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De Gustibus Gravidarum: Pregnancy, Stable Preferences, and the Four Clocks of Household Demand

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Abstract

Pregnancy is the hardest case for the Stigler–Becker doctrine that tastes are stable and that observed changes in demand reflect changes in constraints, prices and household technology. A single before-and-after comparison cannot adjudicate the issue, because any change in a demand vector can be rationalized either by a shift in tastes or by a shift in shadow prices. This paper argues that timing can. Gestation is governed by four clocks that start at different dates and leave different signatures in expenditure: an information clock that starts when the pregnancy is recognized, a physiological clock that runs continuously, an option clock that starts when the risk of pregnancy loss resolves, and a deadline clock that ends at the birth. A household production model with fixed preferences delivers distinct timing predictions for harm goods, food, irreversible child durables and home readiness goods, and a non-identification result for designs that ignore timing. The predictions are tested on 1,164 births identified in the rotating panel of the U.S. Consumer Expenditure Interview Survey (2007–2025), using monthly expenditure records and event-study regressions with household and calendar-month fixed effects against 35,008 comparable households without a birth. Tobacco expenditure falls by about 30 percent within a quarter of expected recognition and does not recover; alcohol falls more gradually, deepens as the pregnancy becomes safer, and returns to its baseline within a quarter of the birth. Purchases of infant furniture and equipment are small while the first trimester lasts, then rise nearly twenty-fold, with more than half of all such spending compressed into the three months before the expected birth month, and the response is concentrated in first births. Household textiles and other home readiness goods peak in the third trimester and revert at the birth, out-of-town travel falls only at the birth, and food at home does not move. The paper also documents

that clothing bought for an unborn child is partly recorded as gifts in the survey, a measurement feature with implications for any study of prenatal spending.

Keywords: pregnancy; household demand; stable preferences; household production; event study; Consumer Expenditure Survey; nesting; irreversible investment

JEL codes: D12; D13; D83; D91; J13

1. Introduction

Few events change what a household buys as thoroughly as the arrival of a child, and few events are announced as far in advance. Between the day a pregnancy is recognized and the day of birth lie roughly thirty-five weeks during which the household knows, with rising certainty, that its composition, its time budget and its needs are about to change. Expectant parents stop buying some things, start buying others, bring forward some purchases and postpone the rest. Marketing scholars have long treated the transition to parenthood as the paradigmatic "life status change" that reshuffles brand loyalties and consumption habits (Andreasen, 1984; Mathur, Moschis and Lee, 2008). Economists, by contrast, have mostly studied the birth itself, as a discrete demographic shock to a life-cycle budget, and have asked whether consumption falls when the child arrives and the mother's earnings decline (Browning, 1992; Kalwij, 2005; Browning and Ejrnæs, 2009; Stanczyk, 2020). The nine months before the shock have been left largely unexamined, and the question that those months raise for consumer theory has not been posed.

The question is this. Pregnancy appears to be a period in which tastes change. Women report new cravings and aversions, nausea in the first trimester, an urge to clean and reorganize the home in the third, and an aversion to alcohol and tobacco that often precedes any medical advice (Flaxman and Sherman, 2000; Anderson and Rutherford, 2013; Orloff and Hormes, 2014). If the economist's working assumption that preferences are stable (Stigler and Becker, 1977; Becker, 1996) fails anywhere, it should fail here. Yet the same months are also a period in which constraints, information and household technology change: the household learns that a child will arrive, the probability that the pregnancy will reach term rises, the woman's energy requirement increases, the shadow price of foods and drinks that harm the fetus rises, and a stock of child-specific durables has to be in place by a date that is known in advance. The Stigler–Becker program holds that observed behavior should be explained by exactly such changes in the

arguments of the household production function, with preferences held fixed. Pregnancy is therefore a natural experiment on the explanatory reach of that program.

A single comparison of expenditure before and after a pregnancy cannot settle the matter. This is not an empirical limitation but a logical one: for any pair of demand vectors, there exists a taste shift that rationalizes the change and there exists a shadow-price shift that rationalizes it equally well. I state this as a non-identification proposition in Section 2. What breaks the equivalence is timing. The stable-preference model ties each change in demand to an observable clock, and the clocks of pregnancy do not start together. The information clock starts at recognition, around the sixth week of gestation (Branum and Ahrens, 2017). The physiological clock runs continuously and is calibrated by the nutritional literature (Butte and King, 2005). The option clock starts when the risk of pregnancy loss, which is concentrated in the first trimester (Magnus et al., 2019), has resolved. The deadline clock ends at the birth, whose expected date is known to the month. A model with fixed preferences predicts that goods which harm the fetus respond on the first clock, nutrition on the second, irreversible child durables on the third, and the timing of purchases within the remaining window on the fourth. A taste-shift account imposes no such structure. Timing therefore supplies a one-sided but sharp test: if the signatures hold, the parsimonious model survives; if they fail, it does not.

The empirical contribution of the paper is to recover these signatures from a source that has not been used for this purpose. The Interview component of the U.S. Consumer Expenditure Survey (CE) follows each sampled address for four consecutive quarterly interviews and records, for every interview, the household roster and expenditures by month and by item. A birth can be identified when a member aged zero appears in the roster who was absent three months earlier, which dates the birth to a three-month window, and the monthly expenditure records of the same household over the preceding nine to twelve months can then be read as a record of the pregnancy. Pooling eighteen years of the survey (2007–2025) yields 1,164 births with a plausible mother in the household and 35,008 comparable households without a birth. I estimate event-study regressions with household and calendar-month fixed effects, using Poisson pseudo-maximum likelihood for the many categories in which most households spend nothing in most months (Santos Silva and Tenreyro, 2006; Correia, Guimarães and Zylkin, 2020), and I exploit a feature of the survey design that is useful here: because the panel rotates by address, the quarter in which the birth falls relative to the household's four interviews is as good as random, so that

the households observed around conception and the households observed around delivery are drawn from the same population.

Four findings organize the results. First, the information clock is visible and it ticks at the right time. Tobacco expenditure falls by about 30 percent within one quarter of the expected date of pregnancy recognition and stays down through the birth and beyond, which is what a model of addictive consumption capital predicts when the shadow price of smoking rises permanently (Becker and Murphy, 1988). Alcohol bought for home consumption falls more gradually, by roughly a tenth in the quarter after recognition and by a fifth in the third trimester, which is the pattern implied by a shadow price that is proportional to the probability that the pregnancy reaches term; alcohol purchases then return to their baseline within a quarter of the birth, as a reversible price change requires. The extensive margin carries most of the alcohol response: the share of households buying any alcohol for home consumption falls by six percentage points from a base of thirty-nine.

Second, the option clock is visible and it has a different shape from the information clock. Purchases of infant furniture and equipment, the most irreversible items in the budget, remain small during the first trimester even though the household already knows that it is pregnant: the months from conception to the end of the first trimester account for about 5 percent of the twelve-month spending on these goods. They rise by more than an order of magnitude once the first trimester has ended, reach nearly twenty times their baseline in the last trimester, and collapse within two months after the birth. The response is concentrated in households for which this is the first birth, whose stock of such durables is empty, which is the prediction of a model in which the durable, not the child, is what the household is buying. More than half of all spending on these goods over the twelve observed months occurs in the three months before the expected birth month, a degree of back-loading that the deadline clock predicts under either present bias or a positive carrying cost, and that is as strong among high-income households as among low-income ones, which argues against a purely liquidity-based explanation.

Third, the physiological clock is not visible in food expenditure. Neither food at home nor total grocery purchases rise during pregnancy relative to the conception quarter, despite an energy requirement that rises by several hundred kilocalories a day in the second and third trimesters. Grocery purchases rise only after the birth, when they include diapers and formula, and by more each quarter. This null result is informative about measurement as much as about

behavior, because the Interview survey collects food at home as a usual weekly amount, and I discuss it as such.

Fourth, home readiness goods behave as the nesting literature in evolutionary psychology would predict and as a stable-preference model with a time-varying household technology can accommodate: spending on household textiles rises by two thirds in the third trimester and returns to baseline after the birth, and the broader furnishings aggregate peaks in the same quarter; women's apparel rises in the middle of the pregnancy and falls by a third after the birth; and out-of-town travel collapses by nearly two thirds in the quarter of the birth while changing little during the pregnancy. Total expenditure does not rise significantly at any point (+4 percent in the third trimester), so that the reallocation toward the child is financed mainly by cuts in adult apparel, entertainment, travel and alcohol.

The paper also contributes two measurement findings that any future study of prenatal spending in household surveys will need. The first is that the survey's gift flag, which marks purchases for persons outside the consumer unit, captures part of what is bought for the unborn child, because an unborn child is not a member of the consumer unit. The coding is concentrated in clothing: a quarter of the infant clothing bought by expectant households in the third trimester is recorded as a gift, against less than 1 percent after the birth, and gift-coded purchases of infant goods double in the quarter before the birth and fall by nearly nine tenths after it. Measures of prenatal clothing purchases that exclude gifts therefore understate the response, and I report both. The second is that infants are under-enumerated in the survey roster relative to one-year-olds by about one third, a pattern consistent with the well-documented undercount of very young children in household surveys (O'Hare, 2015), which bounds the share of births that any roster-based method can recover.

The paper relates to several literatures. The economics of consumption around births has documented the fall in household consumption after the arrival of a child and its relation to the mother's labor supply (Kalwij, 2005; Browning and Ejrnæs, 2009; Kleven, Landais and Søgaard, 2019; Stanczyk, 2020), demand-system work has treated children as demographic shifters (Browning, 1992; Preston, Sanchis Llopis and Labeaga, 2001), and Australian panel evidence documents higher spending on health care and clothing after a first birth (Brandrup and Mance, 2010). Recent work with scanner and administrative data has begun to open the prenatal period: Lührmann and co-authors, using British household scanner data, find that households buy more

calories and a less healthy basket as the pregnancy advances, while the Portuguese statistical office, using electronic invoice records, finds that household expenditure begins to rise from the fourth month of pregnancy and is 17 percent above its pre-pregnancy level in the last three months, with transport and restaurant spending falling (Lusa, 2023). This paper differs in asking what these dynamics imply for the stability of preferences and in showing that the timing of the responses, not their size, is what discriminates between explanations. It also connects the economics of irreversible investment under uncertainty (Dixit and Pindyck, 1994) and of deadlines and procrastination (Akerlof, 1991; O'Donoghue and Rabin, 1999) to a setting in which the deadline is biological and the uncertainty is resolved on a known schedule.

The rest of the paper is organized as follows. Section 2 sets out the model and derives the timing predictions. Section 3 describes the data, the identification of births and the construction of expenditure categories. Section 4 presents the empirical strategy. Section 5 reports the results, Section 6 discusses what they imply for consumer theory, measurement and policy, and Section 7 concludes.

2. Four clocks: a stable-preference model of demand during pregnancy

2.1 Household production with a biological state

Consider a household that maximizes

$$\int_{-\infty}^{\infty} e^{-\rho t}\, u(Z_t)\, dt \;+\; v(q), \qquad (1)$$

where u and v are fixed, strictly concave functions, $Z_t = (Z_{at}, Z_{nt}, Z_{ht}, Z_{ot})$ is a vector of commodities consumed at date t and q is the quality (health) of a child born at date 0. Time is measured in months and the birth is normalized to $t = 0$; conception occurs at $t_c = -9$. Commodities are produced from market goods with the household's technology, in the sense of Becker (1965), Michael and Becker (1973) and Stigler and Becker (1977):

$$Z_{at} = a_t, \qquad Z_{nt} = \phi_t f_t - n_t, \qquad Z_{ht} = H(h_t, K_t), \qquad Z_{ot} = o_t, \qquad q = Q(K_0) - \delta \int_{t_c}^{0} a_t\, dt. \qquad (2)$$

Here a_t is the quantity of goods that harm the fetus (alcohol and tobacco), f_t is food, n_t is the woman's biological energy requirement in excess of her non-pregnant requirement, $\phi_t \leq 1$ is the efficiency with which food is converted into nourishment (reduced by nausea), h_t is a flow of home goods (furnishings, textiles, repairs), K_t is the stock of child-specific durables (cribs, strollers, car seats, infant clothing) and o_t is everything else. Child quality at birth depends on the durable stock available at birth and is reduced by cumulative exposure to harm goods during gestation at rate δ. The household faces market prices $(p_a, p_f, p_h, P_K, 1)$, an interest rate r and lifetime wealth W. Preferences, that is u, v, ρ, never change. Everything that changes during a pregnancy is in the technology $\theta_t = (n_t, \phi_t, \delta, K_t, s_t, \Omega_t)$, where s_t is the probability, assessed at t, that the pregnancy reaches term and Ω_t is the household's information set.

The information structure is the heart of the model. Before the date of recognition t_I the household does not know that it is pregnant and behaves as a non-pregnant household. Pregnancy awareness in the United States occurs on average at 5.5 weeks of gestation, that is roughly one month after conception, with about a quarter of pregnancies recognized at seven weeks or later (Branum and Ahrens, 2017); I therefore take $t_I \approx -8$ as the modal recognition month. After t_I the household knows that it is pregnant and assigns probability s_t to reaching term. Because about 13 percent of recognized pregnancies end in miscarriage and the loss hazard is concentrated before the end of the first trimester (Magnus et al., 2019), s_t rises steeply between t_I and the end of the first trimester at $t_R \approx -6$ and is close to one afterwards. The birth date is uncertain only at the margin: about 10 percent of births occur before 37 weeks (Martin, Hamilton and Osterman, 2023), so the early-birth hazard π_t becomes material only in the last two months.

2.2 Non-identification in a two-period comparison

The Stigler–Becker position is often tested, implicitly, by comparing demand before and after an event and asking whether the change "looks like" a taste change. The following proposition records why such a test cannot work.

Proposition 1. Let x^0 and x^1 be two demand vectors observed at the same market prices and the same wealth, before and after a pregnancy begins. Then (i) there exists a change in the household technology θ, holding u and v fixed, that rationalizes both observations, and (ii) there exists a change in preferences, holding θ fixed, that rationalizes both observations. Consequently

the pair (x^0, x^1) carries no information about the stability of preferences in the absence of restrictions on how θ may move.

Proof. Part (ii) is immediate: take any strictly concave u^1 whose gradient at $Z(x^1;\theta^0)$ is proportional to the vector of shadow prices implied by θ^0. For part (i), write the technology with input-requirement coefficients, so that one unit of commodity j requires θ_j units of its market good (equation (2) is the case $\theta_j = 1$); the shadow price of commodity j is then $\pi_j = \theta_j p_j$ and any strictly positive shadow-price vector is attainable by a suitable choice of θ. Choosing θ^1 such that $\theta_j^1 p_j$ is proportional to $u_j\big(Z(x^1;\theta^1)\big)$ for every j makes x^1 utility-maximizing under the original u, and x^0 is utility-maximizing under θ^0 by assumption. ▫

The proposition is not a counsel of despair. It says that the empirical content of the stable-preference hypothesis lies entirely in restrictions on the technology path θ_t, and pregnancy supplies unusually strong restrictions of exactly this kind, because its clocks are set by biology and medicine rather than by the household. The remainder of this section derives them.

2.3 The information clock: harm goods

For $t < t_I$ the household's first-order condition for the harm good is $u_a(a_t) = \lambda p_a$, where λ is the marginal utility of wealth. For $t \geq t_I$ the household internalizes the expected harm to the child:

$$u_a(a_t) = \lambda\,[\,p_a + s_t\,\delta\,\mu\,], \qquad \mu \equiv v'(q)/\lambda, \qquad (3)$$

so that the shadow price of a unit of alcohol or tobacco rises by the expected money value of the harm it causes, $s_t\,\delta\,\mu$. Four predictions follow.

Prediction 1(a). Harm-good consumption is unchanged between conception and recognition and falls discontinuously at t_I. Because the household does not know that it is pregnant before t_I, no change in demand can be attributed to the pregnancy before that date; a taste-change account has no reason to respect this restriction.

Prediction 1(b). The fall deepens between t_I and t_R, because s_t rises as the loss hazard is left behind; after t_R the shadow price is approximately constant and so is consumption.

Prediction 1(c). After the birth the exposure term in (2) is replaced by a smaller lactation and secondhand-exposure term $\delta_L \leq \delta$, so the shadow price falls back toward p_a and consumption recovers, fully if $\delta_L = 0$. For a good with consumption capital in the sense of Becker and Murphy (1988), in which the marginal utility of current consumption rises with past

consumption, the fall in the stock accumulated during gestation lowers the marginal utility of consumption after the birth and the recovery is slower or absent. Tobacco is the natural example; alcohol consumed at the moderate levels typical of these households is not.

Prediction 1(d). If only the woman's consumption enters the exposure term and the partner's consumption is separable, the proportional fall in household expenditure equals the woman's pre-pregnancy share of the household's expenditure on the good. A taste change that spreads to the partner, or a norm of sympathetic abstinence, would produce a larger household response than the woman's share can account for.

2.4 The physiological clock: food

The energy cost of pregnancy, averaged over each trimester, is about 375, 1,200 and 1,950 kJ per day, or roughly 90, 290 and 470 kcal, and the cost of exclusive breastfeeding is about 2.6 MJ per day, of which part is met from body stores (Butte and King, 2005). Relative to a 2,000 kcal reference intake these are increments of 4, 14 and 23 percent for the woman and, in a two-adult household, roughly half of that for the household's food requirement. In the model the requirement enters as n_t in (2). The first-order condition $\phi_t \, u_n(\phi_t f_t - n_t) = \lambda p_f$ implies that food purchases rise with the requirement, one for one if the household keeps net nourishment constant and less than one for one otherwise, and fall temporarily when ϕ_t falls during the weeks of nausea, which affect about 80 percent of pregnancies, begin on average at 5.5 weeks and resolve on average by 12 weeks (Gadsby, Barnie-Adshead and Jagger, 1993).

Prediction 2. Food expenditure follows the requirement: it does not jump at t_1, because needs do not depend on knowledge, it dips in the first trimester, rises smoothly through the second and third, and remains elevated after the birth during lactation. The response does not depend on parity, because a second pregnancy raises the requirement by as much as a first. Two qualifications matter for the empirical work. Calories are cheap at the margin, so the household can meet a higher requirement by changing the composition of the basket at little extra expenditure, and the expenditure signature is therefore weaker than the calorie signature that scanner data would reveal. And a food measure collected as a usual weekly amount is a measure of habitual rather than actual purchases.

2.5 The option clock: irreversible child durables

Let the child require a stock $\bar{K}$ of durables at birth, purchased at price P_K per unit. The purchase is irreversible in the sense that, if the pregnancy ends, the durable can be resold only at a fraction $\kappa < 1$ of its price. Holding the durable before the birth yields a flow of readiness benefits $b \geq 0$ per month (the time to assemble, learn and arrange it) and, if the birth occurs before the purchase, a cost C is incurred (an unprepared household must buy in haste or do without). Write $L_t = 1 - s_t$ for the probability, assessed at t, that the pregnancy will not reach term, and π_t for the hazard of an early birth. Postponing the purchase from t to $t + dt$ changes expected utility, in money terms, by

$$-(1-\kappa)P_K \underbrace{L_t'}_{\text{loss avoided}} + \underbrace{rP_K}_{\text{carrying cost saved}} - \underbrace{b}_{\text{readiness forgone}} - \underbrace{\pi_t C}_{\text{risk of being unprepared}}, \qquad (4)$$

and the household buys at the first date t^* at which (4) turns negative. This is a stopping problem of the kind analyzed by Dixit and Pindyck (1994), with the resolution of uncertainty supplied by gestation itself.

Prediction 3(a). Because $-L_t'$ is large during the first trimester and close to zero after t_R, (4) is positive during the first trimester for any plausible b and C: the household does not buy irreversible durables between t_I and t_R even though it knows that it is pregnant. The option clock therefore starts about two months after the information clock. Within the first trimester, demand for harm goods falls while demand for child durables does not move; this is the sharpest qualitative difference between the two clocks.

Prediction 3(b). A household that already holds the stock from a previous child faces $\bar{K} - K_t \approx 0$ and does not buy. The response of durables is concentrated in first births. The same hormonal state, which a taste-change account would invoke, prevails in every pregnancy, so the parity gradient discriminates between the two accounts.

Prediction 3(c). Child goods that are not irreversible, or that are needed only after the birth (clothing in larger sizes, toys), can be bought at or after the birth; their profile should lag the profile of furniture and equipment.

2.6 The deadline clock and nesting

After t_R, the loss term in (4) is negligible and the timing of purchases within the window $[t_R, 0]$ is governed by the carrying cost rP_K, the readiness value b and the early-birth hazard π_t,

which becomes material only in the last two months. With exponential discounting and a small b, the household waits until $\pi_t C$ exceeds $rP_K - b$, which places purchases late in the window; with a large b it buys at t_R. With quasi-hyperbolic discounting (Laibson, 1997; O'Donoghue and Rabin, 1999), a naive household that intends to buy next month repeatedly postpones until the perceived cost of a further delay exceeds the discounted cost of acting now, which concentrates purchases at the deadline regardless of b. The evolutionary psychology literature describes a nesting urge that peaks in the third trimester (Anderson and Rutherford, 2013); in the model this is a rise in b and in the productivity of home goods h_t in $H(\cdot)$ during the last trimester, which pulls purchases of child durables earlier than the deadline and raises spending on home readiness goods at the same time.

Prediction 4(a). Spending on child durables within $[t_R, 0]$ is back-loaded, with a mode in the last two months before the birth.

Prediction 4(b). If back-loading reflects liquidity constraints rather than discounting or carrying costs, it should be weaker in households with higher income; if it reflects discounting or carrying costs, it should not.

Prediction 4(c). Spending on home readiness goods (furnishings, textiles, repairs) rises in the third trimester, together with child durables, and reverts after the birth, when b returns to its normal level and the time price of home production rises.

Two further implications complete the picture. The shadow price of time rises in the last trimester and after the birth, so expenditures that are intensive in out-of-home time (travel, restaurant meals, admissions) fall around the birth rather than at recognition. And the woman's body changes from the second trimester, which creates a transitory demand for maternity clothing that a stable-preference model attributes to a change in the technology of producing "being clothed" rather than to a change in tastes; it predicts a hump in women's apparel in the second trimester followed by a decline after the birth, when the time price of shopping rises and resources are reallocated to the child.

2.7 Summary of predictions

Table 1 collects the predictions by clock and by good. The table makes explicit what Proposition 1 implies: it is the pattern of dates, not the signs, that tests the model. A taste-change account can accommodate any sign; it cannot explain why the sign appears at recognition for

tobacco, after the first trimester for cribs, and at the birth for travel, nor why cribs respond to parity while tobacco does not.

Table 1. Timing predictions of the stable-preference model

Clock	Starts	Goods	Signature	Parity dependence
Information	Recognition, about month −8	Alcohol, tobacco	Step down at recognition; deepens through first trimester; alcohol recovers after birth, tobacco does not	None
Physiological	Conception, continuous	Food at home	No jump at recognition; smooth rise through second and third trimester; elevated during lactation	None
Option	End of first trimester, about month −6	Infant furniture and equipment	Zero during first trimester despite knowledge; steep rise afterwards; collapse after birth	Concentrated in first births
Deadline	Birth, month 0	Child durables; home readiness goods	Back-loaded within the window; third-trimester peak in furnishings that reverts at birth	Weak
Time price	Third trimester and birth	Travel, restaurants, admissions, adult apparel	Decline around the birth, not at recognition	None

Note: Months are counted relative to the birth month. The dates are modal values from the medical literature cited in the text; the empirical event time is measured with an error of up to one month, as explained in Section 3.

3. Data

3.1 The Consumer Expenditure Interview Survey as a panel

The empirical analysis uses the public-use microdata of the Interview component of the U.S. Consumer Expenditure Surveys, conducted by the Census Bureau for the Bureau of Labor Statistics (U.S. Bureau of Labor Statistics, 2024). The Interview Survey is a rotating panel of addresses. Each sampled address is visited once a quarter for four consecutive quarters (five before 2015, the first being a bounding interview that is not released), and at each visit the consumer unit living at the address reports its expenditures for the three preceding months, item by item, together with the month of each expenditure. The survey also records, at each visit, the roster of consumer unit members with their age, sex and relationship to the reference person. Households that move are not followed; a new consumer unit at the address is interviewed for the remaining visits. I use three files for each quarter: the family file (FMLI), the member file (MEMI) and the monthly expenditure file (MTBI), which contains one record per item code, month and consumer unit, with the cost and a flag indicating whether the item was bought for someone outside the consumer unit. The Interview Survey measures the large and recurring components of spending with reasonable accuracy and under-reports some small and irregular

ones (Bee, Meyer and Sullivan, 2015); the within-household design used here is robust to under-reporting that is stable over a household's four interviews.

The analysis covers the quarterly files from the first quarter of 2007 to the first quarter of 2025, that is seventy-three consecutive quarters. Together these files contain 440,207 interviews of 159,078 consumer units. Consecutive interviews of the same unit are always three months apart. I renumber the interviews as waves 1 to 4 within each unit, so that the pre-2015 numbering (2 to 5) and the post-2015 numbering (1 to 4) coincide; the survey redesign of 2015 did not change the quarterly spacing or the three-month reference period.

3.2 Identifying and dating births

A birth is identified from the roster. If a member aged zero is listed at wave k, the unit was interviewed at wave $k-1$, and that member was not listed at wave $k-1$, then the child was born between the two interviews, that is within a window of three months. I take the first such event for each unit. There are 1,389 such events in the data, of which 1,240 occur in units that had, at wave $k-1$, a woman aged 15 to 49 who was the reference person, the spouse or the unmarried partner of the reference person. Restricting the mother's age to 18–44 and the newborn's relationship to the reference person to child or grandchild yields the analysis sample of 1,165 births, of which 1,164 have expenditure records; 19 are twin births. The detection rate is about five births per thousand pairs of consecutive interviews and it is nearly the same whether the detecting wave is the second, the third or the fourth (5.0, 5.0 and 5.4 per thousand). This flatness is what one expects if the timing of a birth relative to the unit's entry into the panel is random, and it is the property that allows the pre-conception months of some households to be compared with the post-birth months of others: the households detected at wave 4, for which the first three interviews cover the pregnancy from conception onward, are drawn from the same population as the households detected at wave 2, for which the last two interviews cover the first half-year of the child's life. I refer to this property as rotation randomization.

Two measurement features of the roster deserve emphasis. First, the roster undercounts infants. Across all member-interviews in the data there are 10,336 observations of members aged zero against 15,049 aged one and 13,994 aged two, so that infants are enumerated at about two thirds of the rate at which one-year-olds are. The pattern is consistent with the undercount of very young children documented for the decennial census and household surveys (O'Hare, 2015)

and implies that a roster-based method recovers a subset of births; nothing in the subsequent analysis requires that the subset be complete, but it bounds the external validity of the sample. Second, the method dates the birth to a three-month window, not to a month. Let M_k denote the calendar month of the detecting interview. The birth occurred in one of the three reference months of that interview, $M_k - 3$, $M_k - 2$ or $M_k - 1$. I define the expected birth month as $\hat{B} = M_k - 2$ and the event month of any expenditure month m as $e = m - \hat{B}$, so that the true event month is $e + \varepsilon$ with $\varepsilon \in \{-1,0,1\}$. With a gestation of nine months the conception month is at true event time −9, recognition at about −8, the end of the first trimester at about −6 and the birth at 0. The interview-relative quarter $\tau = k' - k$, by contrast, is measured without error: $\tau = -3$ covers event months −10 to −8 (in expected-month units), $\tau = -2$ covers −7 to −5, $\tau = -1$ covers −4 to −2, $\tau = 0$ covers −1 to +1, $\tau = +1$ covers +2 to +4 and $\tau = +2$ covers +5 to +7. In words, $\tau = -3$ is the conception quarter, $\tau = -2$ runs from recognition through the end of the first trimester and into the second, $\tau = -1$ is the third trimester, $\tau = 0$ straddles the birth, and $\tau = +1$ and +2 are the first half-year of the child's life. Each unit contributes four consecutive quarters: households detected at wave 4 contribute $\tau = -3$ to 0, those detected at wave 3 contribute $\tau = -2$ to +1, and those detected at wave 2 contribute $\tau = -1$ to +2.

The timing of health expenditures provides an external check on the dating. If births were systematically recorded late, the hospital bills that accompany a delivery would appear before the detecting interview. They do not: hospital expenditure is flat through $\tau = -2$ and $\tau = -1$, rises more than eight-fold in the quarter that straddles the birth and is still nearly six times its baseline in the following quarter, when the bills arrive (Section 5).

3.3 Expenditure categories and the unborn child in the gift code

Expenditures are classified from the universal classification codes (UCC) of the MTBI file into categories using the survey's own hierarchical grouping files for the Interview Survey, year by year, so that the content of each category follows the survey's definitions as they change. The categories used in the analysis are listed in Appendix Table A1. For most categories the records are itemized by month. Four are collected as usual weekly or monthly amounts and allocated evenly across the three reference months: food at home, total grocery purchases including non-food, alcohol at home and tobacco. For these, the monthly event-time profiles are step functions within each interview and the effective resolution is quarterly. The survey redesign of the second

quarter of 2023 merged the person-specific apparel categories into adult and children's clothing and merged alcohol away from home into restaurant meals. Categories affected by the redesign are estimated on the sample of months before April 2023 and are marked as such in the tables; categories defined consistently throughout, including alcohol at home, tobacco, infant furniture and equipment, health, furnishings, travel and total expenditure, use all months.

The gift flag requires a separate comment. The survey asks, for each item, whether it was bought for someone outside the consumer unit. An unborn child is not a member of the consumer unit. Purchases of a crib, a stroller or infant clothing made during the pregnancy can therefore be, and evidently often are, recorded as gifts. In the quarter before the birth, gift-coded purchases of infant goods by the expectant households are twice their level in the conception quarter; in the quarter that straddles the birth and the quarter after it they are 87 and 94 percent below it, exactly when own-use purchases of the same goods jump, as the child becomes a member of the unit (Section 5.4). The coding is concentrated in clothing, whose person-specific codes require the respondent to say for whom each item was bought: 17 percent of the infant clothing bought by the expectant households in the conception quarter, 22 percent in the following quarter and 25 percent in the third trimester is recorded as a gift, against less than 1 percent in the three quarters from the birth onward. Infant furniture and equipment, by contrast, are almost never recorded as gifts by expectant households. For this reason I report two measures of child-goods expenditure: own-use purchases, which follow the survey's convention, and all purchases regardless of the gift code, which I regard as the better measure of prenatal spending; for furniture and equipment the two nearly coincide, for clothing they do not. I define infant hard goods as infant furniture (UCC 290420) plus infant equipment (UCC 320130), the two most irreversible items in the budget; infant durables add clothing for children under two (UCCs 410110–410901), available through the first quarter of 2023.

3.4 Sample and descriptive statistics

The comparison group consists of consumer units in which, at the first observed interview, a woman aged 18–44 was the reference person, the spouse or the unmarried partner, in which no member aged zero was listed at any interview, and which were observed at least twice: 35,008 units. The treated units are the 1,164 births described above. Table 2 reports descriptive statistics. Expectant households are slightly younger (the mother is 30.5 years old on average against 33.6

in the comparison group), more often live with a partner (90 against 71 percent), and have similar incomes (a median of 65,000 against 60,800 dollars before taxes). Thirty-one percent of the births are first births in the sense that no child under eighteen lived in the unit before the birth; the remainder are higher-order births. Attrition after a birth is slightly higher than in the comparison group: 81 percent of the units in which a birth was detected at wave 2 are observed at wave 3, against 83 percent of comparison units between the same waves, and 84 against 87 percent between waves 3 and 4. Attrition before the birth cannot be observed by construction, because a household that moves before the birth is never detected; since moving is itself a readiness behavior, the estimates below describe households that did not move during the pregnancy and are, if anything, conservative about the scale of nesting.

Table 2. Descriptive statistics

	Births (treated units)	Comparison units
Number of consumer units	1,164	35,008
Age of (prospective) mother	30.5	33.6
CU size	3.32	3.22
Children under 18	1.24	1.27
Partner present	89.9%	70.9%
Income before taxes (mean)	85,999	81,164
Income before taxes (median)	65,000	60,800
Homeowner	55.9%	51.6%
Urban	93.8%	95.3%
Age of reference person	31.7	34.7
Interviews observed	3.55	3.22
Births detected at wave 2 / 3 / 4	368 / 372 / 424	
First births (no child under 18 before)	31.0%	
Twin births	1.6%	
Newborn female	48.8%	

4. Empirical strategy

The main specification is an event study in interview-relative quarters,

$$y_{imt} = \sum_{\tau \neq -3} \beta_\tau \, \mathbf{1}[\tau_{it} = \tau] + \alpha_i + \lambda_m + \varepsilon_{imt}, \qquad (5)$$

where y_{imt} is the expenditure of unit i in calendar month m reported at interview t on a given category, α_i is a unit fixed effect, λ_m is a calendar-month fixed effect (one for each of the 202 months in the data), and τ_{it} is the interview-relative quarter for treated units; for comparison units all event dummies are zero. The omitted category is the conception quarter, $\tau = -3$, so that each β_τ measures the change in expenditure relative to the quarter in which the pregnancy began, net of the change experienced over the same calendar months by comparable households without a birth. Because the panel is short and every treated unit is observed in at most four of the six

event quarters, the coefficients are identified by chaining overlapping windows across units detected at different waves; rotation randomization makes the chained units comparable. The design uses never-treated controls and a fully flexible set of event dummies, so the negative-weighting problems of staggered designs with already-treated controls (Sun and Abraham, 2021; Borusyak, Jaravel and Spiess, 2024) do not arise.

For expenditure categories in which most households spend nothing in most months, (5) is estimated by Poisson pseudo-maximum likelihood with high-dimensional fixed effects (Santos Silva and Tenreyro, 2006; Correia, Guimarães and Zylkin, 2020). The coefficients are then semi-elasticities and $\exp(\beta_\tau) - 1$ is the proportional change relative to the conception quarter; units with no positive expenditure in the category at any interview drop out of the estimation, as in any fixed-effects Poisson model. For total expenditure, vehicle purchases, which can be negative, and the extensive margins (an indicator for any purchase in the month), (5) is estimated by ordinary least squares and the coefficients are reported in dollars or in percentage points. Standard errors are clustered by consumer unit. The monthly specification replaces the quarter dummies with dummies for the event month e from −8 to +7, with the two earliest months, $e = -10$ and −9, pooled as the omitted category; these two months are the only ones that precede recognition for nearly all births and they are observed only for the units detected at wave 4. The monthly profiles are therefore less precise than the quarterly estimates, and they are smoothed by the one-month dating error; for the itemized categories they show the shape of the response within quarters, which is where the option clock and the deadline clock leave their marks, while for the four usual-weekly categories they can only reproduce the quarterly steps.

Two features of the normalization matter for interpretation. The conception quarter contains about one month after modal recognition, so that the estimated changes in harm goods relative to it understate the full response by roughly a third of the first-trimester effect; the monthly profiles, normalized on the months before recognition, do not share this attenuation. And because the comparison households experience no pregnancy, β_τ for the post-birth quarters combines the effect of the pregnancy having ended with the effect of the child having arrived; the model's predictions concern the sign of the change at the birth, which the design identifies.

Heterogeneity is estimated by re-running (5) on the comparison households together with the subset of treated households of interest (first births against higher-order births, income terciles defined within calendar year, couples against single mothers, owners against renters).

The timing of purchases within the pregnancy is described without regression, on the 424 households detected at wave 4, whose twelve observed months run from the conception quarter to the birth quarter, by computing the share of their twelve-month spending on child durables that falls in each event quarter and month.

5. Results

5.1 The aggregate profile

Table 3 reports the quarterly event-study estimates for the main expenditure categories, grouped by the clock that the model assigns to them, and Figure 1 plots the monthly profiles for six of them. The percentages quoted in the text are proportional changes, exp(β) − 1, computed from the coefficients in the tables. Before turning to the clocks, three features of the aggregate profile are worth recording. Total expenditure changes little relative to the conception quarter: by +0.3 percent in the quarter that runs from recognition into the second trimester, +4.0 percent in the third trimester (156 dollars a month, standard error 163, $p = 0.34$), +2.8 percent in the quarter of the birth and +1 to 2 percent in the first half-year of the child's life; the monthly profile peaks at +15 percent two months before the expected birth month ($p = 0.01$) and at +11 percent five months before it ($p = 0.08$), but the quarterly averages are not distinguishable from zero. The reallocation toward the child is therefore financed mostly by cuts elsewhere: in adult apparel (−33 percent in the birth quarter, $p < 0.001$), out-of-town travel (−64 percent, $p < 0.001$), entertainment as a whole (−22 and −24 percent already in the two pregnancy quarters, $p = 0.008$ and 0.004), entertainment fees and admissions (−33 percent in the birth quarter and the next), alcohol away from home (−55 percent in the birth quarter, $p < 0.001$) and personal care. Health expenditure rises by 51 percent in the birth quarter ($p < 0.001$) and 33 percent in the following one ($p = 0.01$), driven by hospital room and services, which rise eight-fold in the birth quarter and six-fold in the following one, by physician services (+78 percent in the birth quarter, $p = 0.05$) and by laboratory tests, which more than double in the second and third trimester; the share of households with any physician payment in a month rises by 5 to 7 percentage points in the two pregnancy quarters and by 4 points in the birth quarter, from a base of 15 percent, which is prenatal care appearing in the budget. Health insurance premiums do not change. Housing costs

do not change either, which is a consequence of the design: households that moved during the pregnancy are not in the sample.

Table 3. Quarterly event-study estimates by clock

Category	Q−2	Q−1	Q0	Q+1	Q+2	N	Units
Information clock							
Tobacco	-33.3* (17.6)	-38.7** (16.9)	-33.0* (17.4)	-19.1 (18.6)	-20.4 (21.0)	76,248	238
Alcohol, total (to 2023Q1)	-22.1** (10.0)	-26.2*** (9.7)	-26.7*** (10.1)	-5.9 (11.7)	-0.6 (14.7)	183,526	584
Alcohol at home	-12.4 (11.0)	-22.0** (10.7)	2.9 (10.5)	19.0 (13.0)	12.6 (17.1)	173,959	546
Alcohol away from home (to 2023Q1)	-34.1* (19.7)	-40.0** (16.2)	-80.8*** (17.7)	-45.3** (19.8)	-24.5 (26.3)	141,280	400
Any alcohol at home (OLS, pp)	-5.3** (2.5)	-6.3** (2.4)	-3.7 (2.5)	-2.7 (2.7)	-0.1 (3.3)	350,285	1,164
Physiological clock							
Food at home (to 2023Q1)	-1.5 (2.7)	-3.8 (2.8)	1.4 (2.9)	4.5 (3.4)	5.6 (4.2)	286,258	1,027
Grocery purchases incl. non-food	0.8 (2.4)	-0.1 (2.4)	6.2** (2.4)	8.1*** (2.8)	11.0*** (3.3)	349,766	1,164
Food away from home (to 2023Q1)	3.1 (6.5)	-0.5 (6.0)	-13.8** (6.2)	-8.7 (7.2)	-12.0 (8.3)	274,590	968
Option clock							
Infant furniture and equipment, all purchases	172.6*** (47.0)	294.0*** (45.6)	290.0*** (46.4)	123.0** (49.6)	94.4* (55.0)	24,395	643
Infant furniture and equipment, own use	175.4*** (49.3)	293.8*** (48.1)	286.0*** (49.1)	116.0** (52.4)	81.6 (58.1)	20,818	638
Infant durables incl. clothing <2, all purchases (to 2023Q1)	55.1*** (14.5)	141.8*** (16.5)	190.0*** (15.8)	167.9*** (16.8)	168.5*** (20.5)	84,428	955
Any infant furniture or equipment (OLS, pp)	2.0*** (0.7)	6.2*** (0.8)	11.7*** (0.9)	4.0*** (1.0)	2.7** (1.3)	350,285	1,164
Infant durables coded as gifts (to 2023Q1)	49.9 (37.0)	68.8*** (22.9)	-203.1*** (43.9)	-281.8*** (77.1)	-132.3** (57.2)	36,426	167
Children's clothing, all ages, all purchases	8.9 (13.8)	13.9 (12.7)	58.7*** (12.2)	77.7*** (13.0)	77.1*** (15.4)	220,088	1,007
Toys and games, all purchases	2.9 (17.2)	-17.2 (17.6)	0.4 (18.0)	7.2 (20.9)	25.6 (22.5)	164,696	734
Deadline clock and nesting							
Household furnishings and equipment (excl. infant)	8.0 (14.5)	21.2 (15.0)	-9.1 (15.7)	-7.1 (17.7)	12.2 (21.8)	263,368	966
Household textiles	21.2 (22.5)	51.2** (22.3)	43.0* (23.1)	16.8 (25.9)	3.0 (32.6)	148,376	643
Furniture (excl. infant)	5.0 (31.6)	19.8 (32.0)	4.0 (32.6)	-30.3 (37.7)	-38.8 (48.2)	115,752	500
Small appliances and housewares	20.6 (24.7)	19.2 (26.0)	-20.2 (26.2)	5.6 (33.3)	-13.8 (38.0)	136,783	464
Home maintenance and repair	6.3 (48.6)	34.5 (39.4)	23.7 (44.5)	-20.9 (48.1)	38.5 (65.4)	110,218	438
Housekeeping services	38.3 (29.2)	48.2** (24.2)	77.9*** (23.7)	67.5*** (25.8)	83.5** (35.0)	27,951	128
Net vehicle purchases (OLS, dollars)	58 (154)	133 (144)	63 (146)	-26 (163)	-165 (174)	350,285	1,164
Time price							
Out-of-town travel	-16.6 (17.9)	-19.9 (16.4)	-100.9*** (18.9)	-48.3** (21.1)	-32.4 (24.2)	188,763	616
Entertainment fees and admissions	-16.5 (13.7)	-20.7 (15.2)	-40.0*** (15.2)	-41.0** (16.0)	-4.1 (25.2)	223,810	742
Gasoline and motor fuel	-7.6 (8.6)	-3.2 (8.5)	-15.8* (9.0)	-11.1 (9.9)	-16.5 (11.8)	74,847	226
Women's apparel (to 2023Q1)	3.2 (10.9)	1.3 (10.8)	-47.8*** (11.0)	-37.4*** (13.0)	-53.8*** (16.8)	236,541	804
Adult apparel	-8.9 (11.3)	-8.2 (10.5)	-40.5*** (10.6)	-23.9** (11.7)	-36.9** (15.7)	302,493	994
Health and total							

Category	Q−2	Q−1	Q0	Q+1	Q+2	N	Units
Health care, total	-0.7 (9.5)	3.8 (9.6)	41.4*** (10.1)	28.7** (11.2)	-4.8 (12.7)	264,627	936
Hospital room and services	-4.6 (65.5)	24.5 (53.4)	214.6*** (49.7)	176.1*** (54.3)	6.8 (63.7)	41,759	363
Physician services	-1.7 (27.8)	23.4 (29.5)	57.5* (29.6)	27.3 (32.2)	-17.5 (44.0)	162,571	688
Laboratory tests and X-rays	77.0* (42.6)	95.1** (39.9)	86.2** (41.7)	55.4 (50.0)	-112.8** (57.3)	51,340	257
Any physician payment (OLS, pp)	5.3*** (1.9)	6.7*** (1.9)	4.2** (1.9)	2.6 (2.3)	2.4 (2.8)	350,285	1,164
Health insurance	-5.2 (5.9)	-9.5 (6.3)	-3.1 (6.6)	0.9 (7.6)	-5.9 (9.7)	206,191	711
Life and personal insurance	-0.3 (25.6)	-3.7 (25.5)	7.8 (25.4)	26.0 (40.3)	-21.2 (39.1)	101,477	320
Total expenditure (OLS, dollars)	12 (173)	156 (163)	110 (169)	58 (187)	22 (213)	350,285	1,164

Note: Coefficients from equation (5) relative to the conception quarter (Q−3), with standard errors clustered by consumer unit in parentheses. PPML rows report coefficients multiplied by 100, so that the proportional change quoted in the text is $\exp(\beta) - 1$; OLS rows for total expenditure and vehicle purchases report dollars per month; OLS rows marked "pp" report percentage points. N is the number of consumer-unit months; Units is the number of treated consumer units with positive expenditure in the category (PPML) or in the sample (OLS). Categories marked "to 2023Q1" are estimated on months before April 2023. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

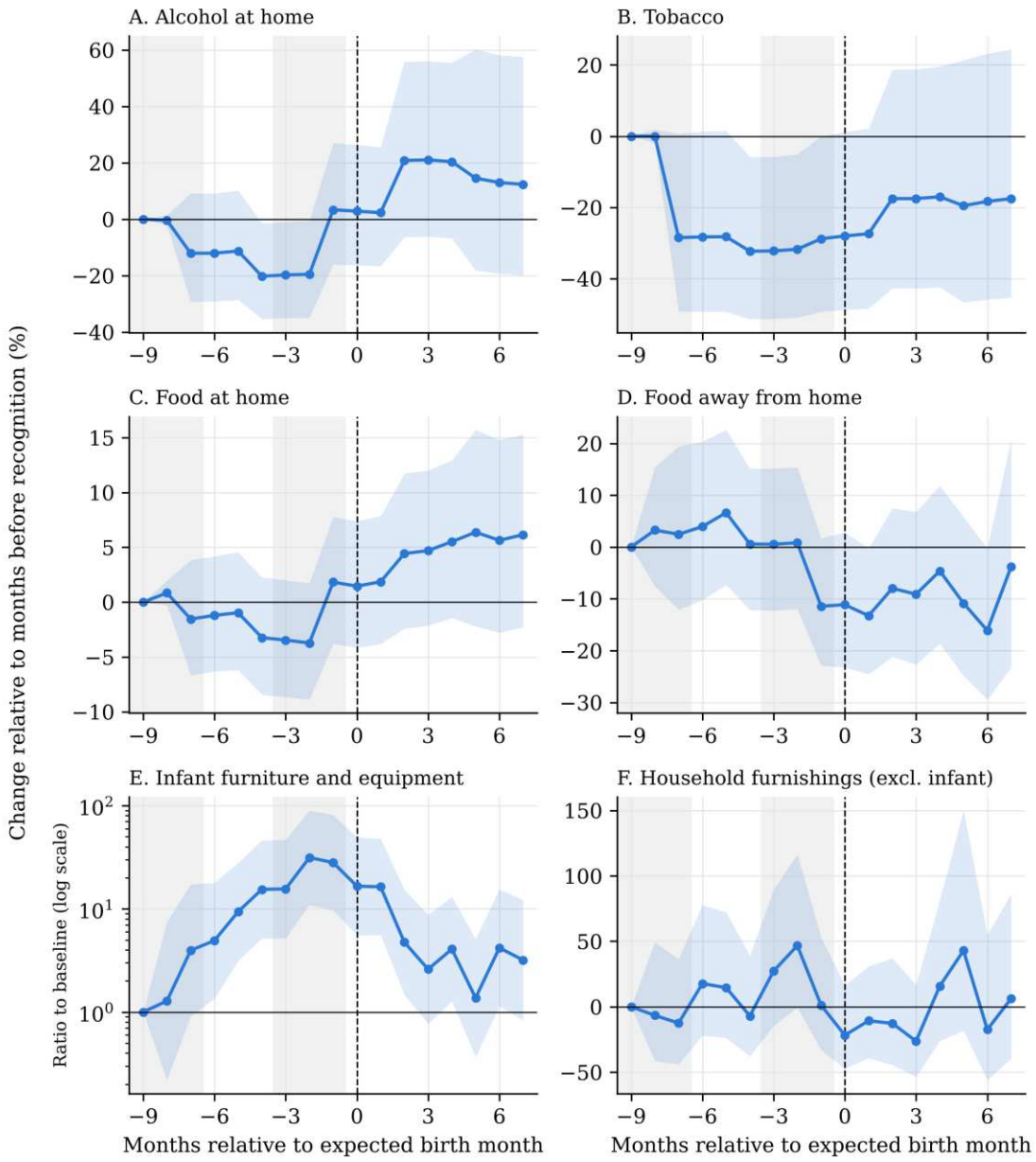


Figure 1. Monthly event-time profiles of six expenditure categories. Points are the estimated proportional changes relative to the two months before pregnancy recognition (expected event months −10 and −9), from Poisson pseudo-maximum-likelihood event-study regressions with consumer unit and calendar-month fixed effects; shaded bands are 95 percent confidence intervals with standard errors clustered by consumer unit. The horizontal axis is the event month relative to the expected birth month; the dashed line marks the expected birth month; the grey bands mark the first and the third trimester. Food at home, alcohol at home and tobacco are collected as usual weekly amounts and vary only across interviews. Panels C, D and E use months before April 2023.

5.2 The information clock: alcohol and tobacco

The first column of Table 3 and panels A and B of Figure 1 show the harm goods. Tobacco expenditure falls by 28 percent in the quarter that follows the conception quarter ($p = 0.059$), by

32 percent in the third trimester ($p = 0.022$), by 28 percent in the birth quarter ($p = 0.058$) and by 17 and 19 percent in the two quarters after it. Because tobacco is collected as a usual weekly amount and allocated evenly across the three months of each interview, the monthly profile in panel B of Figure 1 can change only at interview boundaries; what it adds to the quarterly estimates is that the full fall is already present in the first interview after the conception quarter, which covers expected event months −7 to −5 (true months −8 to −4), that is within one quarter of recognition. From there the profile is flat at about −30 percent through the pregnancy and the birth and recovers only partially, to about −18 percent, in the second half-year of the child's life. The step is complete within a quarter of expected recognition, it does not deepen afterwards and it reverses only slowly after the birth. This is Prediction 1(a) and, for an addictive good, Prediction 1(c): the shadow price of smoking rises once and the consumption stock that would have supported a return to the old level is not rebuilt. The extensive margin moves little (the share of households buying tobacco in a month falls by 2 to 3 percentage points from a base of 16, $p = 0.10$ in the third trimester), so most of the adjustment is in quantities purchased by smoking households rather than in quitting as recorded by the budget, which is consistent with the 7 percent of U.S. mothers who report smoking at some point during pregnancy (Drake, Driscoll and Mathews, 2018) and with cutting down being far more common than quitting.

Alcohol behaves differently, and the difference is the one the model predicts. Total alcohol expenditure (at home and away, available through the first quarter of 2023) falls by 20 percent in the quarter after conception ($p = 0.027$), by 23 percent in the third trimester ($p = 0.007$) and by 24 percent in the birth quarter ($p = 0.008$), and it is back at its conception-quarter level in the two quarters after the birth (−6 and −1 percent, neither significant). Alcohol at home is also a usual-weekly amount, so its monthly profile in panel A of Figure 1 moves in quarterly steps, and the steps show the gradient within the pregnancy: a fall of 12 percent in the quarter after recognition, deepening to 20 percent in the third trimester ($p = 0.04$), a return to +3 percent in the quarter straddling the birth and a rebound of 21 percent in the first quarter after it (not significant), after which the profile settles at 12 to 15 percent above baseline (not significant). The fall deepens as the pregnancy becomes safer, as Prediction 1(b) requires when the shadow price is proportional to the probability that the pregnancy reaches term, and it is fully reversed after the birth, as Prediction 1(c) requires for a good without consumption capital. The extensive margin carries most of the alcohol response: the share of households buying any alcohol for home consumption

in a month, 39 percent in the conception quarter, falls by 5.3 percentage points in the following quarter ($p = 0.039$), by 6.3 points in the third trimester ($p = 0.011$) and by 3.7 points in the birth quarter ($p = 0.13$), and is back at baseline two quarters after the birth. In national surveys 11.5 percent of pregnant women aged 18–44 report drinking in the past month (Denny et al., 2019), so a fall of 6 points in a household participation rate of 39 percent is of the order one would expect if most women stop and their partners do not. Alcohol away from home falls throughout, by 29 and 33 percent in the two pregnancy quarters and by 55 percent in the birth quarter ($p < 0.001$), where the time price of going out rises; the first part of that fall belongs to the information clock and the second to the time-price clock, and the two can be separated only because they tick at different dates.

The extensive-margin response is present in most subgroups, with the precision that their sizes allow. The share of households buying alcohol at home falls by 11 and 10 percentage points in the two pregnancy quarters for first births ($p = 0.02$ and 0.05) and by 3 and 5 points for higher-order births ($p = 0.07$ in the third trimester); by 9 and 8 points for mothers under 30 ($p = 0.06$ and 0.07) and by 3 and 5 points for mothers aged 30 and over; by 10 points in the third trimester among homeowners ($p < 0.01$), whose baseline share is 48 percent, against 1 point among renters, whose baseline is 24 percent; and by 7 points in the third trimester in the top income tercile ($p = 0.05$), whose baseline is 51 percent, against 2 points in the bottom tercile, whose baseline is 22 percent. Tobacco falls by 8, 9 and 10 dollars a month in the quarter after conception, the third trimester and the birth quarter for mothers under 30 ($p = 0.13$, 0.06 and 0.05), from a base of 29 dollars, and by an insignificant 3 dollars for older mothers, whose base is 17 dollars; among smoking households it falls by 59 percent in the quarter after conception when the birth is a first birth ($p < 0.01$) and by 20 percent when it is not (Table 4). The response is larger where there is more to give up.

Prediction 1(d) concerns the size of the response relative to the woman's share of household consumption. Ninety percent of the births in the sample occur in households with a partner, and the 114 single mothers, of whom only 13 percent buy alcohol in a given month before the pregnancy, are too few to estimate a separate profile with any precision (their extensive margin falls by 10 points in the quarter after conception, with $p = 0.15$). In the pooled sample a fall of about 20 percent in household alcohol expenditure, and of 6 points in a participation rate of 39 percent, is well within what the woman's own share of a couple's

drinking can account for, and leaves no room for a large sympathetic response by the partner; a sharper test requires individual-level purchase data.

5.3 The physiological clock: food

Food is where the stable-preference model predicts the smoothest response, and it is where the data show none. Food at home, measured as the survey's usual weekly amount, changes by −1.5, −3.8, +1.4, +4.6 and +5.7 percent across the five event quarters, none of them distinguishable from zero (the smallest p-value is 0.17), and the monthly profile stays within four percent of baseline throughout the pregnancy (panel C of Figure 1). Total grocery purchases, which include non-food items and are available for all years, are flat during the pregnancy (+0.8 and −0.1 percent) and rise after the birth, by 6.4 percent in the birth quarter (p = 0.011), 8.4 percent in the following quarter (p = 0.004) and 11.6 percent in the second (p = 0.001); the post-birth rise is diapers, wipes and infant formula entering the grocery basket rather than food. Food away from home does not change during the pregnancy (+3 and −1 percent) and falls by 13 percent in the birth quarter (p = 0.026) and by 8 to 11 percent afterwards (not significant).

An energy requirement that rises by 14 percent of the woman's intake in the second trimester and 23 percent in the third should raise a two-adult household's food requirement by roughly 7 and 12 percent. That no trace of this appears in food expenditure admits three readings, which the data cannot fully separate. Calories are cheap at the margin, so the requirement can be met by changing the composition of the basket at little extra cost; this is consistent with the British scanner-data finding that pregnant households buy about 20 percent more calories toward the end of the pregnancy while the nutritional quality of the basket deteriorates, with ultra-processed and high-sugar foods driving the deterioration (Lührmann, 2025). The usual-weekly format of the question measures the habitual amount rather than the actual amount, and habitual reports move slowly; Angrisani, Kapteyn and Schuh (2015) examine the role of "typical" and "specific" time frames in survey questions on spending. And nausea in the first trimester, which in the model lowers ϕ_t, may offset the early part of the requirement. What the null result rules out is a large, pregnancy-driven increase in food spending of the kind that a taste-change account built on cravings would predict. The physiological clock, if it ticks in this budget, ticks quietly.

5.4 The option clock: child durables and parity

Infant furniture and equipment are the clearest case in the budget of an irreversible, child-specific investment, and their profile is the clearest result in the paper. Table 3 and panel E of Figure 1 show that purchases of these goods, counting all purchases regardless of the gift code, are more than five times their conception-quarter level in the quarter that runs from recognition through the first trimester (+462 percent, $p < 0.001$), nineteen times their level in the third trimester (+1,792 percent) and eighteen times their level in the birth quarter (+1,718 percent), and two and a half to three and a half times their level in the two quarters after the birth (+242 and +157 percent, $p = 0.013$ and 0.086). In dollars, the average expectant household spends 4 dollars a month on these goods in the conception quarter, 22 dollars in the next quarter, 67 dollars in the third trimester and 53 dollars in the birth quarter if it is a first birth, and 1, 4, 21 and 32 dollars if it is not. The extensive margin tells the same story: the share of households buying any infant furniture or equipment in a month rises from 1.2 percent in the conception quarter by 2.0 percentage points in the next quarter, 6.2 points in the third trimester and 11.7 points in the birth quarter, and falls back to 3 to 4 points above baseline afterwards.

The monthly profile (Figure 2, panel B, and Figure 6) shows the shape of the response, and because these goods are itemized by month the profile is informative within interviews. In the month after the normalization months, which is the month of modal recognition, purchases are 28 percent above baseline, which is not distinguishable from zero ($p = 0.79$). One month later they are 295 percent above baseline ($p = 0.07$); at the end of the first trimester, 392 percent ($p = 0.02$); and from there the profile rises to 839, 1,444 and 1,458 percent in the three months of the second trimester, peaks at 3,037 and 2,705 percent two months and one month before the expected birth month, remains at about 1,550 percent in the birth month and the month after, and drops to 375 percent two months after the birth. The levels put the early months in proportion: of the twelve-month spending of households observed from conception to birth, 0.4 percent falls in each of the two months before recognition, 0.6 percent in the recognition month, 2.6, 0.8 and 2.5 percent in the three months that follow, and 8 to 25 percent in each of the four months before the expected birth (Section 5.5). Purchases therefore begin around recognition but remain small, about 5 percent of the total, until the first trimester ends, and then rise by more than an order of magnitude. Prediction 3(a) holds in this weaker form: households do not wait until the first trimester ends to buy anything, but they buy little until it does. The contrast with tobacco, which

has completed a fall of about 30 percent within the same quarter and stays there, is the difference between the information clock and the option clock in a single figure: a step in one case, a ramp that accumulates 95 percent of its mass after the first trimester in the other.

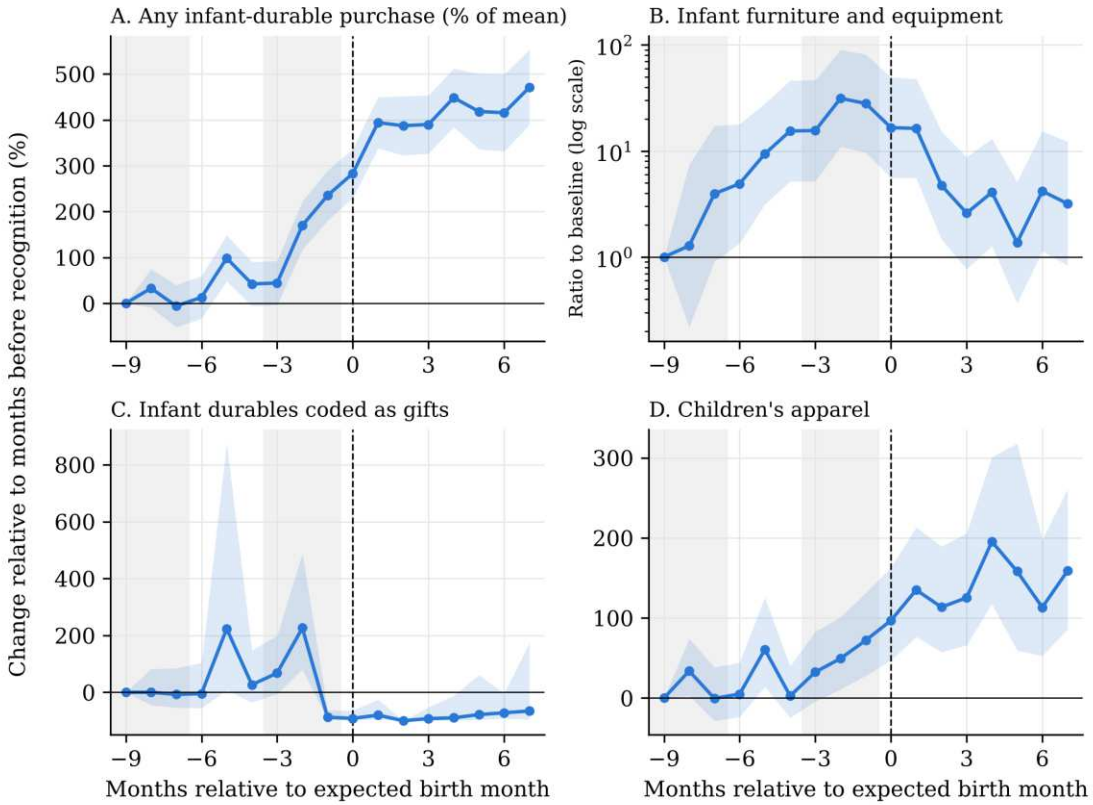


Figure 2. Monthly event-time profiles of child goods. Panel A plots the change in the probability of any infant-durable purchase in percent of the comparison-group mean (OLS); panels B to D plot proportional changes from Poisson pseudo-maximum-likelihood regressions. Specification and conventions as in Figure 1.

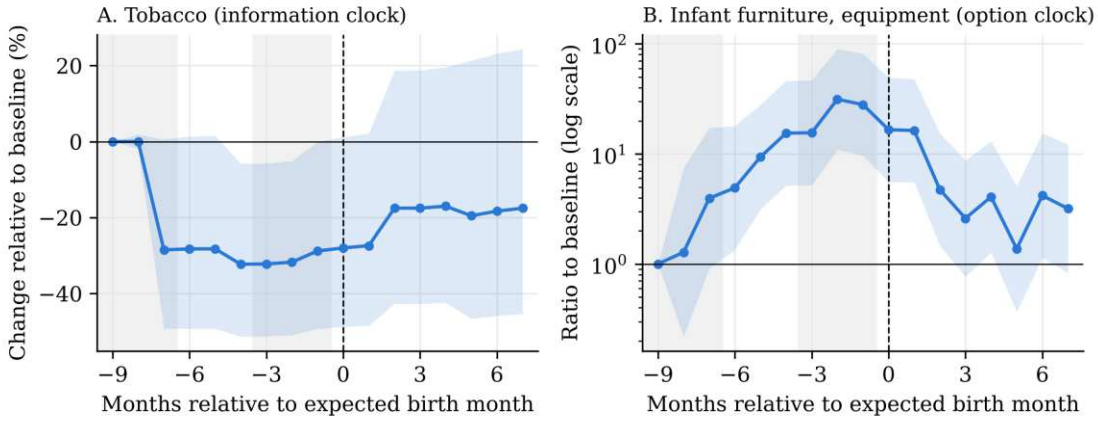


Figure 6. Two clocks in one picture: tobacco (information clock) and infant furniture and equipment (option clock), monthly proportional changes relative to the months before recognition. Infant goods are plotted as the ratio to

baseline on a logarithmic scale. Tobacco is a usual-weekly amount and moves in quarterly steps. Conventions as in Figure 1.

Prediction 3(b) concerns parity. Table 4 reports the event-study coefficients in dollars separately for first and higher-order births. For first births, spending on infant furniture and equipment rises by 23 dollars a month in the quarter after conception ($p = 0.01$), by 64 dollars in the third trimester and by 50 dollars in the birth quarter ($p < 0.001$), and is back at baseline in the two quarters after the birth (8 and −3 dollars, not significant). For higher-order births the corresponding increases are 5, 21 and 32 dollars, followed by 10 and 8 dollars after the birth ($p \leq 0.04$ through the first quarter after the birth and $p = 0.10$ in the second). The pre-birth response of first births is thus three to five times that of higher-order births, and it ends at the birth, whereas households that already have children buy later and keep buying after the birth, as a household that holds a depreciated stock and replaces what turns out to be missing would do. The extensive margin confirms the timing: in the third trimester 12.7 percent of first-birth households buy infant furniture or equipment in a given month, against 6.2 percent of higher-order households, while in the birth quarter the two shares are much closer (15.6 against 12.8 percent). Since the hormonal state of pregnancy is the same at every parity, the parity gradient is difficult to attribute to a change in tastes; it is what a model in which the durable, not the child, is the object of demand predicts.

Child goods that are not irreversible follow Prediction 3(c). Own-use purchases of clothing for children under two rise by 44 percent in the third trimester ($p = 0.011$) and five- to nine-fold after the birth (Table 3), and counting the gift-coded items the third-trimester rise is 48 percent ($p = 0.001$); for first births they rise from zero to 29, 39 and 45 dollars a month in the birth quarter and the two quarters that follow. Toys do not move until after the birth and then rise only for first births, roughly four- to five-fold in the first half-year of the child's life (Table 4). Infant clothing and toys are bought when the size and the age of the child are known, as a model with a small resale loss and a large information gain from waiting implies.

Table 4. Heterogeneity by parity, income and housing tenure

Category	Group	Q−2	Q−1	Q0	Q+1	Q+2	Units
Infant furniture and equipment, all purchases	First birth	23*** (9)	64*** (12)	50*** (11)	8 (12)	-3 (14)	361
Infant furniture and equipment, all purchases	Higher-order birth	5** (2)	21*** (5)	32*** (4)	10** (4)	8 (5)	803
Infant durables incl. clothing <2, all purchases	First birth	19*** (7)	60*** (12)	76*** (12)	44*** (12)	41*** (15)	343

Category	Group	Q−2	Q−1	Q0	Q+1	Q+2	Units
Infant durables incl. clothing <2, all purchases	Higher-order birth	6 (4)	22*** (6)	51*** (5)	41*** (6)	40*** (10)	780
Any infant furniture or equipment (pp)	First birth	3.9*** (1.4)	11.3*** (1.7)	14.2*** (1.9)	4.4** (1.9)	3.1 (2.5)	361
Any infant furniture or equipment (pp)	Higher-order birth	1.3* (0.8)	4.2*** (0.9)	10.8*** (1.0)	4.1*** (1.2)	2.9* (1.6)	803
Toys and games, all purchases (PPML, ×100)	First birth	-33.6 (59.7)	1.3 (54.2)	39.0 (52.5)	133.7** (54.6)	159.1** (62.0)	151
Toys and games, all purchases (PPML, ×100)	Higher-order birth	5.5 (17.7)	-18.1 (18.3)	-2.3 (18.8)	-11.6 (22.5)	4.1 (24.0)	583
Food at home (PPML, ×100)	First birth	5.6 (5.1)	-0.4 (5.5)	3.1 (5.6)	0.3 (6.6)	4.4 (7.3)	307
Food at home (PPML, ×100)	Higher-order birth	-3.6 (3.1)	-4.8 (3.2)	1.0 (3.3)	6.3 (3.9)	6.4 (5.0)	720
Alcohol at home (PPML, ×100)	First birth	-8.2 (15.7)	-11.5 (16.5)	11.0 (16.8)	29.9 (23.6)	35.3 (29.3)	184
Alcohol at home (PPML, ×100)	Higher-order birth	-12.9 (13.4)	-25.3* (13.0)	0.9 (12.5)	15.3 (14.4)	-0.7 (18.5)	362
Any alcohol at home (pp)	First birth	-11.4** (4.9)	-9.7* (5.0)	-7.6 (5.0)	-8.5 (5.4)	-0.5 (6.3)	361
Any alcohol at home (pp)	Higher-order birth	-2.9 (2.9)	-5.0* (2.8)	-2.2 (2.8)	-0.3 (3.1)	-0.3 (3.8)	803
Tobacco (PPML, ×100)	First birth	-88.8*** (29.3)	-50.2* (29.7)	-39.8 (31.8)	-23.9 (33.8)	-49.4 (39.7)	72
Tobacco (PPML, ×100)	Higher-order birth	-22.5 (19.8)	-37.3* (19.4)	-33.1* (19.9)	-20.9 (21.5)	-12.1 (23.5)	166
Household furnishings (PPML, ×100)	First birth	11.5 (23.6)	19.3 (25.1)	-23.8 (26.6)	-36.5 (30.1)	3.1 (38.2)	288
Household furnishings (PPML, ×100)	Higher-order birth	6.5 (18.0)	21.8 (18.4)	-2.5 (19.1)	5.6 (21.2)	16.6 (26.0)	678
Out-of-town travel (PPML, ×100)	First birth	-15.2 (33.9)	-25.5 (27.6)	-114.4*** (31.3)	-91.6*** (34.6)	-98.6*** (35.9)	202
Out-of-town travel (PPML, ×100)	Higher-order birth	-16.5 (19.6)	-17.3 (20.0)	-92.7*** (23.0)	-27.5 (25.5)	4.5 (30.2)	414
Total expenditure (dollars)	First birth	-8 (331)	261 (306)	69 (313)	-56 (324)	178 (427)	361
Total expenditure (dollars)	Higher-order birth	21 (203)	111 (192)	131 (199)	114 (228)	-48 (236)	803
Infant furniture and equipment, all purchases	Bottom income tercile	4* (3)	12*** (4)	26*** (5)	6 (4)	6 (5)	338
Infant furniture and equipment, all purchases	Middle income tercile	2 (6)	18*** (5)	23*** (6)	-3 (6)	-9 (8)	389
Infant furniture and equipment, all purchases	Top income tercile	17*** (5)	58*** (10)	52*** (9)	13 (10)	8 (12)	437
Infant furniture and equipment, all purchases	Homeowners	15*** (4)	41*** (7)	40*** (7)	5 (7)	-1 (9)	656
Infant furniture and equipment, all purchases	Renters	1 (3)	21*** (4)	30*** (5)	11*** (4)	10* (5)	508
Total expenditure (dollars)	Bottom income tercile	-72 (205)	-93 (210)	7 (215)	-90 (231)	-95 (269)	338
Total expenditure (dollars)	Middle income tercile	-151 (212)	-43 (206)	-26 (229)	-26 (255)	183 (288)	389
Total expenditure (dollars)	Top income tercile	175 (353)	469 (324)	256 (328)	189 (370)	-55 (418)	437

Category	Group	Q−2	Q−1	Q0	Q+1	Q+2	Units
Total expenditure (dollars)	Homeowners	226 (257)	390 (241)	323 (247)	167 (273)	76 (306)	656
Total expenditure (dollars)	Renters	-338** (172)	-221 (167)	-239 (179)	-129 (199)	-43 (227)	508

Note: Coefficients from equation (5) estimated on the comparison households together with the treated households of the indicated group, relative to the conception quarter. Income terciles are defined within calendar year on income before taxes at the first observed interview; housing tenure is measured at the interview before the birth. Rows in dollars are OLS estimates; rows marked PPML report coefficients multiplied by 100; rows marked pp report OLS estimates for an indicator of any purchase in the month, in percentage points. Standard errors clustered by consumer unit in parentheses. Units is the number of treated consumer units in the estimation sample. * p < 0.10, ** p < 0.05, *** p < 0.01.

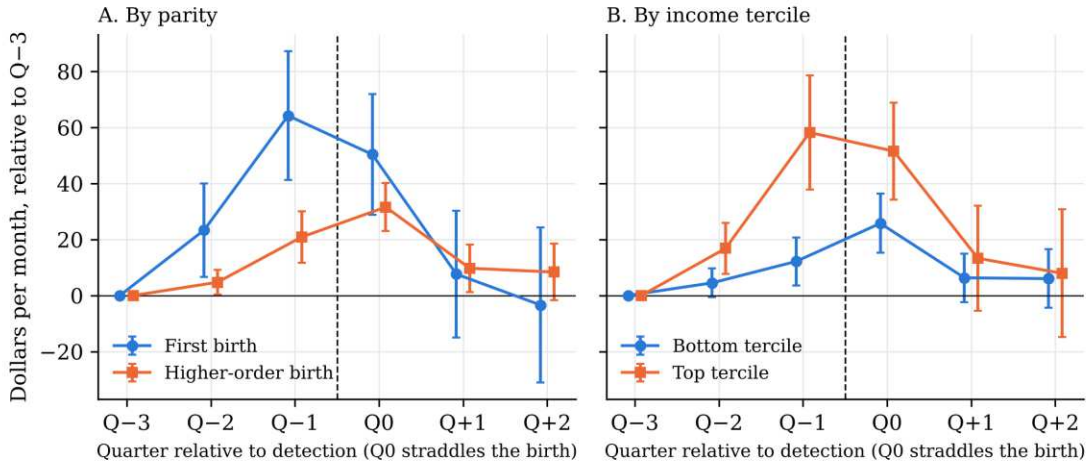


Figure 3. Infant furniture and equipment by parity and by income: quarterly event-study estimates in dollars per month relative to the conception quarter (OLS with consumer unit and calendar-month fixed effects), with 95 percent confidence intervals; all purchases regardless of the gift code. Each group is estimated together with all comparison households.

5.5 The deadline clock: timing within pregnancy

The within-pregnancy distribution of purchases is best read from the 424 households detected at wave 4, whose twelve observed months run from the conception quarter to the quarter of the birth. Table 5 reports, for these households, the share of their twelve-month spending on child durables that falls in each event quarter and month. Half of them (212) buy infant furniture or equipment at least once in the twelve months. Of their total spending on these goods, 1.4 percent falls in the conception quarter, 5.9 percent in the quarter that runs from recognition through the first trimester, 43.0 percent in the third trimester and 49.7 percent in the quarter straddling the birth; by month, 46 percent falls in the two months before the expected birth month and a further 28 percent in the birth month and the month after (Figure 4). The share of these households buying in a given quarter rises from 5.2 to 11.3, 44.8 and 64.1 percent. Counting infant clothing as well, the distribution is 6.3, 9.4, 33.3 and 51.0 percent. The

purchases are back-loaded to a degree that the carrying-cost interpretation of (4) alone would struggle to produce for goods whose annual carrying cost is a few percent of their price; Prediction 4(a) holds, and the mode is in the last two months before the birth, as the deadline interpretation implies.

Prediction 4(b) asks whether the back-loading is a matter of liquidity. Among households in the top income tercile, 4.5 percent of twelve-month spending on infant furniture and equipment falls before the third trimester, 45.8 percent in the third trimester and 49.7 percent in the birth quarter; among households in the bottom tercile the corresponding shares are 5.7, 34.1 and 60.3 percent. Both groups concentrate virtually all of their purchases in the last six months, so liquidity cannot be what produces the back-loading in general; but low-income households push a larger part of it past the birth itself, into the quarter in which the child has arrived and, in the United States, baby showers and gifts from relatives have been received, which is what a binding liquidity constraint adds to a common deadline. Owners and renters show the same pattern (43 and 42 percent in the third trimester, 48 and 54 percent in the birth quarter), as do first and higher-order births (46 and 40 percent in the third trimester, 44 and 56 percent in the birth quarter). The event-study estimates in dollars tell the same story from the other side (Table 4 and Figure 3): in the third trimester, households in the top income tercile raise their spending on infant furniture and equipment by 58 dollars a month and households in the bottom tercile by 12 dollars ($p < 0.001$ and $p = 0.01$), while in the birth quarter the figures are 52 and 26 dollars; the poorer households' peak comes at the birth. The same households differ in how the pregnancy is financed. Total expenditure does not change significantly in any group, but the point estimates differ in sign: +469 dollars a month in the third trimester in the top tercile ($p = 0.15$) and +390 dollars among homeowners ($p = 0.11$), against −93 dollars in the bottom tercile and −221 dollars among renters, whose total expenditure is already 338 dollars below its conception-quarter level in the quarter after conception ($p = 0.05$). Where the budget does not expand, the deadline is met later and out of reallocation rather than out of additional resources.

Prediction 4(c) concerns home readiness goods. Household furnishings and equipment excluding infant items rise by 8 percent in the quarter after conception and by 24 percent in the third trimester, and are below baseline in the birth quarter (−9 percent) and the quarter after it; the aggregate is imprecisely estimated ($p = 0.16$ in the third trimester), but its components agree on the date. Household textiles rise by 67 percent in the third trimester ($p = 0.022$) and 54

percent in the birth quarter ($p = 0.063$) and are back at baseline afterwards; furniture excluding infant furniture rises by 22 percent and small appliances and housewares by 21 percent in the third trimester, and both turn negative after the birth (not significant individually); home maintenance and repair rises by 41 percent (not significant); and housekeeping services rise by 62 percent in the third trimester ($p = 0.047$), by 118 percent in the birth quarter ($p = 0.001$) and remain roughly doubled afterwards, which is the one readiness good whose demand the child's arrival sustains. The monthly profile of furnishings (Figure 1, panel F) peaks two months before the expected birth month, at +47 percent ($p = 0.05$), and turns negative in the birth month. Net vehicle purchases, the largest durable in the budget, rise by 58, 133 and 63 dollars a month in the two pregnancy quarters and the birth quarter, that is by 18, 42 and 20 percent of the comparison-group mean, but the estimates are too imprecise to reject zero ($p = 0.36$ in the third trimester). The home is prepared in the third trimester and the preparation stops when the child arrives: this is nesting as the evolutionary literature describes it, and it is what the stable-preference model generates when the productivity of home goods in producing readiness rises before the birth.

Table 5. Within-pregnancy timing of child-durable spending (households observed from conception to birth)

Category and group	Households buying	Q−3	Q−2	Q−1	Q0
Infant furniture and equipment	212 of 424	1.4	5.9	43.0	49.7
Share of these households buying in quarter (%)		5.2	11.3	44.8	64.1
First births	78	1.7	8.2	46.4	43.7
Higher-order births	134	1.1	3.7	39.5	55.7
Bottom income tercile	47	0.4	5.3	34.1	60.3
Middle income tercile	64	4.6	11.7	40.8	42.9
Top income tercile	101	0.5	4.0	45.8	49.7
Homeowners	120	1.6	7.4	43.4	47.6
Renters	92	0.9	3.0	42.1	54.0
Infant durables incl. clothing <2	318 of 409	6.3	9.4	33.3	51.0
Share of these households buying in quarter (%)		25.8	31.4	54.7	84.3
First births	91	2.0	4.8	36.5	56.7
Higher-order births	227	8.6	11.8	31.6	48.0
Bottom income tercile	77	4.2	7.5	29.7	58.6
Middle income tercile	101	10.3	11.8	30.7	47.1
Top income tercile	140	5.3	9.0	35.4	50.3
Homeowners	180	7.7	11.0	31.9	49.3
Renters	138	3.7	6.5	35.8	54.0
Household furnishings (excl. infant)	356 of 424	20.1	23.9	36.6	19.5
Share of these households buying in quarter (%)		52.2	57.0	65.7	70.8
First births	111	18.9	18.9	39.3	22.9
Higher-order births	245	20.6	26.1	35.3	18.0
Bottom income tercile	88	17.6	25.4	29.0	27.9
Middle income tercile	114	22.0	21.9	35.6	20.5
Top income tercile	154	19.9	24.3	38.6	17.3
Homeowners	208	20.2	24.2	35.6	19.9
Renters	148	19.6	22.7	39.5	18.2
Women's apparel	290 of 409	22.8	26.0	30.8	20.4
Share of these households buying in quarter (%)		52.8	50.0	64.1	49.7

Category and group	Households buying	Q−3	Q−2	Q−1	Q0
First births	97	21.8	30.1	29.6	18.5
Higher-order births	193	23.4	23.1	31.7	21.8
Bottom income tercile	67	20.3	24.9	34.3	20.6
Middle income tercile	92	27.8	22.7	30.0	19.5
Top income tercile	131	21.2	27.8	30.2	20.8
Homeowners	171	23.2	27.7	29.7	19.4
Renters	119	21.7	22.0	33.4	23.0

Note: Households detected at wave 4, whose four observed quarters run from the conception quarter (Q−3) to the quarter straddling the birth (Q0). For each category, the first row reports the share of the group's total twelve-month spending that falls in each quarter and the number of households with positive spending; the second row reports the share of those households with a purchase in the quarter; the remaining rows report the spending shares by subgroup. All purchases regardless of the gift code for infant goods; infant durables including clothing and women's apparel use months before April 2023.

[Figure 4 about here]

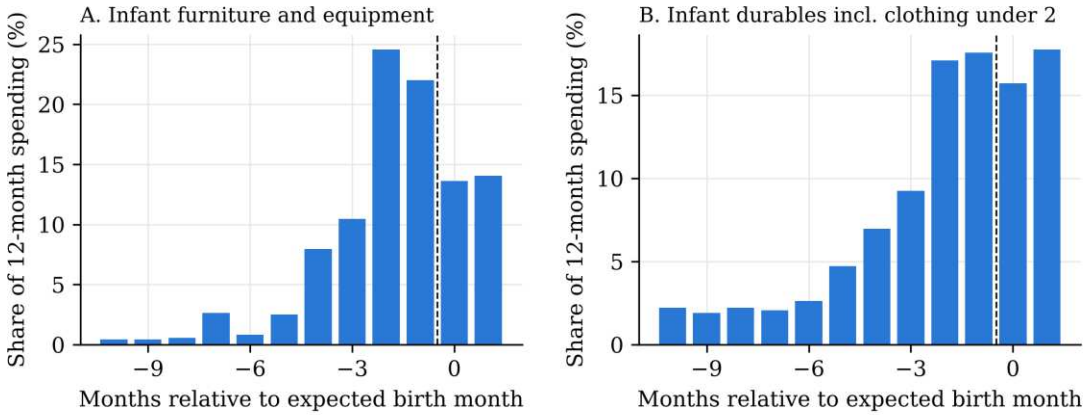


Figure 4. Within-pregnancy timing of child-durable spending. Bars show the share of twelve-month spending that falls in each expected event month, for households detected at wave 4 (observed from the conception quarter to the birth quarter) with positive spending; all purchases regardless of the gift code.

5.6 Time prices, women's apparel and the budget around the birth

The remaining results concern goods whose shadow price is dominated by time. Figure 5 plots the monthly profiles of out-of-town travel, women's apparel and life insurance, together with those of total expenditure and of hospital and physician services, whose quarterly estimates were discussed in Section 5.1. Out-of-town travel changes little during the pregnancy (−15 and −18 percent in the two pregnancy quarters, not significant) and falls by 64 percent in the birth quarter ($p < 0.001$), by 38 percent in the following quarter ($p = 0.022$) and by 28 percent in the second (Figure 5, panel E); the share of households with any travel expenditure in a month falls by 9.5 percentage points in the birth quarter from a base of 18 ($p < 0.001$), after a fall of 3.5 points in the third trimester ($p = 0.019$). Entertainment fees and admissions fall by 15 and 19 percent during the pregnancy (not significant) and by 33 and 34 percent in the birth quarter and

the next (p = 0.008 and 0.011); gasoline falls by 15 percent in the birth quarter (p = 0.078); alcohol away from home by 55 percent. Entertainment as a whole, which also includes pets, audio and video equipment and other lumpy items, falls by about a fifth from the quarter after recognition onward (Table 3); the model assigns no clock to this aggregate, and its early fall owes more to pet expenses (−39 percent in the quarter after conception, p = 0.07) than to the components most intensive in out-of-home time, whose clock is the birth, as the time-price interpretation requires.

Women's apparel follows the physiological timetable of the body rather than the information clock. Quarterly expenditure is flat during the pregnancy (+3 and +1 percent), but the monthly profile (Figure 5, panel D) shows a rise concentrated in the middle of the pregnancy, +51 percent five months before the expected birth month (p = 0.01) and +27 and +16 percent three and two months before it (not significant), followed by a fall of 45 percent in the month before the expected birth (p < 0.01); expenditure is then 38 percent below baseline in the birth quarter (p < 0.001), 31 percent below in the next (p = 0.004) and 42 percent below in the second (p = 0.001). The timing of the rise matches the survey evidence that maternity clothing is first needed in the fifth or sixth month (Enes, 2013) and the subsequent decline matches the reallocation of the budget and of time after the birth. Men's apparel, by contrast, does not rise during the pregnancy and falls by 22 percent in the birth quarter (p = 0.10). Adult apparel as a whole, which is available for all years, falls by 33 percent in the birth quarter (p < 0.001) and by 21 to 31 percent afterwards. Children's clothing of all ages, counting gifts, rises by 80 percent in the birth quarter and more than doubles thereafter. The household's clothing budget is thus reallocated from adults to the child at the birth, and the only adult clothing that rises before it is the mother's, in the months in which her body changes.

Two further categories deserve mention because the model predicts nothing about them and they behave accordingly. Health insurance premiums do not move at any point. Life and other personal insurance does not move either (Figure 5, panel F; the point estimates range from −4 to +30 percent, all with p > 0.5), and the share of households paying a premium falls by one percentage point in the third trimester (p = 0.047) and is otherwise unchanged; the data neither support nor reject the natural conjecture that parents insure their lives when a child arrives.

[Figure 5 about here]

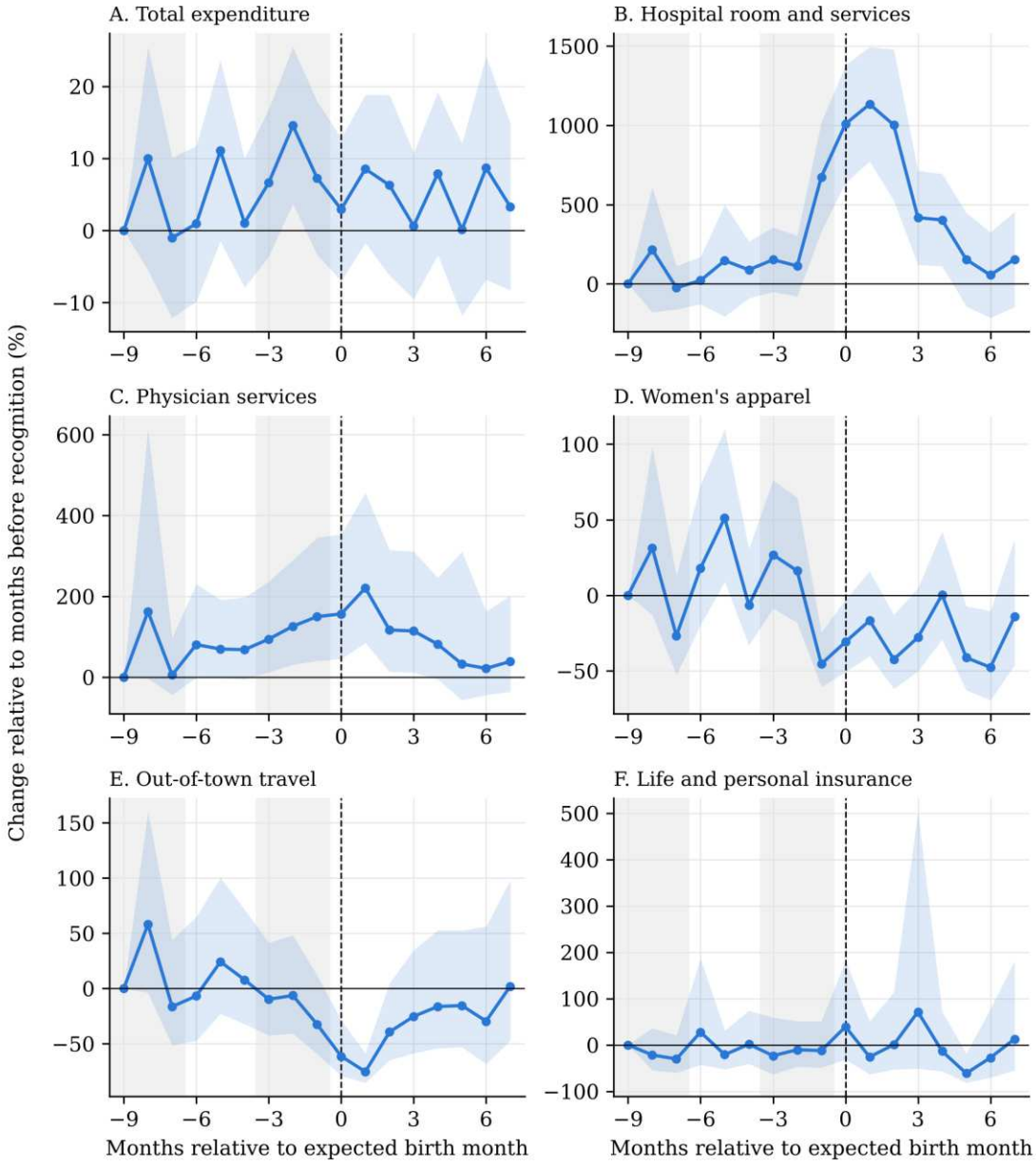


Figure 5. Monthly event-time profiles of total expenditure, health, women's apparel, travel and life insurance. Total expenditure and hospital services are estimated by OLS and expressed in percent of the comparison-group mean; the other panels are Poisson pseudo-maximum-likelihood estimates. Conventions as in Figure 1.

5.7 Robustness, placebo and attrition

Table 6 reports the key coefficients under alternative samples and specifications. Excluding the 19 twin births changes nothing. Excluding the pandemic months from March 2020 to June 2021, during which the composition of spending shifted for every household, leaves the

infant-goods, travel, apparel and food estimates unchanged and attenuates the tobacco estimates to −20, −23 and −22 percent in the three quarters from recognition to the birth (p = 0.15, 0.06 and 0.10), with the same step shape; the pandemic months contribute to the precision of the tobacco estimate but not to its form. Restricting the treated group to the 424 births detected at the last interview, for which all four observed quarters are within-household observations of the same pregnancy from conception to birth, reproduces the profile: tobacco −35 and −34 percent in the two pregnancy quarters (p = 0.02 for both) and −19 percent in the birth quarter, alcohol at home −13 and −22 percent (p = 0.04 in the third trimester) and +6 percent in the birth quarter, infant furniture and equipment +234 percent in the quarter after conception (p = 0.03) and +1,774 and +1,914 percent in the third trimester and the birth quarter, furnishings +34 percent in the third trimester (p = 0.07) and −19 percent in the birth quarter, travel −65 percent in the birth quarter, women's apparel +1 percent in the third trimester and −37 percent in the birth quarter (p < 0.01), and total expenditure +3 percent in the third trimester (not significant). Taking the quarter after conception rather than the conception quarter as the reference, so that the second half of the pregnancy is compared with its first months, shows which responses are complete by then: tobacco is within 5 percent of its post-recognition level in the third trimester and the birth quarter, alcohol at home is 9 percent below it in the third trimester and 17 and 37 percent above it in the birth quarter and the quarter after (p = 0.05 and p < 0.01), infant furniture and equipment are still 237 and 223 percent above it in the third trimester and the birth quarter, and travel is 57 percent below it in the birth quarter. Estimating the harm-good equations by least squares in dollars rather than by PPML gives coefficients of the same sign and similar relative size (tobacco −5, −5 and −4 dollars a month from a base of 21; alcohol at home −2 and −4 dollars from a base of 19, p = 0.06 in the third trimester) but with standard errors that mostly do not reject zero, as one expects for goods that one household in six, or two in five, buy; weighting the least-squares estimates by the survey's calibration weights leaves the point estimates close to the unweighted ones (tobacco −8 dollars in the third trimester, infant furniture and equipment +34 dollars, travel −95 dollars in the birth quarter, women's apparel −10 dollars) and widens the confidence intervals.

Table 6. Robustness of the main estimates

Category	Variant	Q−2	Q−1	Q0	Q+1	Estimator
Tobacco	Baseline	-33.3* (17.6)	-38.7** (16.9)	-33.0* (17.4)	-19.1 (18.6)	PPML
Tobacco	Excluding twin births	-31.3* (17.7)	-37.1** (17.0)	-32.3* (17.5)	-19.6 (18.7)	PPML
Tobacco	Excluding Mar 2020–	-21.6 (14.9)	-26.5* (14.3)	-24.2 (14.8)	-4.7 (16.3)	PPML

Category	Variant	Q−2	Q−1	Q0	Q+1	Estimator
	Jun 2021					
Tobacco	Births detected at wave 4 only	-42.8** (18.1)	-42.1** (17.8)	-21.2 (18.4)		PPML
Tobacco	Reference quarter Q−2	ref.	-5.4 (12.1)	0.3 (12.5)	14.2 (13.7)	PPML
Tobacco	OLS in dollars	-5 (4)	-5 (4)	-4 (4)	-2 (4)	OLS
Tobacco	Weighted OLS (FINLWT21)	-8 (6)	-8 (6)	-7 (6)	-5 (6)	OLS
Alcohol at home	Baseline	-12.4 (11.0)	-22.0** (10.7)	2.9 (10.5)	19.0 (13.0)	PPML
Alcohol at home	Excluding twin births	-10.6 (11.2)	-20.5* (11.0)	4.6 (10.7)	19.7 (13.2)	PPML
Alcohol at home	Excluding Mar 2020–Jun 2021	-10.4 (11.8)	-19.6* (11.7)	4.0 (11.6)	22.9 (14.1)	PPML
Alcohol at home	Births detected at wave 4 only	-13.9 (12.2)	-24.2** (11.7)	6.2 (10.9)		PPML
Alcohol at home	Reference quarter Q−2	ref.	-9.6 (8.1)	15.4* (7.9)	31.4*** (11.0)	PPML
Alcohol at home	OLS in dollars	-2 (2)	-4* (2)	-0 (2)	2 (2)	OLS
Alcohol at home	Weighted OLS (FINLWT21)	-3 (2)	-4* (2)	-0 (2)	2 (3)	OLS
Food at home	Baseline	-1.5 (2.7)	-3.8 (2.8)	1.4 (2.9)	4.5 (3.4)	PPML
Food at home	Excluding twin births	-0.6 (2.7)	-3.1 (2.8)	2.3 (2.9)	5.4 (3.4)	PPML
Food at home	Excluding Mar 2020–Jun 2021	-1.5 (2.8)	-4.2 (2.9)	1.2 (3.0)	5.5 (3.6)	PPML
Food at home	Births detected at wave 4 only	-3.1 (2.8)	-2.9 (3.1)	2.1 (3.3)		PPML
Food at home	Reference quarter Q−2	ref.	-2.3 (2.3)	2.9 (2.3)	6.0** (2.9)	PPML
Food at home	OLS in dollars	-2 (12)	-12 (12)	10 (12)	20 (15)	OLS
Food at home	Weighted OLS (FINLWT21)	0 (12)	-8 (13)	15 (13)	23 (16)	OLS
Infant furniture and equipment	Baseline	172.6*** (47.0)	294.0*** (45.6)	290.0*** (46.4)	123.0** (49.6)	PPML
Infant furniture and equipment	Excluding twin births	176.9*** (48.3)	297.6*** (47.0)	294.4*** (47.7)	126.7** (50.9)	PPML
Infant furniture and equipment	Excluding Mar 2020–Jun 2021	172.4*** (48.1)	289.7*** (46.7)	287.3*** (47.7)	117.6** (51.0)	PPML
Infant furniture and equipment	Births detected at wave 4 only	120.5** (56.8)	293.1*** (47.8)	300.3*** (47.7)		PPML
Infant furniture and equipment	Reference quarter Q−2	ref.	121.4*** (22.3)	117.4*** (23.9)	-49.7* (29.6)	PPML
Infant furniture and equipment	OLS in dollars	10*** (3)	33*** (5)	36*** (5)	8 (5)	OLS
Infant furniture and equipment	Weighted OLS (FINLWT21)	12** (5)	34*** (6)	36*** (5)	7 (5)	OLS
Infant durables incl. clothing	Baseline	55.1*** (14.5)	141.8*** (16.5)	190.0*** (15.8)	167.9*** (16.8)	PPML
Infant durables incl. clothing	Excluding twin births	57.0*** (14.6)	143.3*** (16.7)	191.5*** (16.0)	168.5*** (17.0)	PPML
Infant durables incl. clothing	Excluding Mar 2020–Jun 2021	61.7*** (15.2)	146.2*** (17.9)	196.1*** (17.4)	173.6*** (18.3)	PPML
Infant durables incl. clothing	Births detected at wave 4 only	31.2** (15.9)	143.6*** (18.9)	190.8*** (16.8)		PPML
Infant durables incl. clothing	Reference quarter Q−2	ref.	86.7*** (12.2)	134.9*** (11.7)	112.8*** (12.4)	PPML
Infant durables incl. clothing	OLS in dollars	9*** (3)	33*** (5)	58*** (5)	40*** (5)	OLS
Infant durables incl. clothing	Weighted OLS (FINLWT21)	10*** (3)	33*** (6)	57*** (6)	37*** (6)	OLS
Furnishings	Baseline	8.0 (14.5)	21.2 (15.0)	-9.1 (15.7)	-7.1 (17.7)	PPML
Furnishings	Excluding twin births	8.3 (14.6)	20.8 (15.1)	-9.6 (15.9)	-7.8 (17.8)	PPML
Furnishings	Excluding Mar 2020–Jun 2021	4.6 (15.0)	15.5 (15.9)	-13.9 (16.7)	-14.9 (18.6)	PPML
Furnishings	Births detected at wave 4 only	7.8 (15.4)	28.9* (16.2)	-20.9 (18.7)		PPML
Furnishings	Reference quarter Q−2	ref.	13.2 (11.4)	-17.1 (12.2)	-15.1 (14.0)	PPML
Furnishings	OLS in dollars	11 (20)	29 (20)	-16 (20)	-18 (22)	OLS
Furnishings	Weighted OLS (FINLWT21)	10 (24)	26 (24)	-36 (24)	-31 (25)	OLS
Travel	Baseline	-16.6 (17.9)	-19.9 (16.4)	-100.9*** (18.9	-48.3** (21.1)	PPML

Category	Variant	Q−2	Q−1	Q0	Q+1	Estimator
Travel	Excluding twin births	-17.4 (18.0)	-20.4 (16.4)	-101.4*** (18.9)	-48.7** (21.1)	PPML
Travel	Excluding Mar 2020–Jun 2021	-18.9 (18.4)	-19.5 (16.7)	-100.8*** (19.5)	-47.9** (21.4)	PPML
Travel	Births detected at wave 4 only	-14.2 (19.2)	-20.4 (17.5)	-105.5*** (21.9)		PPML
Travel	Reference quarter Q−2	ref.	-3.4 (14.0)	-84.3*** (16.9)	-31.8* (18.0)	PPML
Travel	OLS in dollars	-27 (20)	-30 (19)	-86*** (18)	-52** (21)	OLS
Travel	Weighted OLS (FINLWT21)	-36* (21)	-32* (19)	-95*** (18)	-61*** (21)	OLS
Women's apparel	Baseline	3.2 (10.9)	1.3 (10.8)	-47.8*** (11.0)	-37.4*** (13.0)	PPML
Women's apparel	Excluding twin births	2.8 (11.1)	1.2 (10.9)	-48.7*** (11.1)	-37.4*** (13.2)	PPML
Women's apparel	Excluding Mar 2020–Jun 2021	3.5 (11.6)	0.8 (11.5)	-48.9*** (11.5)	-38.1*** (13.6)	PPML
Women's apparel	Births detected at wave 4 only	2.3 (12.1)	1.4 (12.0)	-45.9*** (12.7)		PPML
Women's apparel	Reference quarter Q−2	ref.	-1.9 (9.2)	-51.1*** (9.6)	-40.6*** (10.9)	PPML
Women's apparel	OLS in dollars	1 (4)	0 (4)	-12*** (3)	-10*** (4)	OLS
Women's apparel	Weighted OLS (FINLWT21)	1 (4)	1 (4)	-10*** (4)	-7* (4)	OLS
Total (dollars)	Baseline	12 (173)	156 (163)	110 (169)	58 (187)	OLS
Total (dollars)	Excluding twin births	90 (165)	215 (158)	173 (160)	117 (181)	OLS
Total (dollars)	Excluding Mar 2020–Jun 2021	21 (163)	122 (156)	63 (154)	58 (176)	OLS
Total (dollars)	Births detected at wave 4 only	2 (192)	123 (175)	160 (190)		OLS
Total (dollars)	Reference quarter Q−2	ref.	144 (129)	98 (126)	46 (143)	OLS
Total (dollars)	OLS in dollars	12 (173)	156 (163)	110 (169)	58 (187)	OLS
Total (dollars)	Weighted OLS (FINLWT21)	-113 (208)	162 (193)	41 (200)	-31 (214)	OLS

Note: Coefficients from equation (5) relative to the reference quarter (Q−3 unless stated), with standard errors clustered by consumer unit in parentheses. PPML rows report coefficients multiplied by 100; OLS rows report dollars per month. The excluded pandemic months are March 2020 to June 2021. The weighted specification uses the consumer unit's first-interview calibration weight (FINLWT21). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

A placebo exercise assigns pseudo-births to randomly chosen comparison households at a random interview and re-estimates (5) with the pseudo-treated households in the role of the treated group (Table 7). With 3 percent of the comparison households assigned a pseudo-birth in each of six replications, the average pseudo-coefficient is within 10 log points of zero for alcohol at home, within 2 log points for food at home and within 20 log points for furnishings; for total expenditure it is between −64 and −137 dollars, with a standard deviation across replications of 170 to 370 dollars; and for infant durables it is within 35 log points of zero with a standard deviation across replications of 0.4 to 0.5, which is large because few pseudo-treated households buy such goods at all. Across the 150 pseudo-coefficients for the five non-reference quarters, 9

percent are significant at the 5 percent level and 16 percent at the 10 percent level, close to the nominal rates. None of the placebo profiles has the shape of the treated profiles.

[Table 7 about here]

Table 7. Placebo event studies with pseudo-births assigned to comparison households

Category	Q−2	Q−1	Q0	Q+1	Q+2
Alcohol at home	3.1 [16.2]; 17%	6.2 [11.2]; 0%	6.7 [11.4]; 0%	9.2 [21.8]; 17%	2.4 [16.1]; 0%
Food at home	-1.1 [4.2]; 0%	-1.2 [5.9]; 17%	0.1 [4.3]; 0%	0.7 [6.1]; 17%	-0.6 [5.8]; 17%
Infant durables, own use	33.4 [50.7]; 17%	10.4 [42.5]; 0%	1.0 [36.1]; 17%	-16.9 [41.5]; 17%	-32.1 [43.7]; 17%
Furnishings	-6.6 [10.7]; 0%	3.9 [14.1]; 0%	-19.5 [23.6]; 17%	-13.9 [22.6]; 0%	-5.2 [26.7]; 0%
Total (dollars)	-63.6 [169.2]; 0%	-116.5 [230.7]; 0%	-136.9 [294.5]; 17%	-98.2 [278.9]; 17%	-115.5 [374.5]; 17%

Note: Each cell reports the mean and, in brackets, the standard deviation across six replications of the estimated coefficient (multiplied by 100 for PPML outcomes; dollars for total expenditure), followed by the share of replications in which the coefficient is significant at the 5 percent level. In each replication, 3 percent of the comparison households are assigned a pseudo-birth at a randomly drawn interview after their first.

Attrition after the birth is modest and similar to the comparison group (Appendix Table A3), and restricting the sample to births detected at the last interview, for which all four observed quarters precede or straddle the birth and attrition after the birth plays no role, leaves the pregnancy-quarter estimates essentially unchanged (Table 6).

6. Discussion

6.1 What survives of de gustibus

Proposition 1 says that a before-and-after comparison cannot tell a taste change from a change in shadow prices, and that the stable-preference hypothesis has content only through the restrictions it places on the timing of technology changes. Pregnancy supplies four such restrictions, and the data respect three of them with some precision and are silent on the fourth. Goods that harm the fetus respond on the information clock: tobacco falls within a quarter of recognition and does not recover, alcohol falls gradually as the pregnancy becomes safer and recovers after the birth. Irreversible child durables respond on the option clock: they barely move during the first trimester even though the household knows that it is pregnant, they rise steeply once the loss hazard has passed, and they respond most in households that do not already own them. Home readiness goods and child durables are back-loaded toward the deadline and stop at the birth. Goods intensive in out-of-home time respond at the birth. Food, which should respond on the physiological clock, does not respond in the expenditure measure available.

The reading I propose is not that pregnancy leaves tastes untouched; it is that the behavior of expectant households in the budget is organized by dates that the household does not choose, and that a model with fixed preferences and a changing technology predicts those dates while a taste-change account merely accommodates them. The parity gradient in child durables is the sharpest instance. A hormonal shift that made parents want cribs would operate in every pregnancy; a demand for a stock of durables operates only where the stock is missing. The different shapes of the tobacco and crib profiles are the second instance: knowledge arrives once, but it produces a step completed within a quarter for a good whose shadow price has changed and a ramp that accumulates most of its mass in the last trimester for a good whose cost of acting too early is a wasted irreversible purchase. The reversal of alcohol and the persistence of tobacco after the birth is the third: the same information shock produces a transitory response in a good without consumption capital and a permanent one in a good with it, which is what Becker and Murphy (1988) would predict and what a generic taste change would not.

Where the model is silent, the data are silent too. The model does not predict whether purchases within the safe window should be made early or late without knowledge of carrying costs, readiness values and discounting, and the data show back-loading that is common to all income groups but more pronounced, and pushed past the birth, among the poor. The combination of a universal deadline effect with an income-specific delay is what one would expect if a positive carrying cost or present bias sets the mode near the deadline and liquidity determines whether the household can meet it. I do not claim to have separated present bias from carrying costs; the setting is unusual in that the deadline is biological and the irreversibility is resolved on a known schedule, and it may reward a structural treatment in which the distribution of purchase dates across households identifies the discount function.

6.2 Food and the limits of the expenditure lens

The absence of a food response is the one place where the model's prediction and the data part company, and it is worth being clear about what the null means. The nutritional requirement of pregnancy is not in doubt, and British scanner data show that the calories purchased by pregnant households rise by about a fifth (Lührmann, 2025). What the CE Interview shows is that the usual weekly amount spent on food at home does not rise. Three explanations are consistent with both facts: the household meets the requirement by substituting toward cheaper

calories, so that quantity rises and expenditure does not, which is also what the scanner data's deterioration in nutritional quality suggests; the usual-weekly question measures habit rather than purchases, and habit reports are sticky; and nausea offsets part of the early requirement. The policy relevance of distinguishing among them is considerable, because prenatal nutrition programs such as WIC in the United States are premised on the first (Bitler and Currie, 2005; Hoynes, Page and Stevens, 2011), and the finding that the food budget does not expand while the requirement does is consistent with their premise. The expenditure lens cannot settle the composition question; a design that links the CE Diary, which records food item by item, to a pregnancy marker could, and the identification strategy of this paper (a newborn in the roster three months after an interview without one) applies to the Diary's two-week records only if a panel dimension is added to it.

6.3 Measurement lessons

Two measurement findings bear on any study of prenatal spending in household surveys. The first is the gift code. Because an unborn child is not a member of the consumer unit, purchases made for it during the pregnancy are, with some regularity, recorded as gifts to persons outside the unit: gift-coded purchases of infant goods double in the third trimester and fall by nearly nine tenths after the birth, when the same goods become own-use. The coding is concentrated in clothing, where the survey asks for whom each item was bought: a quarter of the infant clothing bought by expectant households in the third trimester is recorded as a gift, against less than 1 percent after the birth, while infant furniture and equipment are almost never gift-coded. Measures of prenatal clothing purchases that follow the survey's own-use convention therefore understate the response by about a quarter in the third trimester; for the durables on which the option and deadline clocks operate, the two measures coincide. The second is the roster. Infants are enumerated at about two thirds of the rate of one-year-olds, so that a roster-based identification of births recovers a subset of births, probably those of households that are more settled and respond more completely. Neither feature biases the timing comparisons that are the paper's object, because both operate within the treated group and both are stable over event time once the birth has occurred, but both limit what the sample can say about aggregate magnitudes, and the second is a reason to prefer administrative or scanner data where the question is the size of the response rather than its timing.

The survey redesign of 2023, which merged the person-specific apparel categories and the food categories, removes from the public-use files the ability to observe women's apparel and clothing for children under two separately. For the questions asked here these were among the most informative categories in the budget, and the paper's estimates for them end in the first quarter of 2023.

6.4 Policy

The results speak to the timing of transfers around births. Expenditure on child durables and on home readiness is concentrated in the third trimester, total expenditure does not expand to accommodate it, and the mother's labor income, in the United States, typically begins to fall in the same months (Stanczyk, 2020). Transfers paid at or after the birth, which is when most child benefits begin, arrive after the household has already financed its largest child-specific outlays, and low-income households respond, as Section 5.5 shows, by pushing those outlays past the birth. In-kind programs that deliver the durable stock before the birth, of which the Finnish maternity package is the best known example, and cash transfers that begin at a prenatal visit rather than at the birth, address the problem at the date at which the option clock makes the expenditure optimal. The recent evidence that unconditional cash paid from the birth onward raises spending on child-specific goods (Gennetian et al., 2022) and that a large post-birth transfer raises consumption without reducing labor supply (González et al., 2025) establishes that such transfers are spent as intended; the evidence here suggests that part of their value would be greater if they were paid two or three months earlier. The information clock, for its part, suggests that the first prenatal visit, which for most women occurs within weeks of recognition, is the moment at which households are already revising the shadow prices of alcohol and tobacco on their own, and that counseling at that visit works with rather than against the household's own calculation.

7. Conclusion

This paper has asked what the nine months before a birth can tell us about the stability of preferences, and has answered that the question is one of timing. A household production model with fixed preferences assigns each class of goods to a clock: recognition for goods that harm the fetus, the end of the first trimester for irreversible child durables, the birth for goods intensive in

out-of-home time, and the continuous physiology of gestation for food. In the monthly expenditure records of 1,164 expectant households in the Consumer Expenditure Interview Survey, tobacco falls within a quarter of recognition and stays down, alcohol falls as the pregnancy becomes safer and recovers after the birth, infant furniture and equipment barely move until the first trimester has ended and then rise nearly twenty-fold with more than half of the spending in the three months before the expected birth month, the response is concentrated in first births, household textiles and furnishings peak in the third trimester and revert at the birth, travel collapses at the birth and not before, and food at home does not move. Three clocks are visible at the dates the model assigns them; the fourth is not visible in an expenditure measure that was never designed to see it.

The contribution is methodological as much as substantive. A design that compares expenditure before and after an event cannot test the Stigler–Becker hypothesis, for the reason given in Proposition 1; a design that reads the dates at which different goods respond against dates fixed by biology can. Pregnancy is a convenient case because its dates are well documented, but the logic applies to any anticipated event whose constituent shocks arrive on a known schedule, such as retirement, a child leaving home or a planned move. The paper also documents two features of the Consumer Expenditure Survey that future work on prenatal spending must take into account: clothing bought for the unborn child is partly coded as gifts, and infants are under-enumerated in the roster.

Several extensions are open. Linking a pregnancy marker to the Diary component of the survey would allow the composition of the food basket to be studied alongside its cost. Administrative or scanner data with monthly resolution and exact birth dates would sharpen the information and option clocks to the week, and would allow the distribution of purchase dates within the safe window to be used to identify discounting. And the model's prediction that the alcohol response of a couple should equal the woman's share of the couple's consumption could be tested directly with individual-level purchase data, which would separate a private shadow-price response from a household norm.

Declarations

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Conflicts of interest. The author declares no conflict of interest.

Data availability. The Consumer Expenditure Survey public-use microdata are freely available from the U.S. Bureau of Labor Statistics (https://www.bls.gov/cex/pumd_data.htm). The code that identifies births, constructs the expenditure categories and estimates the models is available from the author on request.

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Appendix

A.1 Expenditure categories

Table A1 lists the expenditure categories used in the paper, their content under the 2019 definitions of the Interview Survey's hierarchical grouping file, and the number of universal classification codes (UCC) that enter each category in 2019 and 2024. Categories whose definition changed in the redesign of the second quarter of 2023 (clothing by person, food at home, alcohol away from home) are estimated on months before April 2023 and are marked "to 2023Q1" in the tables of the main text.

Table A1. Expenditure categories and universal classification codes

Category	Content (2019 definitions)	UCC codes (2019)	Codes (2019 / 2024)
total	All expenditure UCCs in the EXPEND and FOOD sections of the Interview stub file	487 codes incl. 002120, 005420, 005520, 005620, 190901	487 / 416
tobacco	Cigarettes; other tobacco products	630110, 630210	2 / 2
alc home	Beer, wine, other alcohol at home (usual weekly amount)	790330	1 / 1
alc away	Alcohol at restaurants and taverns; alcohol on trips	200900, 790420	2 / 1
food home	Food and non-alcoholic beverages at home (usual weekly amount); food prepared on trips	190904, 790240	2 / 1
grocery all	All grocery purchases including non-food (usual weekly amount)	790210	1 / 1
food away	Meals at restaurants, carry-outs and other; school meals; catered affairs; food on trips; meals as pay	190901, 190902, 190903, 790410, 790430, 800700	6 / 5
infant furn	Infants' furniture	290420	1 / 1
infant equip	Infants' equipment	320130	1 / 1
infant apparel	Infant coats and snowsuits; dresses and outerwear; underwear; nightwear; accessories (children under 2)	410110, 410120, 410130, 410140, 410901	5 / 0
toys	Toys, games, arts and crafts, tricycles; playground equipment	610110, 610120	2 / 2
children apparel	Boys 2–15, girls 2–15 and children under 2 (to 2023Q1); children's clothing (from 2023Q2)	31 codes incl. 370110, 370125, 370211, 370212, 370213	31 / 3
women apparel	Women 16 and over, all items; women's footwear	16 codes incl. 380110, 380210, 380311, 380315, 380320	16 / 1
men apparel	Men 16 and over, all items; men's footwear	13 codes incl. 360110, 360120, 360210, 360311, 360312	13 / 1
adult apparel	Men and women 16 and over incl. footwear (to 2023Q1); adult clothing (from 2023Q2)	30 codes incl. 360110, 360120, 360210, 360311, 360312	30 / 3
furnishings total	Household textiles, furniture, floor coverings, major and small appliances, miscellaneous household equipment, excluding infants' furniture and equipment	56 codes incl. 230117, 230118, 280110, 280120, 280140	56 / 56
textiles	Bathroom, bedroom, kitchen and dining linens; curtains; slipcovers and pillows	280110, 280120, 280140, 280210, 280220	5 / 5
furniture exinf	Mattresses, bedroom, living room, kitchen, outdoor and other furniture, excluding infants' furniture	290110, 290120, 290210, 290310, 290320, 290410, 290430, 290440	8 / 8
small appl	Flatware, dinnerware, cookware; small electric kitchen appliances; portable heating and cooling	320330, 320345, 320370, 320521, 320522	5 / 5
home repair	Maintenance and repair services and commodities for owned and rented dwellings	30 codes incl. 230112, 230113, 230114, 230115, 230141	30 / 28
housekeeping	Housekeeping services	340310	1 / 1
childcare	Babysitting and child care; day care centers, nurseries and preschools	340210, 670310, 670320	3 / 3
health total	Health insurance, medical services, prescription drugs, medical supplies	39 codes incl. 540000, 550110, 550320, 550330, 550340	39 / 36
hospital	Hospital room and services	570111	1 / 1
physician	Physician's services	560110	1 / 1
lab	Laboratory tests and X-rays	560330	1 / 1
health ins	All health insurance premiums	21 codes incl. 580115, 580116, 580311, 580312, 580401	21 / 21
lifeins	Life, endowment, annuity and other personal insurance	700110	1 / 1
travel	Lodging, food, fuel, fares, admissions and recreation on out-of-town trips; airline fares; catered affairs	24 codes incl. 190902, 190903, 190904, 200900, 210210	24 / 25

Category	Content (2019 definitions)	UCC codes (2019)	Codes (2019 / 2024)
fees admissions	Club memberships; participant sports; theater, movie, museum and sporting event admissions; recreational lessons	12 codes incl. 610900, 620111, 620121, 620122, 620212	12 / 12
gasoline	Gasoline, diesel, other fuels, motor oil, electric vehicle charging	470111, 470112, 470113, 470114, 470211, 470212, 470311	7 / 0
veh purchase	New and used cars, trucks, motorcycles and aircraft (net outlay)	450110, 450210, 450220, 450900, 460110, 460901, 460902, 460903	8 / 8
cash contrib	Cash contributions to persons outside the unit, charities and religious organizations	9 codes incl. 800111, 800121, 800804, 800811, 800821	9 / 8

Note: The complete year-by-year mapping from UCC to category is produced from the Interview hierarchical grouping files (CE-HG-Inter-YYYY) and is available from the author. “All purchases” measures add items that the respondent reported as bought for someone outside the consumer unit (the survey’s gift flag) to own-use purchases.

A.2 Full quarterly estimates

Table A2. Quarterly event-study estimates for all categories

Category	Estimator	Q−2	Q−1	Q0	Q+1	Q+2	N	Mean, comparison
Adult apparel	PPML	-8.9 (11.3)	-8.2 (10.5)	-40.5*** (10.6)	-23.9** (11.7)	-36.9** (15.7)	302,493	72.5
Alcohol at home	PPML	-12.4 (11.0)	-22.0** (10.7)	2.9 (10.5)	19.0 (13.0)	12.6 (17.1)	173,959	40.3
Alcohol away from home (to 2023Q1)	PPML	-34.1* (19.7)	-40.0** (16.2)	-80.8*** (17.7)	-45.3** (19.8)	-24.5 (26.3)	141,280	33.2
Alcohol, total (to 2023Q1)	PPML	-22.1** (10.0)	-26.2*** (9.7)	-26.7*** (10.1)	-5.9 (11.7)	-0.6 (14.7)	183,526	57.8
All gift-coded purchases	PPML	5.9 (30.4)	24.5 (30.8)	3.9 (29.2)	60.1 (40.2)	30.4 (40.0)	136,616	69.5
Any alcohol at home (OLS, pp)	OLS	-5.3** (2.5)	-6.3** (2.4)	-3.7 (2.5)	-2.7 (2.7)	-0.1 (3.3)	350,285	0.4
Any child care (OLS, pp)	OLS	0.1 (1.6)	0.9 (1.7)	-0.2 (1.7)	5.4*** (2.1)	14.7*** (2.8)	350,285	0.1
Any food away (OLS, pp)	OLS	0.1 (1.8)	-2.2 (1.7)	-4.0** (1.8)	-1.8 (2.1)	-3.1 (2.6)	327,179	0.7
Any furnishings (OLS, pp)	OLS	-1.5 (2.0)	-2.1 (2.0)	-1.9 (2.0)	-3.5 (2.2)	-0.4 (2.8)	350,285	0.3
Any home repair (OLS, pp)	OLS	-2.5 (1.6)	-2.6 (1.6)	-3.0* (1.6)	-4.1** (1.7)	-2.8 (2.0)	350,285	0.1
Any hospital payment (OLS, pp)	OLS	-1.1 (0.9)	-0.2 (0.9)	5.3*** (1.0)	4.6*** (1.2)	2.1 (1.3)	350,285	0.0
Any infant durable incl. clothing (OLS, pp)	OLS	2.0 (1.7)	6.3*** (1.8)	24.4*** (2.0)	33.1*** (2.4)	33.2*** (3.0)	350,285	0.1
Any infant durable, own use (OLS, pp)	OLS	1.7 (1.7)	4.3** (1.8)	27.4*** (2.0)	36.2*** (2.4)	37.9*** (3.1)	327,179	0.1
Any infant furniture or equipment (OLS, pp)	OLS	2.0*** (0.7)	6.2*** (0.8)	11.7*** (0.9)	4.0*** (1.0)	2.7** (1.3)	350,285	0.0
Any infant furniture/equipment, own use (OLS, pp)	OLS	1.9*** (0.7)	6.1*** (0.8)	11.6*** (0.9)	3.9*** (1.0)	2.5* (1.3)	350,285	0.0
Any life insurance (OLS, pp)	OLS	-0.9 (0.6)	-1.3** (0.6)	-0.7 (0.7)	-0.8 (0.8)	-0.5 (0.9)	350,285	0.1
Any physician	OLS	5.3*** (1.9)	6.7*** (1.9)	4.2** (1.9)	2.6 (2.3)	2.4 (2.8)	350,285	0.1

Category	Estimator	Q−2	Q−1	Q0	Q+1	Q+2	N	Mean, comparison
payment (OLS, pp)								
Any tobacco (OLS, pp)	OLS	-2.1 (1.6)	-2.5* (1.5)	-1.7 (1.6)	-1.7 (1.8)	-0.7 (2.0)	350,285	0.2
Any toys (OLS, pp)	OLS	1.0 (1.3)	-0.1 (1.3)	0.8 (1.4)	3.3** (1.7)	7.9*** (2.0)	350,285	0.1
Any travel (OLS, pp)	OLS	-2.4 (1.6)	-3.5** (1.5)	-9.5*** (1.5)	-4.6*** (1.8)	-4.1** (2.1)	350,285	0.1
Any women's apparel (OLS, pp)	OLS	-2.0 (1.6)	-0.5 (1.6)	-7.2*** (1.6)	-4.9*** (1.8)	-7.7*** (2.2)	327,179	0.2
Apparel and services, total	PPML	-5.2 (9.3)	0.6 (9.9)	8.6 (9.1)	24.0** (9.9)	28.0** (13.2)	297,705	132.7
Apparel services	PPML	-3.8 (29.6)	19.3 (44.2)	19.8 (38.5)	14.1 (40.8)	75.2 (51.7)	172,606	40.5
Cash contributions	PPML	8.4 (9.3)	26.8*** (9.0)	14.2 (8.7)	9.7 (11.3)	17.2 (11.7)	196,494	168.3
Child care	PPML	2.9 (8.5)	9.9 (8.8)	5.6 (9.7)	63.9*** (12.3)	89.9*** (14.5)	68,136	376.2
Children's clothing coded as gifts	PPML	62.6 (40.9)	73.7*** (27.0)	-117.5*** (38.6)	-149.5*** (54.1)	-94.6* (52.3)	46,061	14.9
Children's clothing, all ages, all purchases	PPML	8.9 (13.8)	13.9 (12.7)	58.7*** (12.2)	77.7*** (13.0)	77.1*** (15.4)	220,088	59.9
Children's clothing, own use	PPML	3.3 (13.7)	7.8 (13.6)	63.7*** (13.0)	82.8*** (13.8)	81.6*** (16.2)	202,372	62.0
Clothing for children under 2, own use (to 2023Q1)	PPML	18.5 (13.6)	36.4** (14.3)	164.2*** (14.1)	203.9*** (15.0)	220.6*** (19.6)	45,485	34.5
Dental services	PPML	-17.4 (27.5)	-61.5** (26.6)	-55.7* (29.3)	-28.1 (35.3)	4.9 (42.9)	110,361	65.8
Education	PPML	-32.9 (48.5)	-4.6 (34.9)	-20.5 (45.2)	-12.6 (43.8)	-67.4 (49.7)	124,743	205.4
Entertainment fees and admissions	PPML	-16.5 (13.7)	-20.7 (15.2)	-40.0*** (15.2)	-41.0** (16.0)	-4.1 (25.2)	223,810	96.4
Entertainment, total	PPML	-24.6*** (9.3)	-27.8*** (9.7)	-17.1* (10.3)	-23.8* (12.2)	-2.7 (16.8)	299,590	240.9
Food at home (to 2023Q1)	PPML	-1.5 (2.7)	-3.8 (2.8)	1.4 (2.9)	4.5 (3.4)	5.6 (4.2)	286,258	487.6
Food away from home (to 2023Q1)	PPML	3.1 (6.5)	-0.5 (6.0)	-13.8** (6.2)	-8.7 (7.2)	-12.0 (8.3)	274,590	242.0
Food, total (to 2023Q1)	PPML	-0.2 (2.8)	-2.9 (2.8)	-3.1 (2.8)	0.7 (3.3)	0.5 (4.1)	286,557	718.5
Furniture (excl. infant)	PPML	5.0 (31.6)	19.8 (32.0)	4.0 (32.6)	-30.3 (37.7)	-38.8 (48.2)	115,752	115.8
Gasoline and motor fuel	PPML	-7.6 (8.6)	-3.2 (8.5)	-15.8* (9.0)	-11.1 (9.9)	-16.5 (11.8)	74,847	196.6
Grocery purchases incl. non-food	PPML	0.8 (2.4)	-0.1 (2.4)	6.2** (2.4)	8.1*** (2.8)	11.0*** (3.3)	349,766	601.8
Health care, total	PPML	-0.7 (9.5)	3.8 (9.6)	41.4*** (10.1)	28.7** (11.2)	-4.8 (12.7)	264,627	305.8
Health insurance	PPML	-5.2 (5.9)	-9.5 (6.3)	-3.1 (6.6)	0.9 (7.6)	-5.9 (9.7)	206,191	263.0
Home maintenance and repair	PPML	6.3 (48.6)	34.5 (39.4)	23.7 (44.5)	-20.9 (48.1)	38.5 (65.4)	110,218	175.4
Hospital room and services	PPML	-4.6 (65.5)	24.5 (53.4)	214.6*** (49.7)	176.1*** (54.3)	6.8 (63.7)	41,759	97.0
Household furnishings and equipment (excl. infant)	PPML	8.0 (14.5)	21.2 (15.0)	-9.1 (15.7)	-7.1 (17.7)	12.2 (21.8)	263,368	148.5
Household textiles	PPML	21.2 (22.5)	51.2** (22.3)	43.0* (23.1)	16.8 (25.9)	3.0 (32.6)	148,376	14.1

Category	Estimator	Q−2	Q−1	Q0	Q+1	Q+2	N	Mean, comparison
Housekeeping services	PPML	38.3 (29.2)	48.2** (24.2)	77.9*** (23.7)	67.5*** (25.8)	83.5** (35.0)	27,951	123.5
Housing, total	PPML	1.5 (2.9)	4.5* (2.6)	1.2 (2.7)	4.7 (3.1)	11.0*** (4.0)	309,394	1666.2
Infant durables coded as gifts (to 2023Q1)	PPML	49.9 (37.0)	68.8*** (22.9)	-203.1*** (43.9)	-281.8*** (77.1)	-132.3** (57.2)	36,426	12.3
Infant durables incl. clothing <2, all purchases (to 2023Q1)	PPML	55.1*** (14.5)	141.8*** (16.5)	190.0*** (15.8)	167.9*** (16.8)	168.5*** (20.5)	84,428	28.3
Infant durables, own use (to 2023Q1)	PPML	57.4*** (15.7)	155.3*** (18.3)	215.0*** (17.5)	195.5*** (18.6)	198.0*** (22.4)	56,010	36.3
Infant equipment, own use	PPML	209.7*** (66.7)	342.4*** (61.9)	381.2*** (62.6)	269.6*** (66.5)	281.6*** (71.2)	12,560	16.2
Infant furniture and equipment, all purchases	PPML	172.6*** (47.0)	294.0*** (45.6)	290.0*** (46.4)	123.0** (49.6)	94.4* (55.0)	24,395	22.9
Infant furniture and equipment, own use	PPML	175.4*** (49.3)	293.8*** (48.1)	286.0*** (49.1)	116.0** (52.4)	81.6 (58.1)	20,818	24.8
Infant furniture, own use	PPML	165.0** (64.6)	277.0*** (63.4)	246.8*** (64.3)	30.7 (69.7)	-62.0 (81.8)	13,148	26.2
Laboratory tests and X-rays	PPML	77.0* (42.6)	95.1** (39.9)	86.2** (41.7)	55.4 (50.0)	-112.8** (57.3)	51,340	27.9
Life and personal insurance	PPML	-0.3 (25.6)	-3.7 (25.5)	7.8 (25.4)	26.0 (40.3)	-21.2 (39.1)	101,477	74.2
Major appliances	PPML	16.0 (30.5)	31.9 (36.1)	-19.3 (40.6)	-33.1 (48.9)	86.5* (48.5)	89,963	72.8
Medical services	PPML	10.8 (31.1)	28.9 (30.8)	109.0*** (30.5)	79.2** (32.9)	-2.5 (36.6)	202,483	99.4
Men's apparel (to 2023Q1)	PPML	-8.2 (15.8)	-9.2 (14.6)	-25.3 (15.5)	-3.7 (17.7)	-18.0 (28.4)	170,844	33.9
Miscellaneous	PPML	-34.8 (28.5)	-20.8 (27.6)	-56.6** (27.3)	-30.7 (37.7)	16.4 (37.2)	192,938	61.3
Miscellaneous household equipment (excl. infant)	PPML	3.4 (17.9)	18.1 (17.6)	-20.5 (18.5)	13.9 (21.3)	23.2 (27.5)	221,491	67.3
Net vehicle purchases (OLS, dollars)	OLS	58 (154)	133 (144)	63 (146)	-26 (163)	-165 (174)	350,285	316.1
Other vehicle expenses	PPML	6.4 (7.5)	1.8 (6.2)	-2.7 (6.3)	-5.7 (7.4)	-4.9 (8.7)	288,536	255.3
Out-of-town travel	PPML	-16.6 (17.9)	-19.9 (16.4)	-100.9*** (18.9)	-48.3** (21.1)	-32.4 (24.2)	188,763	243.5
Personal care	PPML	-7.5 (9.2)	-1.5 (9.2)	-13.8 (9.6)	-1.8 (10.6)	-15.4 (11.8)	247,254	36.9
Pets	PPML	-49.1* (27.1)	-39.2 (30.4)	-40.9 (27.1)	-73.6** (30.8)	-41.9 (37.9)	150,778	65.9
Physician services	PPML	-1.7 (27.8)	23.4 (29.5)	57.5* (29.6)	27.3 (32.2)	-17.5 (44.0)	162,571	36.8
Prescription drugs	PPML	-22.8 (31.5)	-2.5 (31.9)	3.3 (33.0)	-17.2 (35.0)	-50.7 (37.3)	179,470	32.5
Public transportation	PPML	21.7 (33.6)	32.5 (31.8)	-52.1 (33.4)	7.5 (38.1)	-18.2 (42.0)	95,837	135.3
Reading	PPML	10.7 (18.7)	-14.0 (20.3)	-25.5 (20.7)	-13.5 (22.8)	3.2 (28.8)	137,089	14.8
Rent	PPML	-2.7 (3.6)	-1.0 (3.4)	-3.4 (3.4)	-6.9* (4.1)	-5.6 (4.9)	157,294	943.7
Shelter	PPML	-0.5 (3.9)	0.3 (3.4)	-1.0 (3.4)	-3.1 (3.8)	1.2 (5.4)	306,975	1088.2
Small appliances and housewares	PPML	20.6 (24.7)	19.2 (26.0)	-20.2 (26.2)	5.6 (33.3)	-13.8 (38.0)	136,783	13.0
Tobacco	PPML	-33.3* (17.6)	-38.7** (16.9)	-33.0* (17.4)	-19.1 (18.6)	-20.4 (21.0)	76,248	106.2

Category	Estimator	Q−2	Q−1	Q0	Q+1	Q+2	N	Mean, comparison
Total expenditure (OLS, dollars)	OLS	12 (173)	156 (163)	110 (169)	58 (187)	22 (213)	350,285	3861.1
Total expenditure (OLS, dollars)	PPML	0.4 (4.3)	4.4 (4.1)	2.9 (4.2)	2.5 (4.8)	1.2 (5.4)	309,780	4200.8
Toys and games, all purchases	PPML	2.9 (17.2)	-17.2 (17.6)	0.4 (18.0)	7.2 (20.9)	25.6 (22.5)	164,696	30.5
Toys and games, own use	PPML	0.1 (17.7)	-22.3 (18.0)	-4.9 (18.2)	2.1 (21.3)	20.7 (22.8)	149,420	30.6
Toys coded as gifts	PPML	53.0 (72.7)	50.5 (70.9)	61.4 (79.8)	108.8 (79.0)	134.1 (95.0)	34,944	12.9
Transportation, total	PPML	6.4 (17.7)	14.2 (16.9)	0.5 (17.5)	-8.8 (20.2)	-31.4 (21.8)	306,137	860.6
Utilities	PPML	2.9 (2.2)	0.8 (2.3)	3.8 (2.3)	7.4*** (2.7)	6.8** (3.2)	306,308	322.8
Women's apparel (to 2023Q1)	PPML	3.2 (10.9)	1.3 (10.8)	-47.8*** (11.0)	-37.4*** (13.0)	-53.8*** (16.8)	236,541	45.9

Note: Coefficients from equation (5) relative to the conception quarter (Q−3), with standard errors clustered by consumer unit in parentheses. PPML rows report coefficients multiplied by 100 (the proportional change is exp(β) − 1); OLS rows for expenditure report dollars per month; OLS rows for "any" outcomes report percentage points. "Mean, comparison" is the mean monthly value in the comparison group. Categories marked "to 2023Q1" are estimated on months before April 2023. * p < 0.10, ** p < 0.05, *** p < 0.01.

A.3 Attrition after the birth

Table A3. Continuation in the panel after a detected birth

Group	Units	Share observed at next wave (%)
Birth detected at wave 2: observed at wave 3	321	78.2
Birth detected at wave 3: observed at wave 4	325	82.8
Comparison units: wave 2 to wave 3	25743	81.7
Comparison units: wave 3 to wave 4	26081	85.2

Note: For treated units the table reports the share observed at the interview following the detecting interview; for comparison units it reports the share observed at the next interview conditional on being observed at the current one. Attrition before the birth cannot be observed, because a unit that leaves the address before the birth is never detected.

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