Babies as industrial policy*

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Abstract

Large pro-natal subsidies often raise fertility only modestly. This paper applies the textbook case for industrial policy to the household production of children. In a local stationary benchmark, the Pigouvian rate equals the sum of a scale wedge and a fiscal wedge, but its welfare gain depends also on the births induced. A generational model separates that response into direct household demand, the credibility of the promised benefit and an equilibrium multiplier generated by cost-scale, technology and credibility feedbacks. Strong feedback can produce a fertility trap and a fold. Large wedges therefore need not imply large gains, and credible commitment enters twice: it scales the direct response and changes the multiplier.

Keywords: fertility; industrial policy; external economies; directed technological change; political economy

JEL codes: J13; O25; O33

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1 Introduction

Fertility is below replacement in countries containing roughly two-thirds of the world's population (United Nations, 2024). Governments increasingly respond with cash, tax concessions and family services, yet quasi-experimental estimates of their effects on births are generally modest (Bergsvik, Fauske and Hart, 2021). The puzzle resembles the textbook case for industrial policy: a large distortion need not yield a large gain when the intervention reallocates little activity.

This paper makes the analogy precise: household production of children competes with market production for parental time, so a birth subsidy reallocates resources towards a sector with cost-side external economies. The contribution is a sufficient-statistics separation. The local stationary distortion is $\varepsilon + \varphi$, whereas the response to a promised subsidy is $qD/(1 - m)$. The feedback m decomposes into cost-scale, directed-technology and credibility channels. A large wedge can therefore yield small gains when births barely respond; close to a fold, the opposite can occur. The model is a theory of policy transmission rather than of the fertility decline itself: it takes the low-fertility state as inherited and asks why a promised subsidy moves it so little. The trap explains why low fertility persists, not why it arrived.

The argument connects the economics of industrial policy to the economics of fertility. Bartelme et al. (2025) estimate sizeable sectoral scale economies but modest gains from optimal industrial policy because reallocation is small. Galiani and Sosa (2026) instead model a preference-side "empathy" externality and show that a simple Pigouvian subsidy can exceed the general-equilibrium optimum. Multiple fertility equilibria from social interaction are longstanding (Kohler, 2001); the novelty here is not multiplicity per se but the decomposition of the feedback slope. Earlier work also notes that child-benefit reforms may gain or lose credibility (Cohen, Dehejia and Romanov, 2013); here credibility is state-dependent and therefore changes the multiplier. Nakakuni, Tertilt and Yum (2026) provide the recent synthesis of fertility norms. Finally, Acemoglu et al. (2026) provide evidence that smaller birth cohorts induce labour-saving innovation. The model supplies the conditional reverse channel, from automation to the opportunity cost of parental time. It is not a general theory of low fertility: bargaining, partnership, childlessness and career–family compatibility remain outside the representative-household benchmark (Doepke et al., 2023).

2 A minimal model

A unit mass of households in generation t chooses consumption c and children n. The inherited state N_t is the preceding generation's fertility, which summarises the installed care infrastructure, workplace practices and the cohort size to which technology responds. This adaptive timing makes the transition below explicit; a static rational-expectations reading gives the same fixed points but not the adjustment dynamics.

Let $s \in [0, 1)$ be a promised ad valorem stream of benefits over childhood, and let $q(N) \in (0, 1]$ be the share of the promised benefit that parents expect will not be repealed. The schedule q is a reduced-form political-economy object; $q' > 0$ below is a maintained, testable restriction. A household solves

$$\max_{c,n}\ c+v(n) \quad \text{s.t.} \quad c+\big[1-q(N_t)s\big]p(N_t)n \le w\big(\Theta(N_t)\big), \tag{1}$$

where $v' > 0 > v''$. Quasi-linearity deliberately removes the wage income effect. The resource cost of a child is parental time valued at the wage,

$$p(N) = w\big(\Theta(N)\big)\tau\big(N, \Theta(N)\big). \tag{2}$$

Here τ is a real time requirement. Thus $\tau_N < 0$ is a technological or institutional external economy, not a pecuniary fall in the price of childcare: a larger parenting sector supports shared care technologies, viable institutions and parent-compatible practices. Technology is directed, $\Theta' < 0$, because a scarcity of young workers induces labour-saving innovation. Write $p_\theta = w'\tau + w\tau_\theta$ and assume $p_\theta > 0$: automation raises the opportunity cost of the non-automatable component of parental time. This sign is contingent; care-augmenting innovation can reverse it (Greenwood, Seshadri and Yorukoglu, 2005).

Let $h(P) \equiv v'^{-1}(P)$, with $h' < 0$, and define the expected private price

$$P(N;s) = \big[1-q(N)s\big]p(N).$$

Fertility follows the generational map

$$N_{t+1} = \Phi(N_t;s) \equiv h\big(P(N_t;s)\big). \tag{3}$$

Both the scale economy and directed technology make $p_N = w\tau_N + p_\theta\Theta' < 0$, hence $\Phi_N > 0$. State-dependent credibility adds a third feedback if $q'(N) > 0$: higher fertility makes long-lived family commitments more credible.

3 The wedge and the policy base

Define the direct response $D \equiv -h'(P)p > 0$ and decompose the slope of the transition map as

$$\Phi_N = m_\tau + m_\theta + m_q \equiv m, \qquad \begin{cases} m_\tau = h'(P)(1-qs)w\tau_N, \\ m_\theta = h'(P)(1-qs)p_\theta\Theta', \\ m_q = -h'(P)sq'p, \end{cases} \tag{4}$$

where each component is positive under the maintained signs: m_τ is the cost-scale feedback, m_θ the directed-technology feedback and m_q the credibility feedback. Shared practices that spread with sector size are one microfoundation of m_τ; norms in the strict sense—expectations about how one should behave—and preference-side social influence are not modelled.

Proposition 1. *Suppose Φ is a C^2 increasing self-map of $[0, \bar{N}]$. (i) A fixed point exists. (ii) Let a smooth fundamental δ enter Φ and write $H(N; s, \delta) \equiv \Phi(N; s, \delta) - N$. If, at a given δ, the only zeros of H are three interior transversal zeros, the outer two are stable and the middle one unstable. If the upper pair coalesce at (N^*, δ^*), where $H = H_N = 0$, $H_{NN} \neq 0$ and $H_\delta \neq 0$, the pair forms a fold: locally, two fixed points exist on one side of δ^* and none on the other. (iii) At a stable fixed point, with all terms evaluated there,*

$$\frac{dN}{ds} = \frac{q(N)D}{1-m} > 0. \tag{5}$$

Thus credibility scales the direct response by q and, when $q' > 0$ and $s > 0$, changes the equilibrium multiplier through m_q.

The proof is immediate: existence follows from the intermediate value theorem; the absence of boundary zeros, transversality and sign alternation give the stability pattern; the stated non-degeneracy conditions are the local saddle-node conditions; and equation (5) follows by implicit differentiation. A simple sufficient shape condition is that, for some $0 < a < b < \bar{N}$, $m = 1$ only at a and b, with $m < 1$ on $[0, a) \cup (b, \bar{N}]$ and $m > 1$ on (a, b), while $H(0) > 0$, $H(a) < 0 < H(b)$ and $H(\bar{N}) < 0$. The multiplier diverges as $m \uparrow 1$; at a non-degenerate fold, continuation past the branch requires a jump.

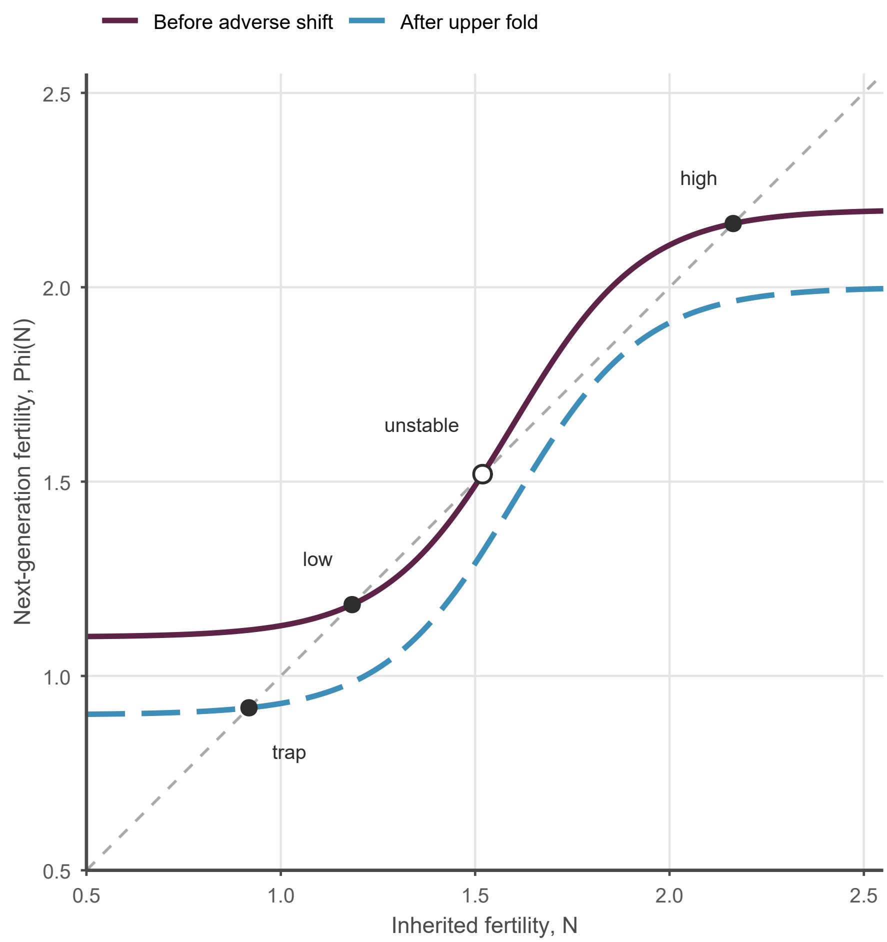

Figure 1: A fertility trap. The solid transition map has two stable fixed points separated by an unstable one. An adverse shift in fundamentals shifts the map to the dashed curve; after the upper fold only the low fixed point remains. A promised subsidy shifts the map upwards at the local rate qD; the equilibrium effect is amplified by $1/(1-m)$. Curves are illustrative.

The welfare wedge is distinct from this policy base. As a deliberately local stationary benchmark, compare an uncorrected stable fixed point with a nearby local optimum, holding technology fixed and ignoring transition costs. At a stationary symmetric allocation, $n = N$. Conditional on θ, adult money-metric welfare is

$$W^{SS}(N;\theta) = w(\theta) + v(N) - p(N;\theta)N + \varphi\bar{p}N,$$

excluding the utilities of unborn children as an $\mathcal{A}$-efficiency comparison (Golosov, Jones and Tertilt, 2007). Lump-sum finance makes the subsidy a transfer. The term $\varphi\bar{p}$ is a child's discounted net fiscal contribution, including the child's own future benefit claims; $\bar{p}$ is held at its pre-policy value and equals p at the evaluation point. Define

$$\varepsilon \equiv -\left.\frac{\partial \ln p}{\partial \ln N}\right|_{\theta} = -\frac{N\tau_N}{\tau}.$$

The household condition under an effective subsidy x is $v'(n) = (1-x)p$. Differentiation at $\bar{p} = p$ gives the planner condition $v'(N) = (1-\varepsilon-\varphi)p$. Linearising marginal surplus between the uncorrected stationary equilibrium and the nearby optimum gives, for $0 < \varepsilon + \varphi < 1$,

$$x^{SS*} = \varepsilon + \varphi, \qquad \frac{\Delta W}{Y} \simeq \frac{1}{2}\sigma_n(\varepsilon+\varphi)\frac{\Delta N}{N}, \quad \sigma_n \equiv \frac{pN}{Y}, \quad Y \equiv w(\theta). \tag{6}$$

The first equality is the single-sector Pigouvian benchmark; the second is its local Harberger triangle, with ΔN denoting movement to the nearby optimum. This is an optimum over nearby stationary equilibria, not a Ramsey transition policy or a comparison across basins, and the approximation is unreliable near a fold. A promised subsidy implements it only if $q(N)s = x^{SS*}$ at the target. Marginal public-fund costs, distribution and general-equilibrium responses can change the optimum. The technology feedback affects multiplicity and the policy base but is excluded from ε: its welfare sign depends on innovation spillovers and, for a small economy, much invention responds to world rather than domestic cohort size.

4 Implications

The first implication is that neither spending nor a reduced-form response is sufficient for welfare. The empirical objects are the wedge $\varepsilon + \varphi$, the direct response D and the three components of m. A policy estimate identifies only $qD/(1-m)$; separating its factors requires independent variation in credibility and the feedback channels. Large pension externalities (Boldrin, De Nardi and Jones, 2015) do not imply large gains if fertility responds little; conversely, a modest instrument near a fold can have a large effect. Nor is the pension channel one-signed: a pension windfall shared within the family is an income transfer, which quasi-linearity deliberately mutes, whereas pensions that release grandparents into childcare lower the time requirement τ and so raise fertility through the cost side.

The second concerns evidence on the technology feedback: Acemoglu et al. (2026) identify the channel from demography to technology, not the reverse channel assumed here. Testing m_θ requires linking automation exposure to parental wages, time use and subsequent fertility. Local adoption may generate this channel even where domestic fertility is too small to redirect global invention. Care-augmenting technology lowers p_θ and can weaken or reverse the feedback.

The third is that commitment and experimentation conflict. The infant-industry problem is that temporary support becomes permanent; the natalist version is permanent support believed temporary (Matsuyama, 1990). Population ageing has shifted political agendas towards older voters and retirement policy (Barilari, Mastrorocco and Paradisi, 2025), motivating, but not proving, $q'(N) > 0$. The mechanism therefore suggests preserving benefit streams promised to existing cohorts while allowing rules for future cohorts to expire or adjust. Durable care infrastructure may similarly constitute a stronger commitment than an announcement. Credibility is a policy-induced complementarity: when $s = 0$, $m_q = 0$, so credibility cannot be a primitive cause of the trap.

5 Conclusion

Treating babies as industrial policy makes the case for natalism an empirical question. The local stationary wedge and the responsive policy base are separate objects. A subsidy raises births through its direct incentive, its credibility and the equilibrium multiplier; only the last becomes singular near a fold. Estimating those components, not comparing spending totals, determines whether babies are a suitable target for industrial policy.

Declaration of competing interest

The author declares no competing interests.

Data availability

Code for the illustrative figure accompanies the submission; the paper uses no external data.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work, the author used Claude Code (Opus 4.8 and Fable 5) and Codex (GPT-5.4 and 5.5) to assist with planning, mathematical verification, figure construction and reference checking. The author reviewed and edited the output and takes full responsibility for the content of the publication.

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