented in the broader unconditional cash transfer literature (Reader 2023; Troller-Renfree et al. 2022). The net fiscal impact of the induced births ranges from $-$72.1 million (broad, $r = 1.5\%$) to $-$32.3 million (narrow, $r = 4.5\%$), as shown in Figure 17, though these figures do not incorporate potential productivity gains from improved childhood health and cognitive development, nor do they account for the fiscal contributions of subsequent generations descended from induced births. These program-level estimates should therefore be understood as measuring only the direct fiscal channel—one component of a broader cost-benefit calculus that includes externalities from population growth. On the externality side, the idea-production channel emphasized by Jones (2022), whereby a larger population generates more innovation and sustains long-run growth, and the total welfare gains from additional lives formalized by Adhami et al. (2025), both point to substantial social returns that lie outside the fiscal accounting framework. In this sense, the lifecycle fiscal analysis plays a complementary role: it quantifies the net fiscal cost that these broader social returns must exceed in order to justify the policy, providing policymakers with a concrete threshold—on the order of $112,000 to $753,000 per induced birth depending on the specification—against which to evaluate the externality gains. This framing parallels the economic logic of public education, where direct fiscal returns are negative for many populations yet the policy is justified on human capital and productivity grounds.

Figure 17: Cumulative Discounted Net Fiscal Contribution by Age

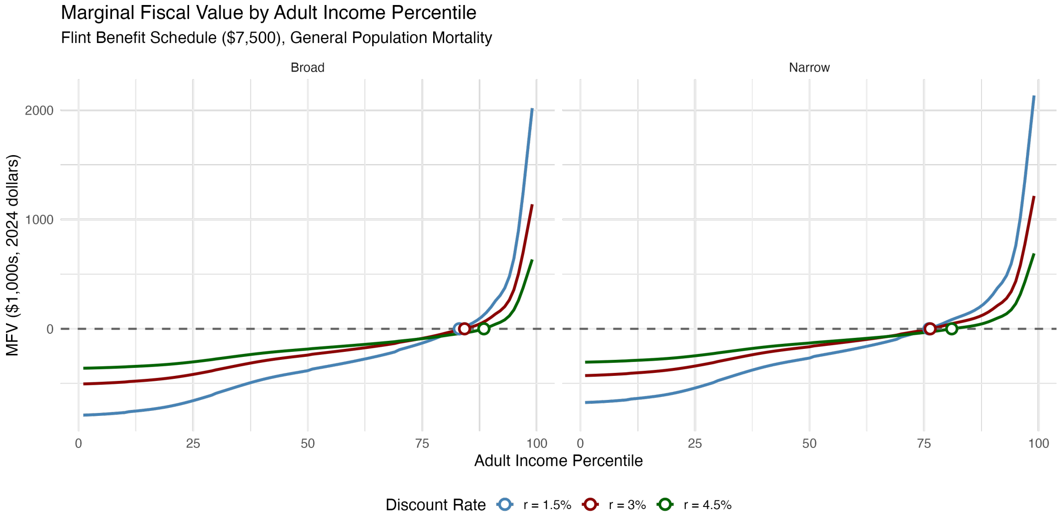


Notes: Cumulative present value of net fiscal contributions from birth through each age, discounted at 3%. Blue lines denote bottom-quintile income profiles; red lines denote middle-income profiles. Solid lines use the broad specification; dashed lines use the narrow specification. The Flint bonus cost ($7,500) is marked for scale. All values in thousands of 2024 dollars.

To explore the conditions under which an induced birth could generate positive fiscal returns, we add a third income profile calibrated to the 90th percentile of the individual earnings distribution, with peak earnings of approximately \$170,000 and a combined effective tax rate of 29%. Under this profile, MFV is positive across all specifications: from \$215,210 (broad, $r = 1.5\%$) to \$1,558 (broad, $r = 4.5\%$), and from \$330,804 to \$56,976 under the narrow specification (Figure 17). These values illustrate that the American fiscal system does generate substantial positive returns from high-earning individuals over the lifecycle, and that the negative average MFV is driven not by any inherent feature of baby bonus programs but by the concentration of induced births in the lower portion of the income distribution. Using the Chetty et al. (2014) national intergenerational transition matrix to weight MFV across the destination quintiles that children born to bottom-quintile parents actually reach, the expected MFV for a Q1-origin child is $-$\$320,913 (broad, $r = 3\%$) or $-$\$244,639 (narrow, $r = 3\%$). Although 7.2% of Q1-origin children reach the top quintile and contribute positively, the majority remain in lower quintiles where lifetime transfers exceed taxes. Under a national counterfactual in which baby bonuses applied to all births regardless of parental income, the expected MFV improves to $-$\$239,475 (broad) or $-$\$163,202 (narrow) at $r = 3\%$, and would improve further in jurisdictions with stronger intergenerational mobility or in combination with complementary investments in education and workforce development that shift the earnings distribution of induced births upward. It is also worth noting that these estimates omit the fiscal contributions of subsequent generations: if an induced birth has children of her own, those descendants generate additional tax revenue and economic activity not captured in the single-lifecycle accounting framework.

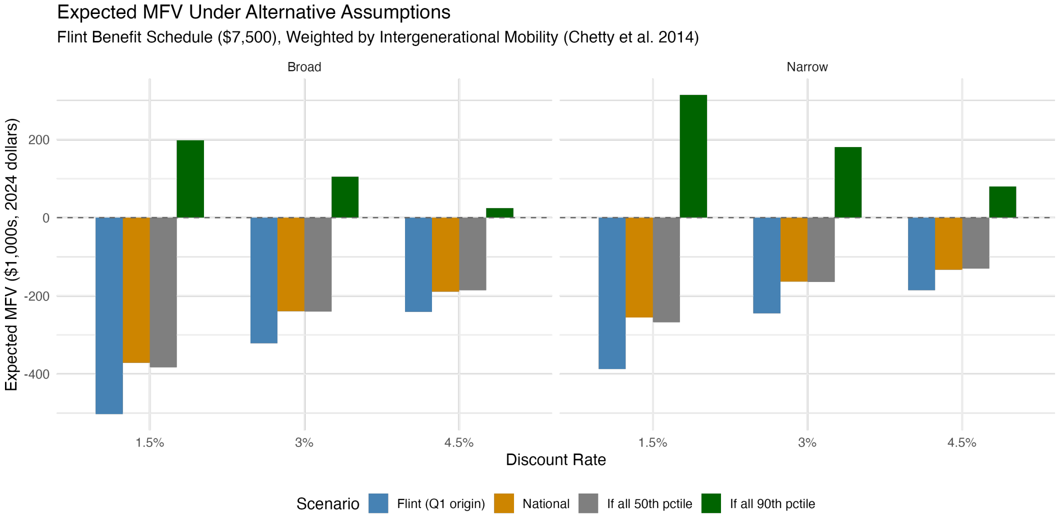
To identify the exact income threshold at which an induced birth becomes fiscally self-financing on direct fiscal grounds alone, we parameterize earnings, taxes, transfers, and government expenditure as continuous functions of adult income percentile using monotone spline interpolation over CBO and CPS anchor points, then compute MFV at every percentile from the 1st through the 99th (Figure 18). At a 3% discount rate, MFV crosses zero at approximately the 84th percentile under the broad specification and the 76th percentile under the narrow specification; at $r = 4.5\%$, the crossover rises to the 88th and 81st percentiles, respectively. These crossover points provide a useful benchmark. Any policy that successfully promotes upward mobility among program participants, whether through education investments, workforce training, or community development alongside the cash transfer, would shift the distribution of adult outcomes rightward and reduce the net fiscal cost per induced birth. For context, the crossover under the narrow specification (76th to 81st percentile) corresponds roughly to individual earnings of $80,000 to $100,000, a threshold that is ambitious but not implausible for a well-supported cohort over a full working lifetime that extends into the 2060s and beyond. These results imply that the welfare externality from each additional induced birth must exceed approximately $245,000 (narrow, $r = 3\%$) for the Flint program to generate positive net social returns, or approximately $163,000 under the national counterfactual. Both thresholds are well within the range of externality values suggested by the endogenous growth literature (Figure 19). Jones (2022) estimates that the idea-production externality from an additional person, operating through the channel that a larger population generates proportionally more researchers and innovation, can be substantial and may exceed these thresholds under moderate assumptions about the elasticity of ideas with respect to population. Adhami et al. (2025) show that the total welfare contribution of an additional life, valued at the individual's own consumption-equivalent utility, is large enough to make population growth a major component of global welfare growth even in the absence of fiscal considerations.

Figure 18: Marginal Fiscal Value by Adult Income Percentile



Notes: MFV of an induced birth as a continuous function of adult income percentile, under the Flint benefit schedule ($7,500). Left panel: broad government expenditure specification; right panel: narrow specification. Open circles mark the crossover percentile where MFV equals zero. Earnings, taxes, transfers, and government expenditure are parameterized as smooth functions of percentile using CBO and CPS anchor points with monotone spline interpolation. All values in thousands of 2024 dollars.

Figure 19: Expected MFV Under Alternative Income Assumptions



Notes: Expected MFV under four scenarios: (1) Flint Q1-origin births weighted by the Chetty et al. (2014) intergenerational transition matrix; (2) national births weighted by the income distribution of new parents and quintile-specific mobility rates; (3) hypothetical in which all induced births earn at the 50th percentile; (4) hypothetical in which all earn at the 90th percentile. Flint benefit schedule ($7,500). Left panel: broad specification; right panel: narrow specification. All values in thousands of 2024 dollars.

6 Conclusion

This paper provides the first evidence on the fertility effects of a baby bonus in the United States. Using administrative birth records and a staggered difference-in-differences design, we find that the Rx Kids program increased birth growth rates in municipalities after adoption. The results are robust to alternative specifications and placebo tests, indicating that the observed increase is unlikely to reflect chance or confounding shocks.

To interpret these findings, we extend the classic Barro–Becker model of fertility choice to incorporate a per-child subsidy. The model shows formally how a baby bonus lowers the effective cost of child-rearing and shifts the optimal fertility decision, yielding higher steady-state population growth. Our empirical estimates align with these theoretical predictions: the observed fertility increase is consistent with a sizable decline in the implicit price of childbearing.

Beyond their local relevance, these results speak to a growing international debate over declining fertility and long-term economic growth. Low fertility carries not only demographic and fiscal risks but also dynamic growth externalities when idea production and aggregate welfare depend on population size. By showing that even a modest, city-level baby bonus can measurably affect fertility behavior, our analysis highlights the potential of targeted pronatalist subsidies to partially offset these externalities.

Several caveats remain. First, the long-run persistence of the fertility response is unknown; follow-up data will be essential to assess whether the initial increase endures or represents timing shifts. Second, while our setting is uniquely informative for U.S. policy, external validity to other regions or larger-scale programs may be limited by institutional and cultural differences. Finally, the fiscal cost per marginal birth and the distributional consequences deserve careful evaluation in future work.

Overall, the Flint baby bonus offers a rare quasi-experimental test of the Barro–Becker insight that lowering the cost of children raises fertility. Our results suggest that well-designed, unconditional cash transfers at birth could potentially meaningfully influence demographic trajectories and, by extension, the economy's long-run growth potential. Scaling such a baby bonus to a larger jurisdiction or region would be one next step as an area of future research that attempts to better understand general equilibrium effects of the policy. As declining fertility becomes an increasingly salient policy challenge, these findings provide a rigorous benchmark for the design and evaluation of broader pronatalist strategies.

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Appendix

A.1 Construction of lifecycle profiles

The marginal fiscal value (MFV) of an induced birth is the present discounted value of the individual's expected net contribution to government budgets, following Auerbach, Gokhale, and Kotlikoff (1991, 1994). For percentile p at discount rate r:

$$\mathrm{MFV}(p, r) \ = \sum_{a=0}^{A} \frac{S_a(p)\left[T_a(p) - B_a(p) - G_a(p)\right]}{(1+r)^a} \ - \ \text{Bonus}, \tag{10}$$

where S_a is survival, T_a is taxes, B_a is transfers received, and G_a is the individual's share of government expenditure. Table 1 lists the anchor values and sources.

Three choices matter most. First, the *broad* specification charges each person a per-capita share of all non-transfer government spending (\$4,000/yr); the *narrow* specification limits G_a to congestible services (\$1,500/yr). At $r = 3\%$, the MFV crossover shifts from the 76th percentile (narrow) to the 84th (broad), making this the most consequential modeling choice. Second, for Figure 18 we replace step-function quintile profiles with smooth functions of percentile, calibrating phase-outs to published EITC, SNAP, and Medicaid schedules. Third, income-adjusted survival applies the Chetty et al. (2016) hazard ratios as an age-constant multiplier on the SSA (2021) baseline. This understates the widening income–mortality gap at older ages and is therefore conservative for the bottom-quintile results.

Figure 15 weights these per-individual MFVs by the Chetty, Hendren, Kline, and Saez (2014) quintile transition matrix. We apply it to Flint's (Q1-heavy) parental income distribution and compare against a national counterfactual using U.S. birth shares across parental quintiles (0.25/0.23/0.21/0.18/0.13). The roughly \$80,000 gap between the two expectations at $r = 3\%$ comes almost entirely from the long right tail of the Q1→Q5 transition (7.2%), not from differences in mean child outcomes.

Caveats.

1. *Medicare is held constant across income groups.* This is conservative for the top decile and slightly overstates bottom-quintile receipt. Interacting Medicare with the Chetty hazard ratios shifts PDV by \$15–25K at $r = 3\%$.
2. *Higher-education enrollment rates (30/50/70%) are below recent NCES tabulations for the top decile (∼80–85%).* The continuous-percentile version in `scripts/lifecycle_fiscal_accounting.R` (lines 1005–1022) already uses 75% at the 90th and 85% at the 99th, which can be cited as the preferred specification.

Table 1: Lifecycle Fiscal Accounting: Parameters and Sources

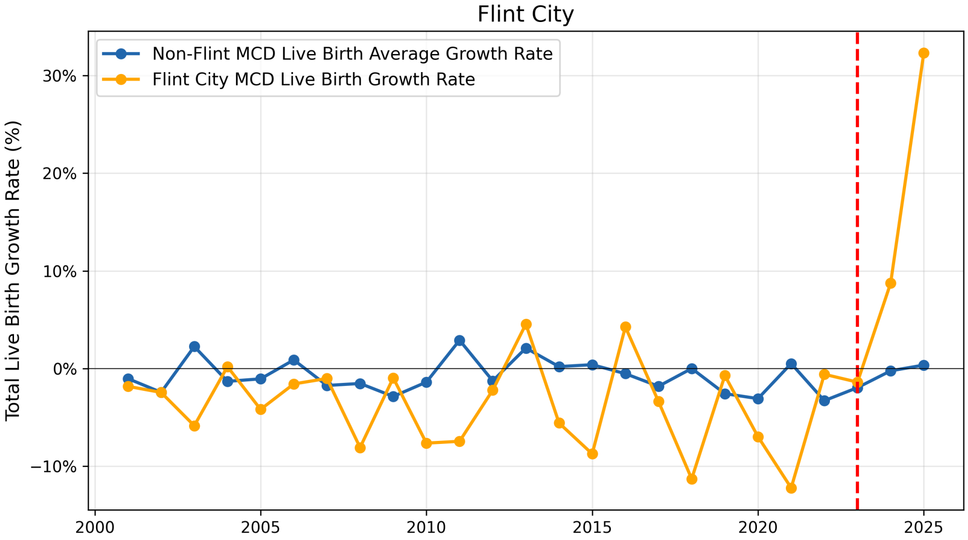
	Income group			
Parameter	Bottom Q	Middle (40–60)	Top decile	**Source**
Panel A. Program and accounting parameters				
Flint bonus ($)	7,500 ($1,500 prenatal + 12×$500)			Program design
Expansion bonus ($)	3,000 ($1,500 prenatal + 3×$500)			Program design
Discount rates (r)	1.5%, 3.0%, 4.5%			AGK (1991, 1994)
Govt. spending — broad	$4,000 / year per capita			CBO (2023)
Govt. spending — narrow (congestible)	$1,500 / year per capita			CBO (2023)
Panel B. Lifetime earnings and taxes				
Peak earnings, ages 45–55 (2024 $)	29,000	60,000	170,000	CBO (2023); CPS
Effective tax rate	12%	22%	29%	CBO (2023); MI Treas.
Components	Federal income + 7.65% FICA + 4.25% MI + sales			
Panel C. Public transfers received (B_a, annual $, by age window)				
EITC (ages 22–50)	2,500	0	0	IRS SOI; CBO
SNAP (18–55 / 56–64)	2,400 / 1,200	0	0	USDA FNS; CBO
Medicaid (0–5 / 6–17 / 18–64)	5,000 / 3,000 / 4,500	1,500 / 500 / 200	500 / 0 / 0	CMS; KFF
SSI (18–64)	800	0	0	SSA
Social Security (claim age)	14,500 (62)	22,000 (67)	36,000 (67)	SSA
Medicare (65–74 / 75–84 / 85+)	13,000 / 16,000 / 20,000 (all groups)			CMS; CBO
Panel D. Government expenditure on the individual (G_a, annual $)				
K–12 (ages 5–17)	13,500 (Michigan per-pupil)			NCES (2023)
Higher-ed enrollment rate	30%	50%	70%	NCES (2023)
Higher-ed subsidy/FTE	9,000			SHEEO
Incarceration EV (18–45)	600	0	0	BJS
Panel E. Mortality and intergenerational mobility				
Baseline survival	SSA 2021 period life table, both sexes			SSA (2021)
Income hazard ratio	1.40	0.90	0.75	Chetty et al. (2016)
Implied ΔLE vs. baseline	−6 yrs	+2 yrs	+4–6 yrs	Chetty et al. (2016)
Mobility matrix P(child | parent)	Quintile transition matrix (Table II)			Chetty et al. (2014)
National birth shares (Q1–Q5)	0.25 / 0.23 / 0.21 / 0.18 / 0.13			CPS Fert. Supp.; NCHS

Notes. The table reports the discrete-profile assumptions used to compute the marginal fiscal value (MFV) of an additional birth in Figures 15–19. All dollar values are in 2024 USD. Profiles are evaluated at three discount rates ($r = 1.5, 3.0, 4.5\%$) and under both broad and narrow specifications of non-individualized government consumption. The continuous-percentile versions used in Figure 18 (and the mobility-weighted expectations in Figure 19) interpolate these anchor values via monotone splines and logistic phase-outs across percentiles 1–99; the full functions are documented in the replication script. Income-adjusted survival uses age-constant hazard ratios calibrated to Chetty et al. (2016). The intergenerational mobility weighting in Figure 19 applies the Chetty, Hendren, Kline, and Saez (2014) quintile transition matrix to map Flint's parental-income distribution (Q1-heavy) into expected child outcomes.

Sources. Auerbach, Gokhale, and Kotlikoff (1991, 1994) [generational accounting framework]; Chetty, Hendren, Kline, and Saez (2014, *QJE*) [mobility]; Chetty et al. (2016, *JAMA*) [income–mortality gradient]; CBO (2023) [income distribution, effective tax rates, federal outlays]; SSA (2021) [period life table]; NCES (2023) [K–12 and higher-ed expenditure]; SHEEO [state higher-ed appropriations per FTE]; BJS [incarceration]; IRS SOI, USDA FNS, CMS, KFF [program participation and per-capita transfers]; Jones (2022, *AER*) and Adhami et al. (2025) [population externality / welfare framework]. Replication: `scripts/lifecycle_fiscal_accounting.R`.

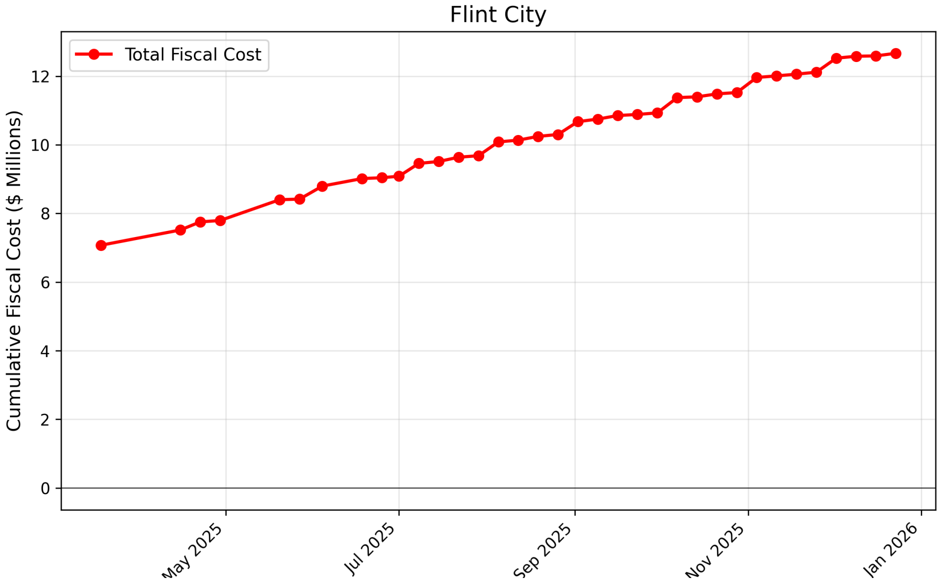
Figures

Figure 20: Flint Live Birth Growth Rates Versus Rest of Michigan Average Live Birth Growth Rates Over Time



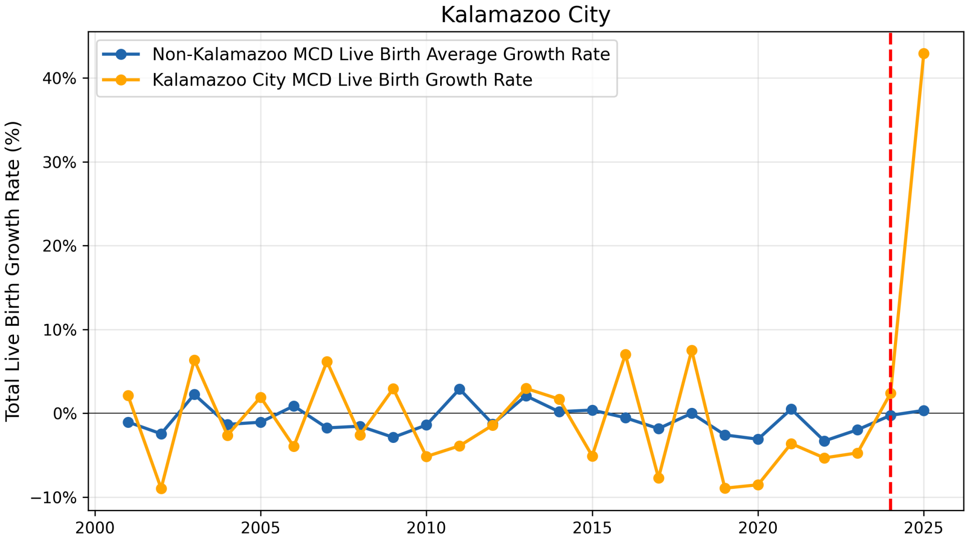
Notes: This appendix figure plots Flint City's annual live birth growth rate against the average live birth growth rate in the rest of Michigan. The red dashed vertical line indicates the beginning of the Rx Kids period. Flint's series rises sharply after treatment relative to the comparison series, consistent with the main results reported in the paper.

Figure 21: Flint Cumulative Fiscal Cost of Baby Bonus Program Over Time



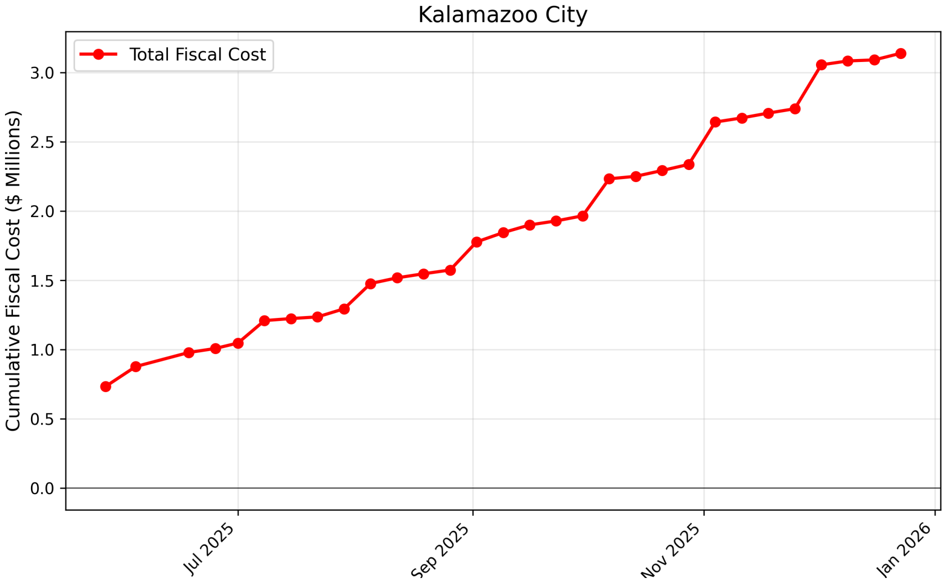
Notes: This appendix figure shows the cumulative fiscal cost of the Rx Kids program in Flint over time. The upward-sloping profile reflects the accumulation of prenatal and infant-year transfers as additional eligible births are covered by the program.

Figure 22: Kalamazoo Live Birth Growth Rates Versus Rest of Michigan Average Live Birth Growth Rates Over Time



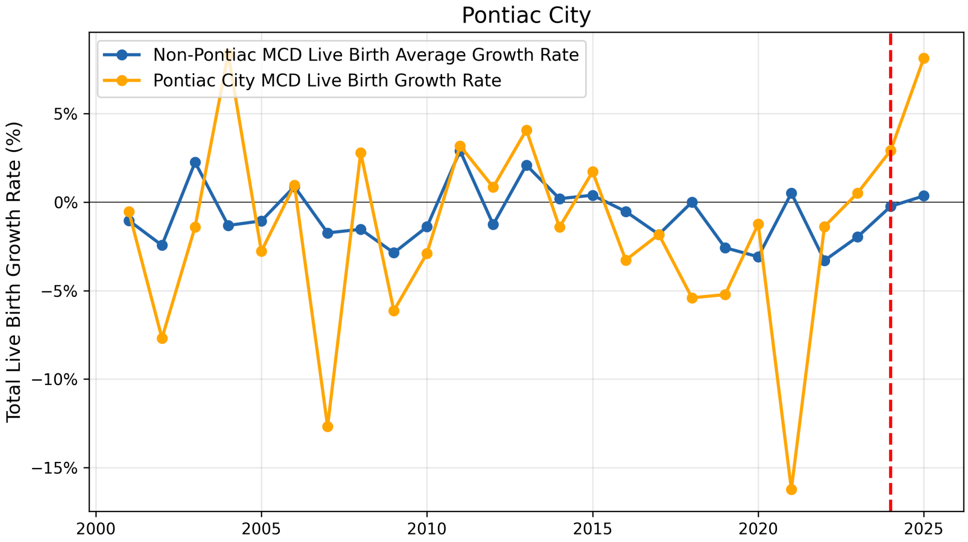
Notes: This appendix figure plots Kalamazoo's annual live birth growth rate against the average live birth growth rate in the rest of Michigan. The red dashed vertical line marks the start of the Rx Kids period in Kalamazoo. The treated-city series rises noticeably after adoption, consistent with a positive fertility effect.

Figure 23: Kalamazoo Cumulative Fiscal Cost of Baby Bonus Program Over Time



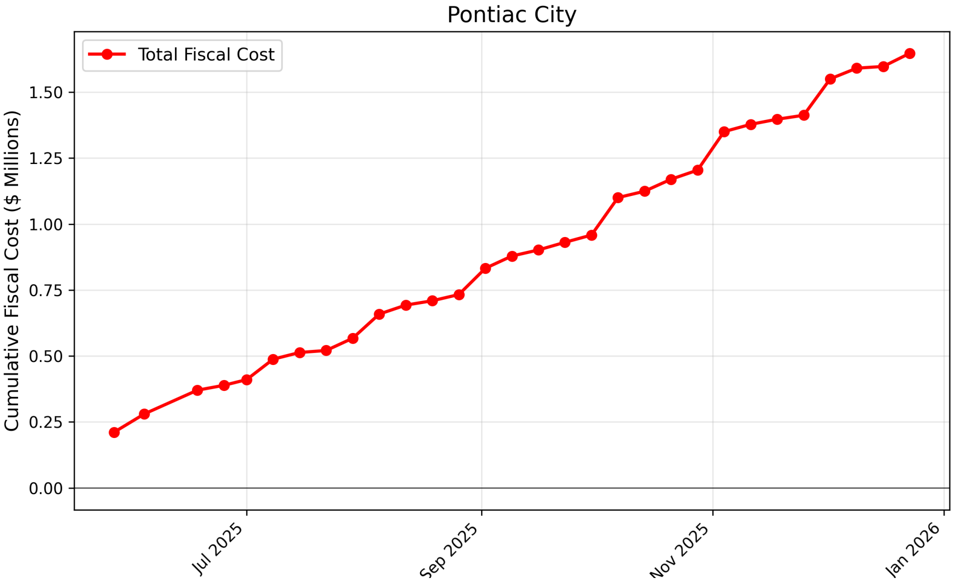
Notes: This appendix figure shows the cumulative fiscal cost of the Rx Kids program in Kalamazoo over time. The cumulative total increases as eligible prenatal and post-birth transfers are disbursed under the city's Rx Kids rollout.

Figure 24: Pontiac Live Birth Growth Rates Versus Rest of Michigan Average Live Birth Growth Rates Over Time



Notes: This appendix figure plots Pontiac's annual live birth growth rate against the average live birth growth rate in the rest of Michigan. The red dashed vertical line marks Rx Kids adoption in Pontiac. Birth growth in Pontiac turns upward after treatment relative to the rest of Michigan comparison series.

Figure 25: Pontiac Cumulative Fiscal Cost of Baby Bonus Program Over Time



Notes: This appendix figure shows the cumulative fiscal cost of the Rx Kids program in Pontiac over time. The series increases as program payments accrue to eligible births following the city's adoption of Rx Kids.