Elaine Drayton

Public economics lectures

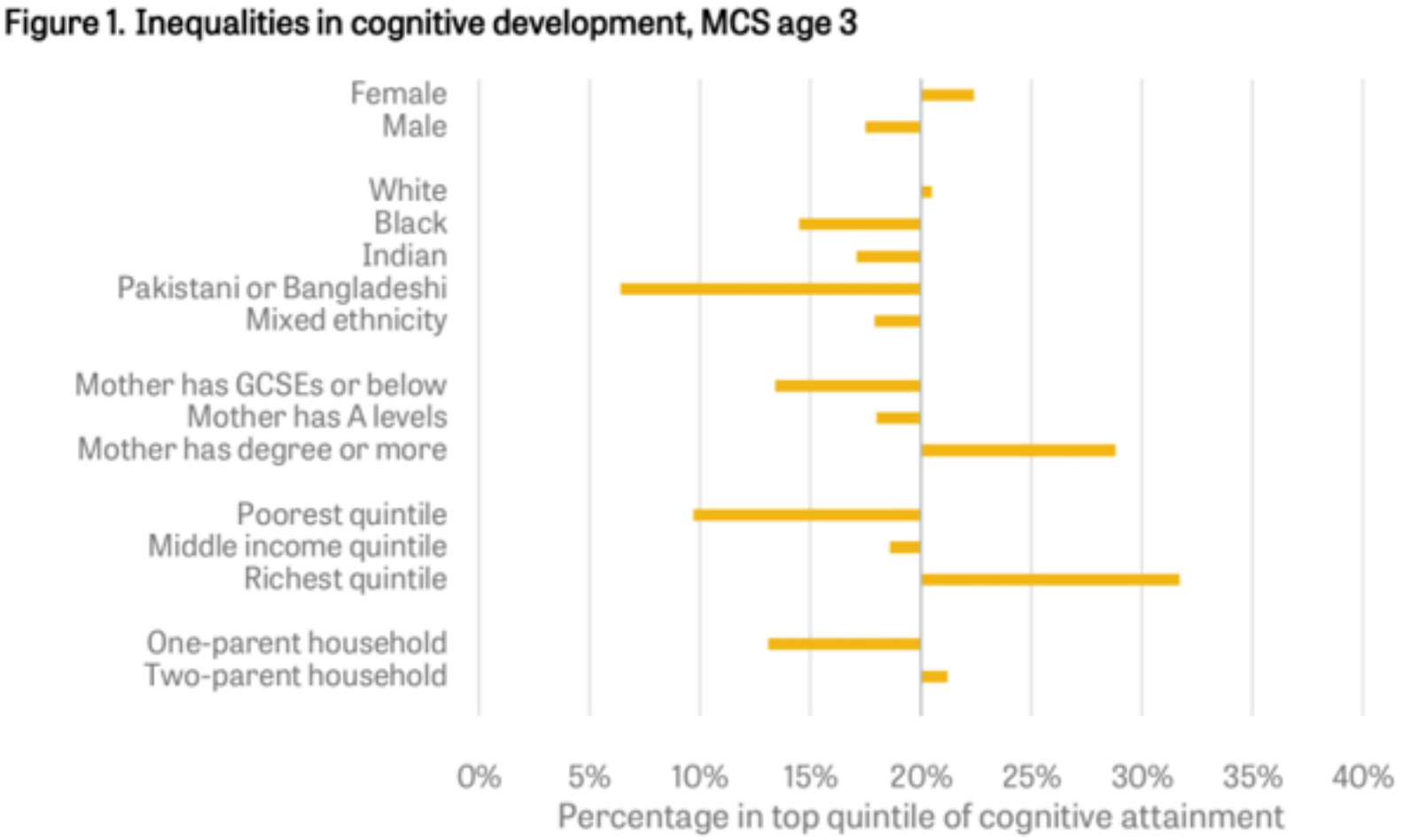
9th January 2025

@TheIFS

The economics of early childhood development

Economic and Social Research Council

Inequalities emerge very early in life….



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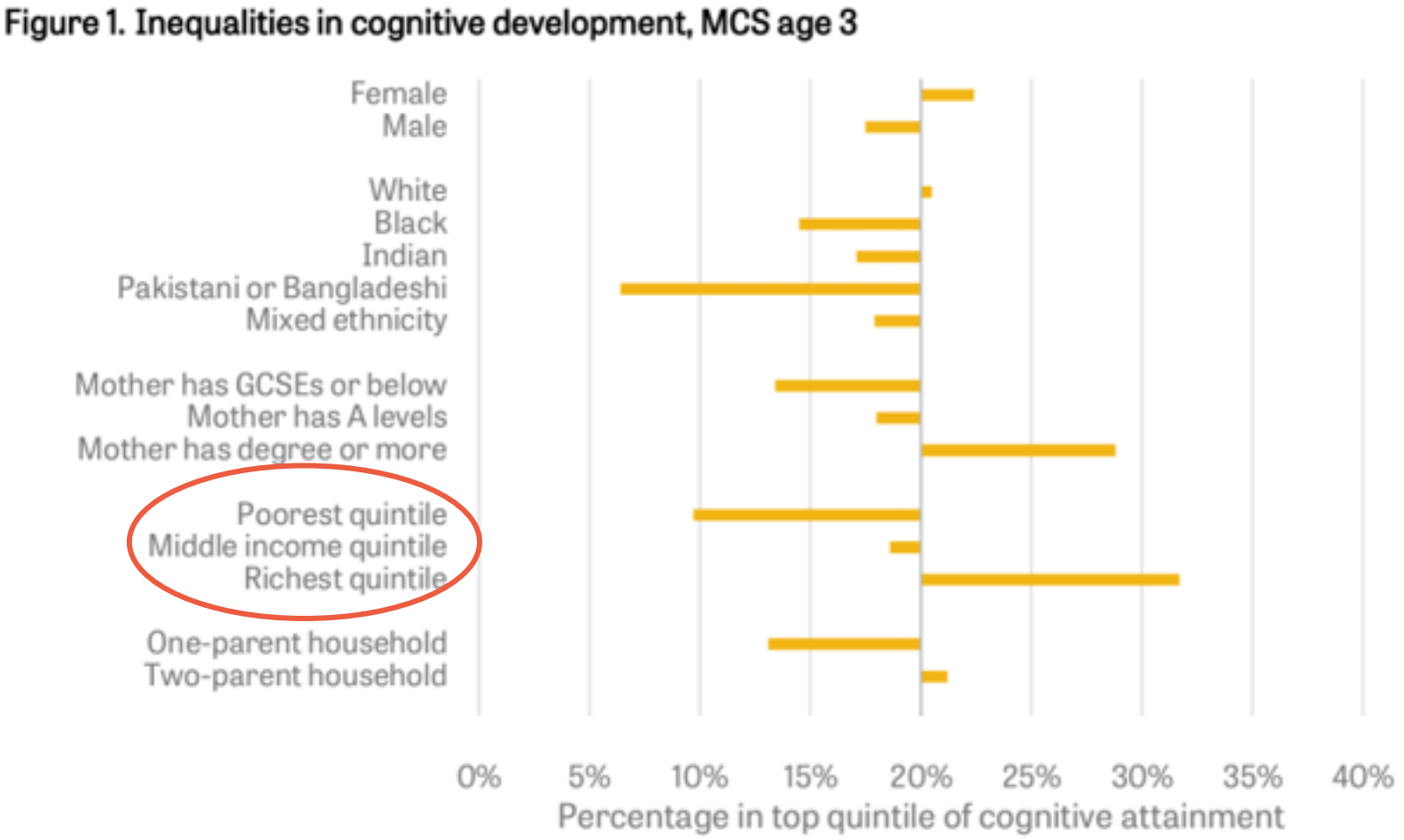
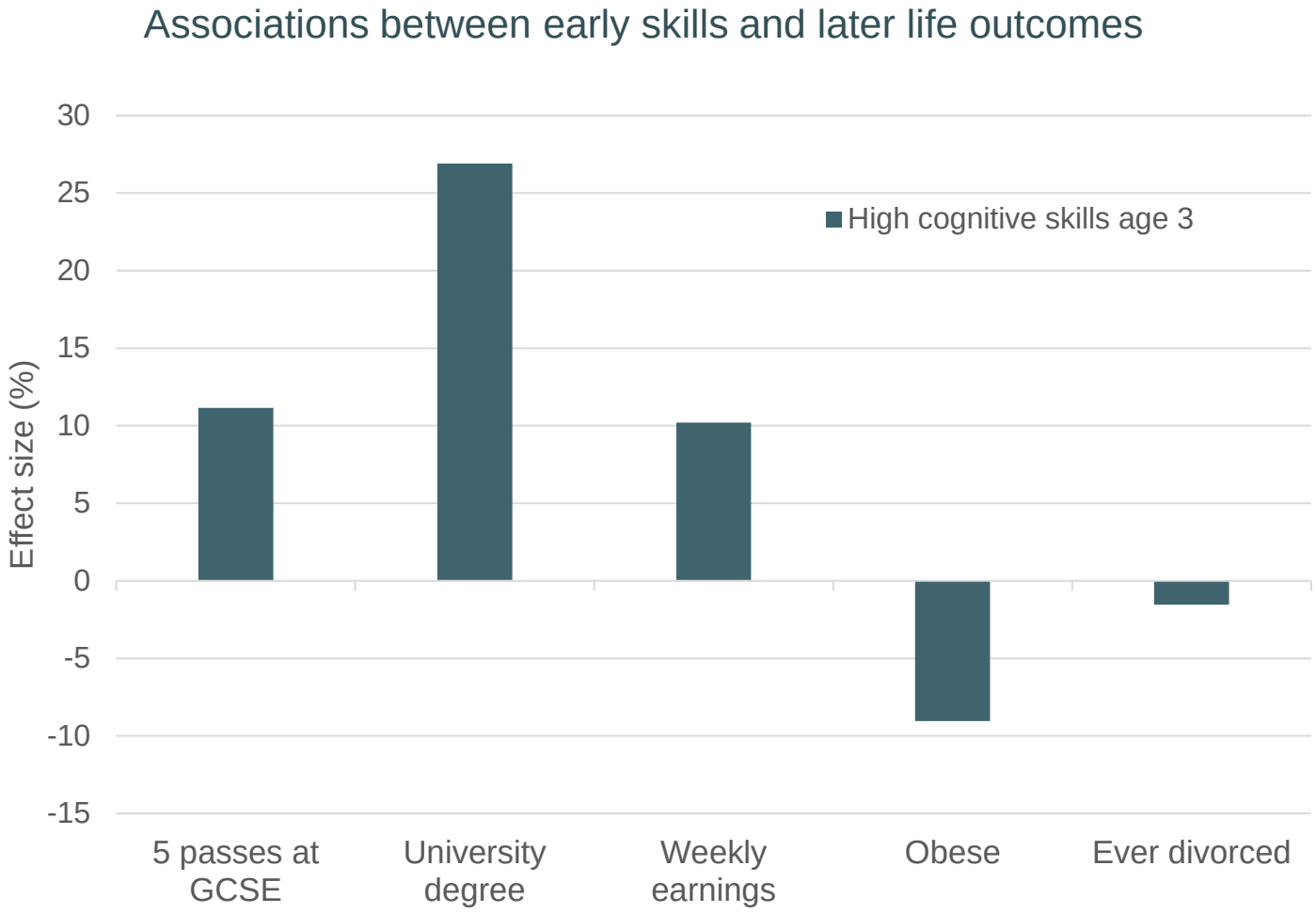
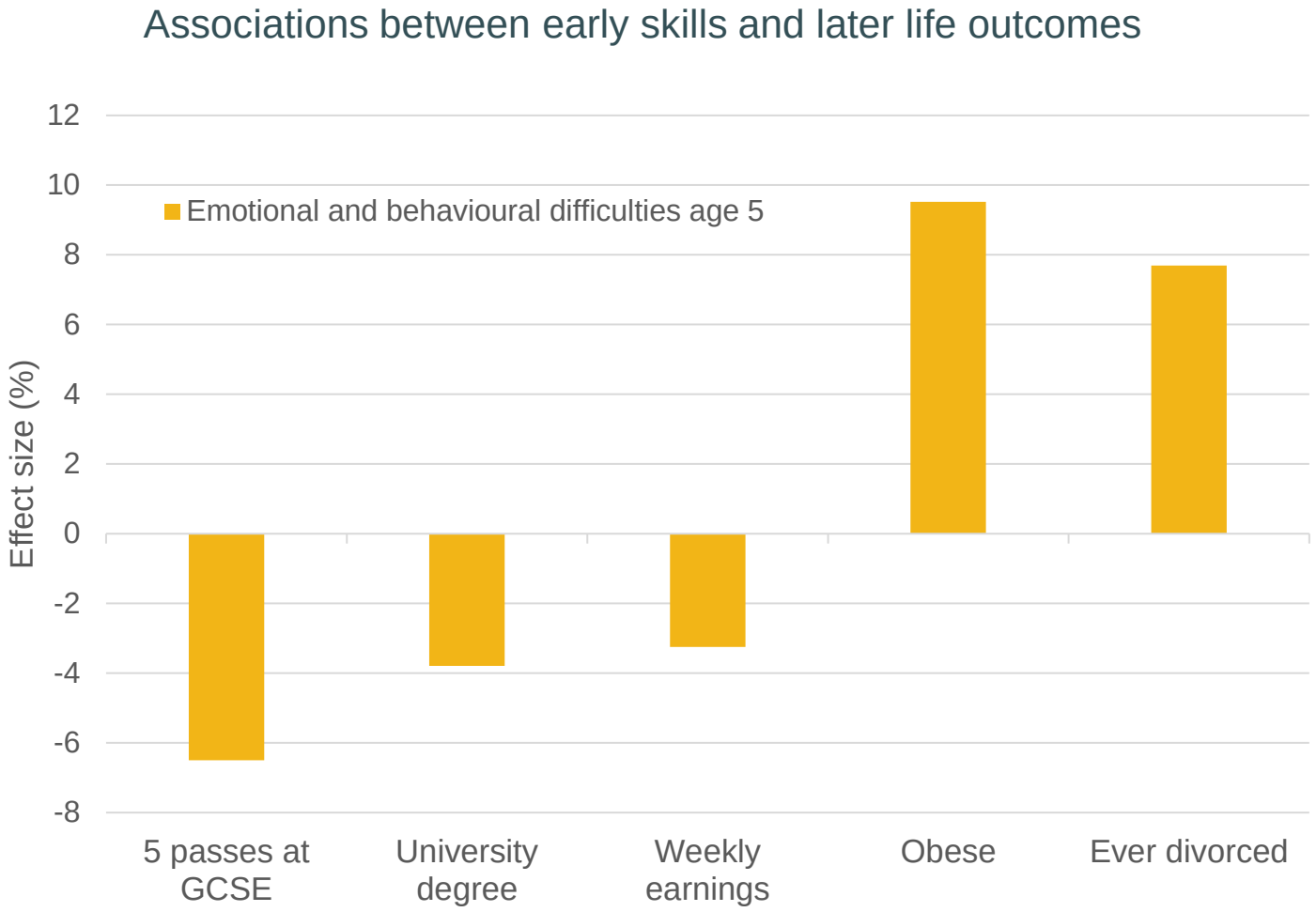


… and persist



Source: adapted from Cattan et al. (2022)
Notes: estimates from regressions of cognitive skills and emotional and behavioural difficulties measured at age 3 or 5 on later life outcomes, controlling for child, family and parent characteristics.

… and persist



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Notes: estimates from regressions of cognitive skills and emotional and behavioural difficulties measured at age 3 or 5 on later life outcomes, controlling for child, family and parent characteristics.

Early years on the political agenda

IFS

> We need to break the cycle of disadvantage so that children born into poverty are not condemned to social exclusion and deprivation. That is why it is so important that we invest in our children.

Tony Blair

Beveridge Speech
18th March 1999

FT FT Adviser

Budget 2023: Hunt announces 30 hours free childcare for all under 5s

The government will extend its free childcare programme to all children between the ages of nine months and five years in England,...

15 Mar 2023

The Independent

Education Secretary says early years is her 'number one priority'

The Government plans to recruit more childcare staff through a 're-energised' recruitment campaign, Bridget Phillipson said.

10 Jul 2024

What can economists add to the study of child development?

Key questions:

- What influences early childhood development (ECD)?
- Why should policymakers care?
- How can policy influence child development?

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The economists' toolkit

- Economic models: simplifications of the world
  - "All models are wrong, but some are useful"
- Economic concepts useful for ECD
- Techniques for robust evaluation of policy
  - How can we know whether a government programme has worked?

Economic framework for child development

Theory of human capital

Key concepts

- Human capital = stock of knowledge and skills that help individuals to be productive
- Skills formation begins in early childhood and can be influenced by “investments”

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- Human capital = stock of knowledge and skills that help individuals to be productive
- Skills formation begins in early childhood and can be influenced by “investments”

Modelling human capital investments

- Initial endowment (genetics, pre-natal investments)
- Parents (or grandparent, teacher etc) invest in child development subject to constraints (technological, material, information)
- Capture features of the development process: dynamic evolution of child human capital, substitutability of investments

Model of human capital investments

Attanasio et al. (2022)

$$\mathbf{H}_{i,a} = F_a(\mathbf{H}_{i,a-1}, \mathbf{H}_{i,a-2}, \ldots, \mathbf{H}_{i,0}, \mathbf{X}_{i,a}, \mathbf{X}_{i,a-1}, \mathbf{X}_{i,a-2}, \ldots, \mathbf{X}_{i,0}, \boldsymbol{\epsilon}_{i,a}),$$

$H_{i,a}$ vector of human capital for child *i* at age *a*

$X_{i,a}$ vector of observable inputs

$H_{i,0}$ child's initial endowment

F_a function representing process of human development

$\epsilon_{i,a}$ vector of unobserved inputs

Parents' investment problem

$$\max_{\{C_t^i, \mathbf{X}_t^i\}_{t=1}^{\alpha}} \sum_{t=1}^{\alpha} \beta^t U_i(C_t^i) + V_i(\mathbf{H}_\alpha^i)$$

$$\text{subject to} \quad \mathbf{H}_t^i = \tilde{\mathbf{f}}_i(\mathbf{H}_{t-1}^i, \mathbf{X}_t^i, \mathbf{Z}_t^i, \boldsymbol{\epsilon}_t^i | \Omega_i),$$

$$A_{t+1}^i = (1 + r_i)A_t^i + Y_t^i - C_t^i - \mathbf{p}_t \mathbf{X}_t^i,$$

H^i_α child development at final age α

C^i_t path of parent's consumption, t = 1, … , α -1

X^i_t path of parental investment, t = 1, … , α -1

Z^i_t , ϵ^i_t observable and unobservable inputs into H^i_t

Y^i_t , A^i_t income and assets

p_t , r_i price of parental investment and interest rate

$\tilde{f}_i(.)$ perceived production function, conditional on information Ω_i

What investments matter?

- Skills are shaped by the environment and investments around the child:
  - Material environments
  - Educational environments
  - Emotional environments
- Poverty interacts with all of these
  - Most obviously through material deprivation
  - Also through time resources and stress
- Broader influences around the child including school, peers - even air pollution

The case for intervention in early years development

Case for intervention

1. **Children don't make their own decisions**
   - Parental (or other adults') choices may be limited by imperfect altruism, information etc

Case for intervention

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2. **We care about inequalities**
   - Equity
   - Efficiency

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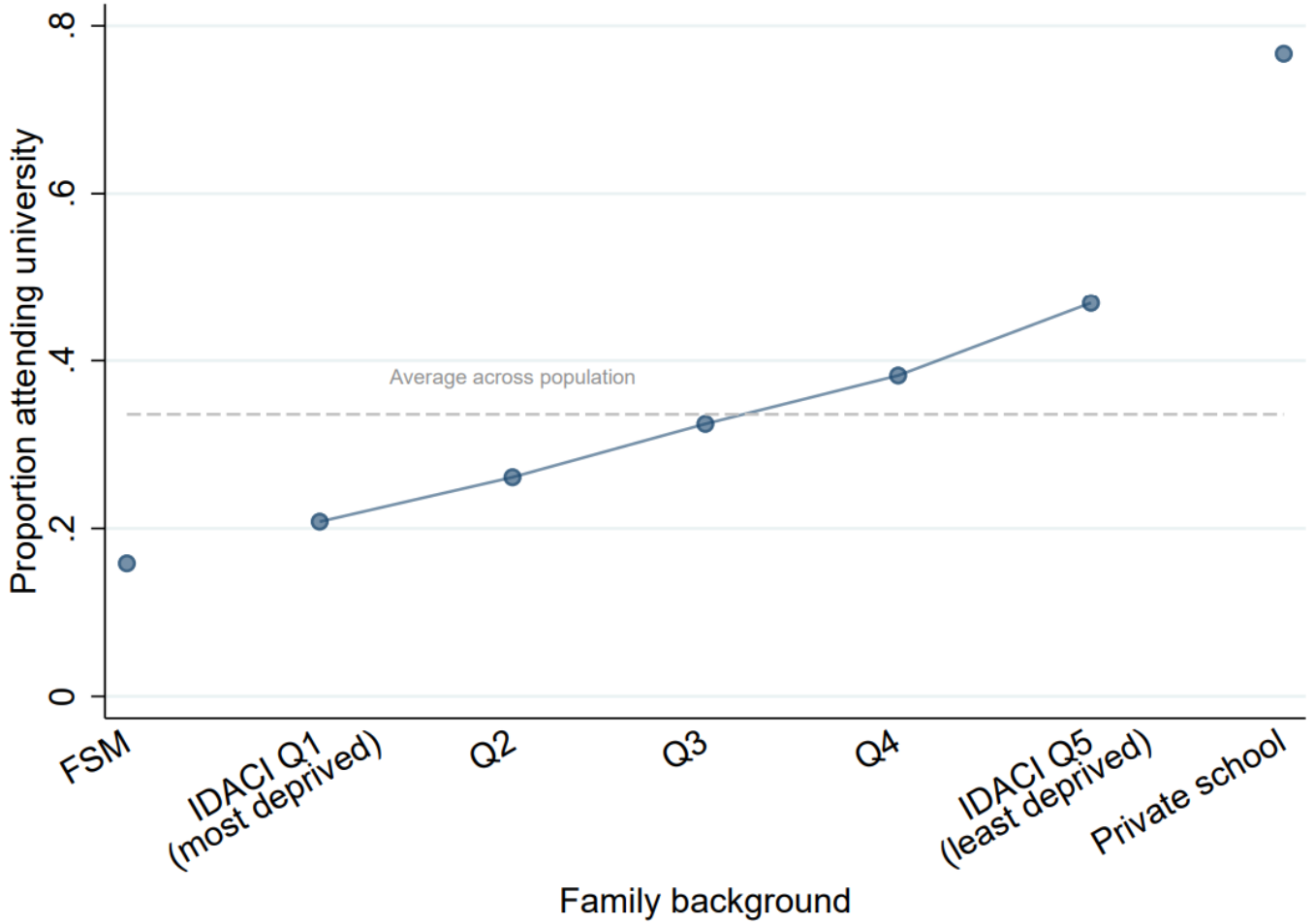
   - Efficiency

Mitigating socio-economic inequalities

University attendance by family background



Source: Britton et al. (2021).
Notes: GCSE cohorts 2002. FSM = free school meals, IDACI = income deprivation affecting children

Case for intervention

1. Children don't make their own decisions
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2. We care about inequalities
   - Equity
   - **Efficiency**

Private and social benefits

- Human capital model highlighted *private* investment decision
  - Underinvestment due to market failures is **inefficient**

Constraints to investment

$$\max_{\{C_t^i, \mathbf{X}_t^i\}_{t=1}^{\alpha}} \sum_{t=1}^{\alpha} \beta^t U_i(C_t^i) + V_i(\mathbf{H}_\alpha^i)$$

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$\tilde{f}_i(.)$ perceived production function, conditional on **information Ω_i**

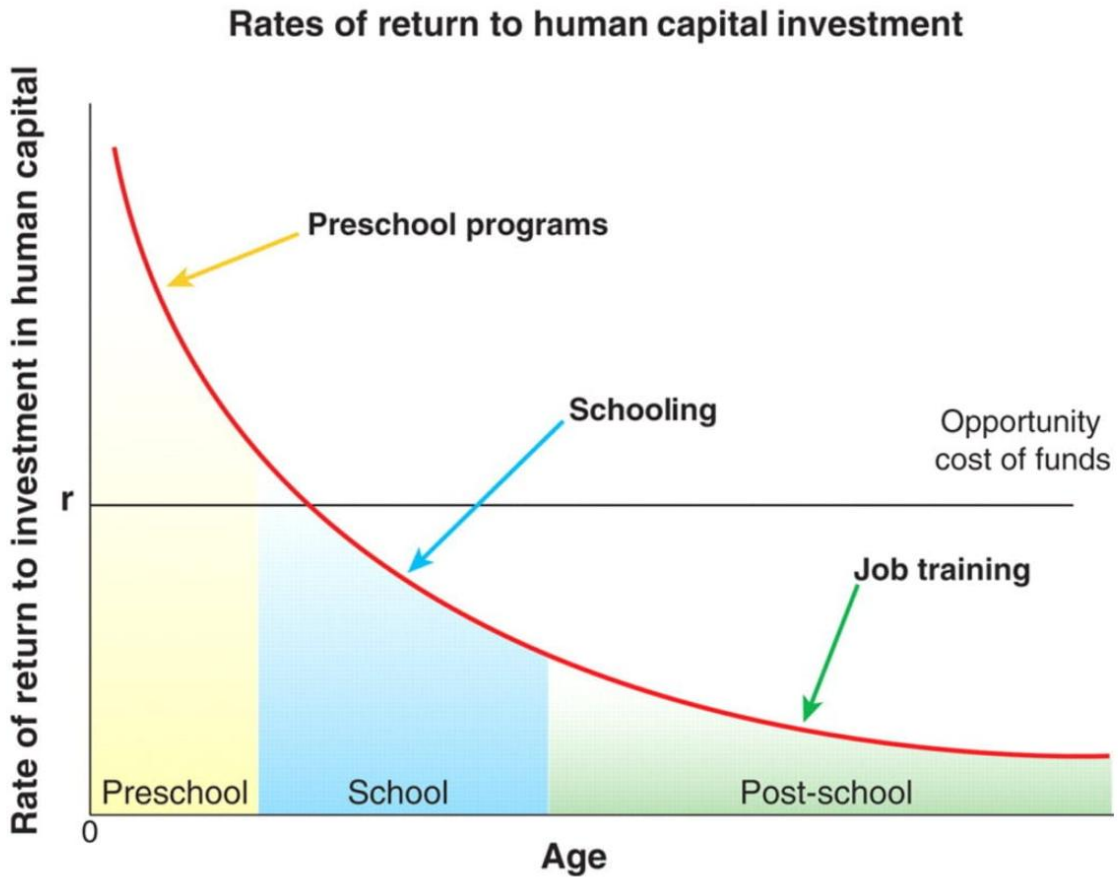
Private and social benefits

- Human capital model highlighted *private* investment decision
  - Underinvestment due to market failures is **inefficient**
- But a more skilled population also benefits society:
  - More productive and innovative, helping to drive economic growth e.g. generating more jobs
  - Higher earners pay more tax which funds public services
  - Less likely to commit crime and tend to be healthier so society pays less money for the NHS, police, prisons etc
- Parents make investment decisions without internalizing wider societal benefits ➔ **also inefficient**

Case for intervention

1. Children don't make their own decisions
   - Parental choices may be limited by imperfect altruism, information etc
2. We care about inequalities
   - Equity
   - Efficiency
3. **The early years are an effective target**
   - Some dimensions of human capital have "sensitive periods"
   - Early development lays the foundations for future skill acquisition (dynamic complementarities)

Higher returns to investing early



Source: adapted from Heckman (2006)

Design of early childhood programmes

Designing interventions

- Human capital model raises some considerations:
  - How do investments interact within and across time?
  - What are the binding constraints?
  - Behavioural responses (or crowding out) / spillovers
- Other considerations when thinking about policies:
  - Deadweight loss
  - How effective / costly are different programmes
  - Practicalities around delivery / scale

Examples of evidence-based early years interventions

Type	Target
Parenting programmes	Socio-emotional skills, child maltreatment
Health visiting	Early health, support for developmental disabilities
Early education and childcare	Cognitive and non-cognitive skills
Integrated family services	Cognitive and non-cognitive skills, physical development
Employment / income support	Cognitive and non-cognitive skills

England’s approach to the early years

Early years policy in England

- Past 25 years have seen huge changes in **scale** and **nature** of investment in early years
- Sustained increases in subsidies for childcare places (for children 2+)
- Accompanied by initial expansion and then decline (since 2010) in family services spending and support targeted to low-income families via the benefits system
- Most recently, government introduced significant expansions in funded childcare places for children in working families

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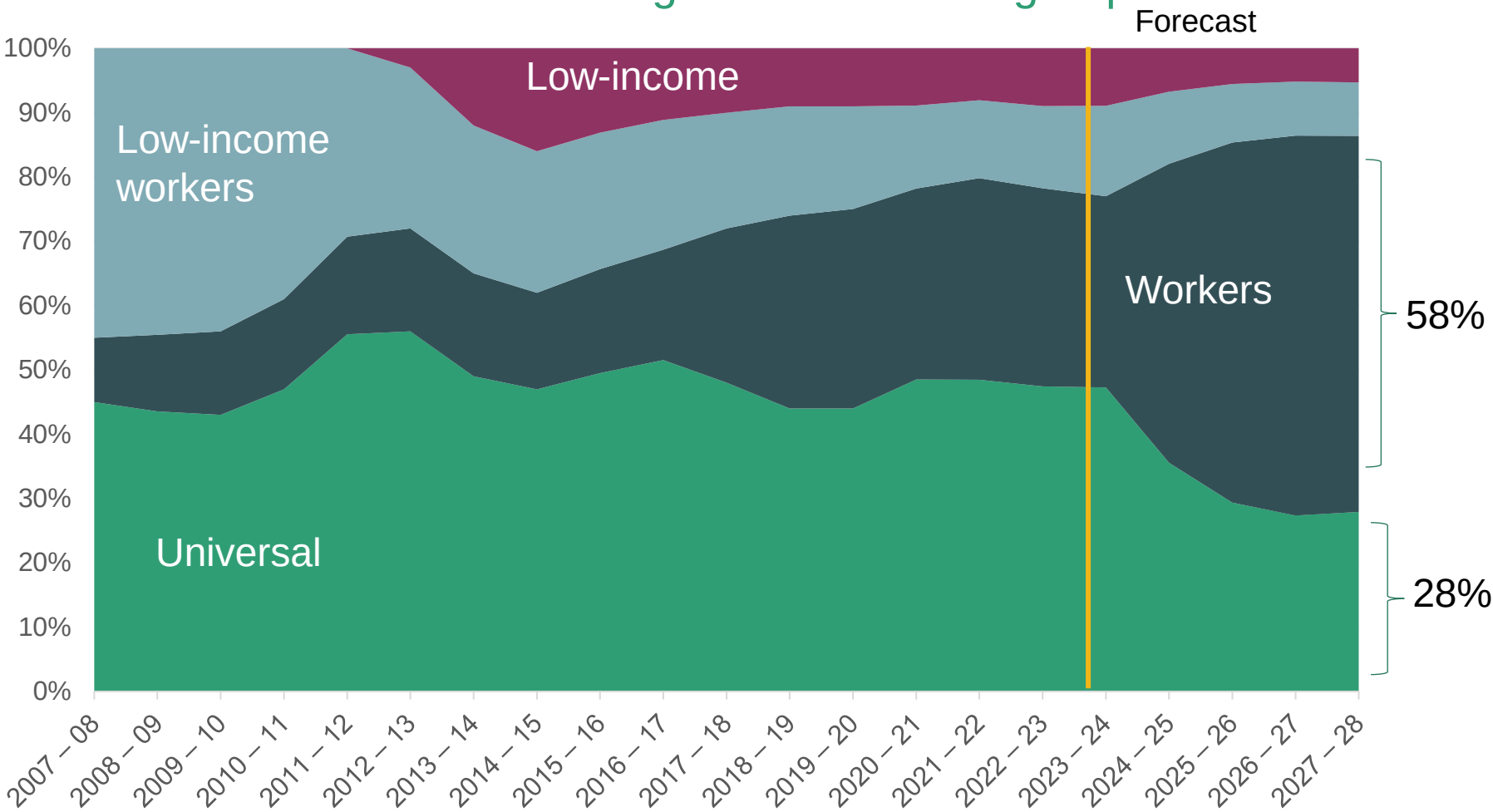
➔ Shift in the prioritisation of efficiency versus equity?

Childcare support ever-more targeted at working families

Share of childcare subsidies targeted at different groups



Source: Adapted from Figure 5, IFS Education Spending microsite – “Early years”.

Is England's spending on children in the early years effective?

Evaluating early childhood interventions

How do these policies impact child development?

- **Naïve approach**: compare the outcomes of children who did and did not use the programme (e.g. childcare)
  - Does this tell us the *causal* effect?
- No! There are other differences between these two groups
- Affluent parents more likely to work and to understand benefits of quality childcare ➔ positive effects driven by selection into treatment

Evaluation challenge

- Economics provides the toolkit for robust, causal inference
- “Gold-standard” randomised control trial
  - High internal validity (how confident we can be that this is the true effect of the programme, as delivered in this context)
  - Less good external validity? (how generalisable are the lessons)

Evaluation challenge

- Economics provides the toolkit for robust, causal inference
- “Gold-standard” randomised control trial
  - High internal validity (how confident we can be that this is the true effect of the programme, as delivered in this context)
  - Less good external validity? (how generalisable are the lessons)
- Alternatively: look for quasi-random assignment of children
  - E.g. exploiting age eligibility cut-offs and variation in rollout over time and space
- Additional challenge: may take many years to see payoffs from early years investments

Case study 1: impact of the “free entitlement”

Blanden et al. (2017) study the impact of the “free entitlement” on test scores

Free entitlement to part-time early education can be used in nurseries/pre-schools or with childminders.

How might free early education affect test scores?

- Early years educators can provide investments into the environments around the child
- Peer effects
- Enable parents to work which boosts family income
  - Possible negative effects from parents working more?

Eligibility cutoffs

For some programmes, eligibility is a function of a child's date of birth, but often not a linear one

- E.g. the "free entitlement" to a childcare place
- This means that some children become entitled at a slightly earlier age than others, based on their month of birth
    - In England, children become eligible in the term *after* they turn 3.
    - Children born just a few days apart are entitled to different amounts of free early education (up to 4 months)

Eligibility cutoffs

Birth month	Eligible month	Age at eligibility (in months)
January	April	39
February	April	38
March	April	37
April	September	41
May	September	40
June	September	39
July	September	38
August	September	37
September	January	40
October	January	39
November	January	38
December	January	37

Eligibility cutoffs

Birth month	Eligible month	Age at eligibility (in months)	Extra months (relative to late starters)
January	April	39	2
February	April	38	3
March	**April**	**37**	**4**
April	**September**	**41**	**0**
May	September	40	1
June	September	39	2
July	September	38	3
August	September	37	4
September	January	40	1
October	January	39	2
November	January	38	3
December	January	37	4

Eligibility cutoffs

Idea: Compare children with different care entitlements at given age

- Using a regression discontinuity design or (with panel data) an individual-level difference-in-difference

Assumption: Month of birth has no other impact on child outcomes

How realistic is this assumption?

- No manipulation of the cutoff
- More plausible the less time apart children are born
- Watch out for if birth-month affects other access to services

Case study 1: impact of the “free entitlement”

Findings

- Strong crowd out effects: only 10% of children start childcare when they become eligible – many were in childcare already or don’t use
- No impact on test scores for children attending additional months of early education

Why?

- Quality
- Marginal difference in attendance – internal vs external validity

Case study 2: health impact of Sure Start

Sure Start centres (SS) were **'one-stop' shops** for families with children under 5

Cattan et al. (2022) study the impact of SS on child hospitalisations

How might SS have impacted hospitalisations?

Case study 2: health impact of Sure Start

Sure Start centres (SS) were **'one-stop' shops** for families with children under 5

Cattan et al. (2022) study the impact of SS on child hospitalisations

How might SS have impacted hospitalisations?

- Health services for children

  ➔ Early identification and support for disabilities / developmental challenges

- Parent-focused activities

  ➔ Improved home environments

- Centre-based services with other children and centre staff

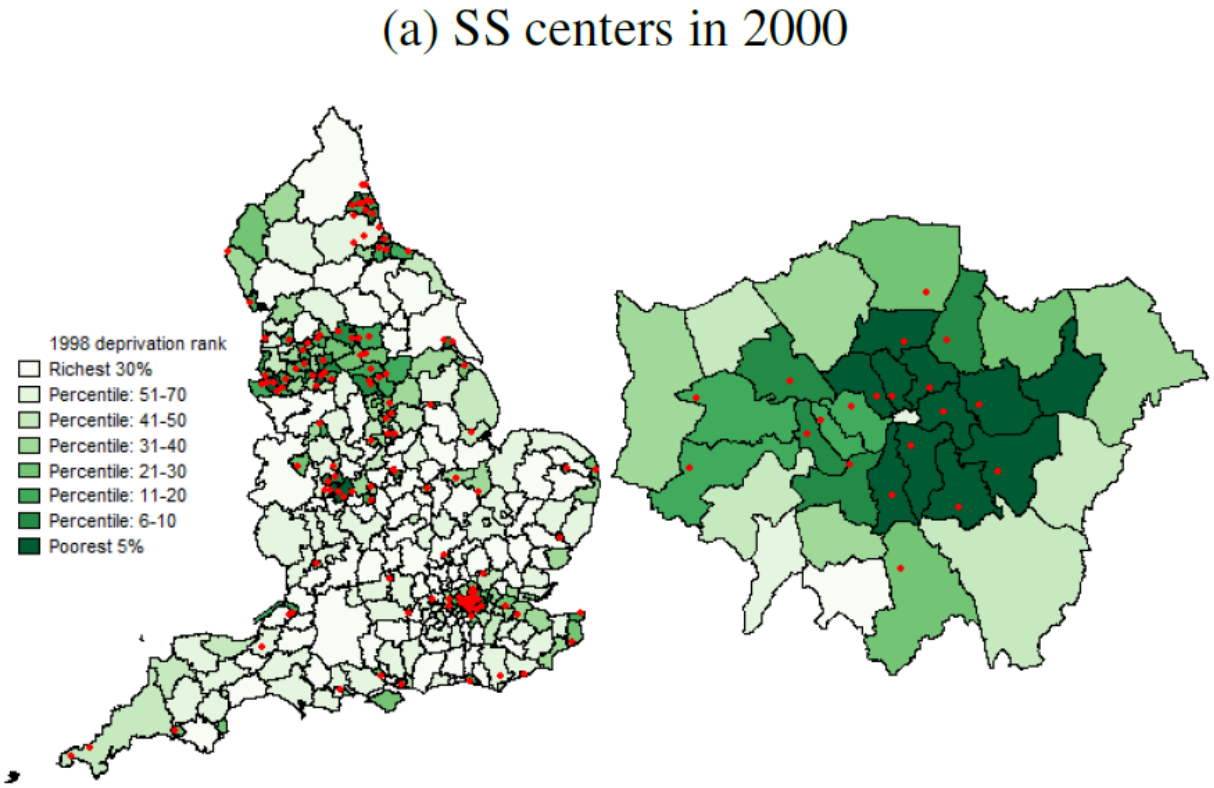
  ➔ Opportunities to screen for concerning parent-child interactions / early building of children's immune systems

Staggered rollout of Sure Start

Many early years programmes are rolled out at different speeds in different areas

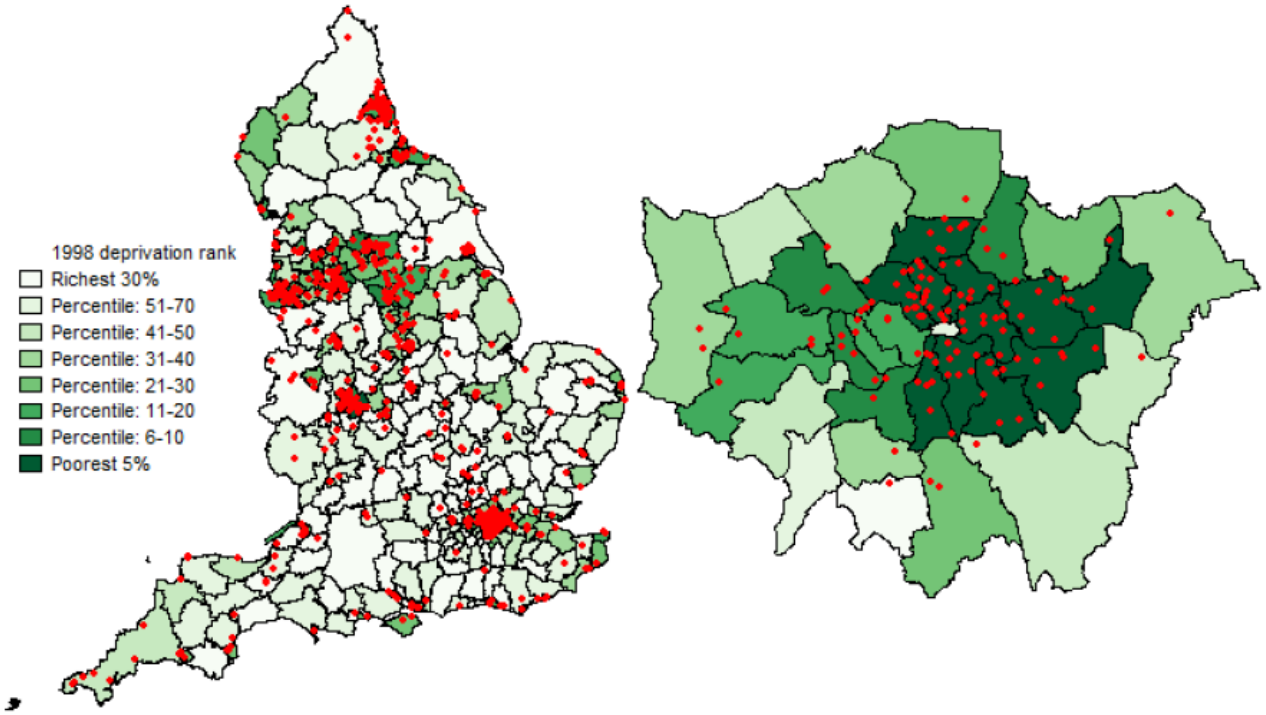
For example, **Sure Start** children's centres

Staggered rollout of Sure Start

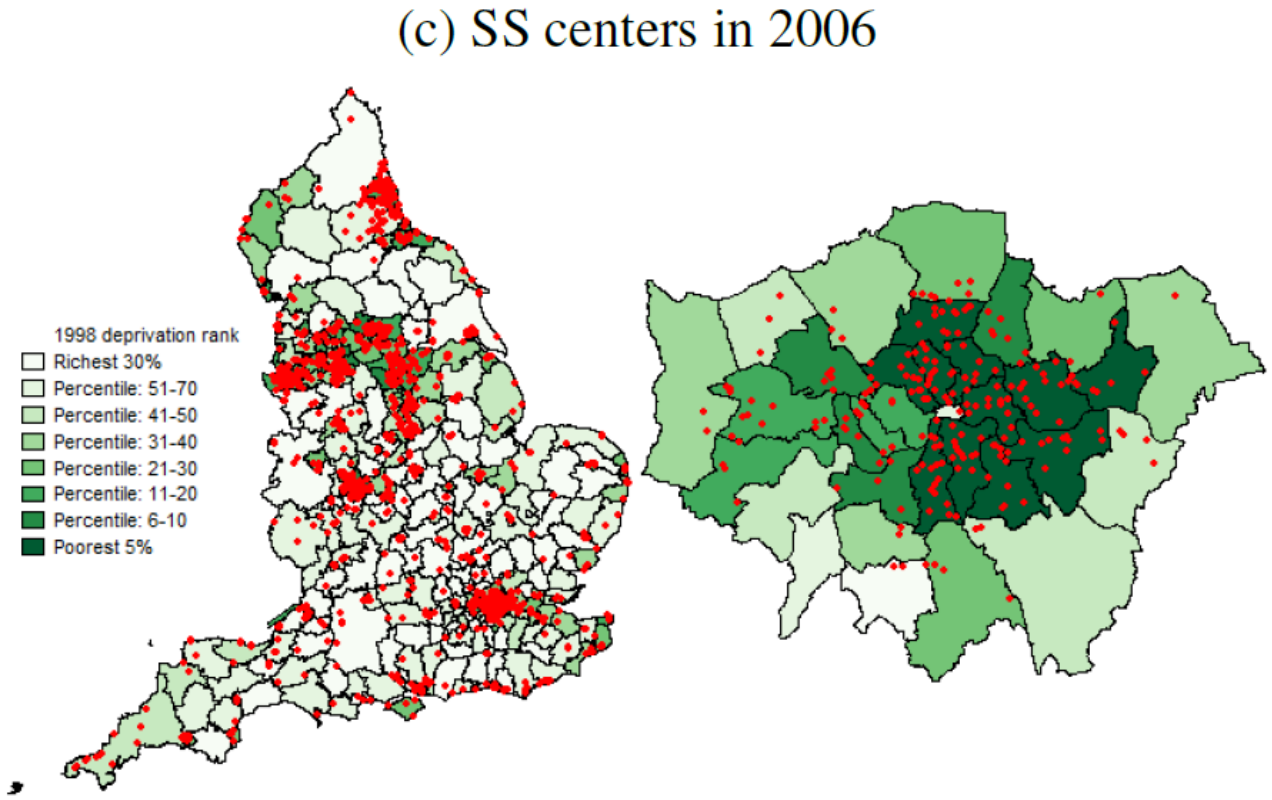


Staggered rollout of Sure Start

(b) SS centers in 2004



Staggered rollout of Sure Start



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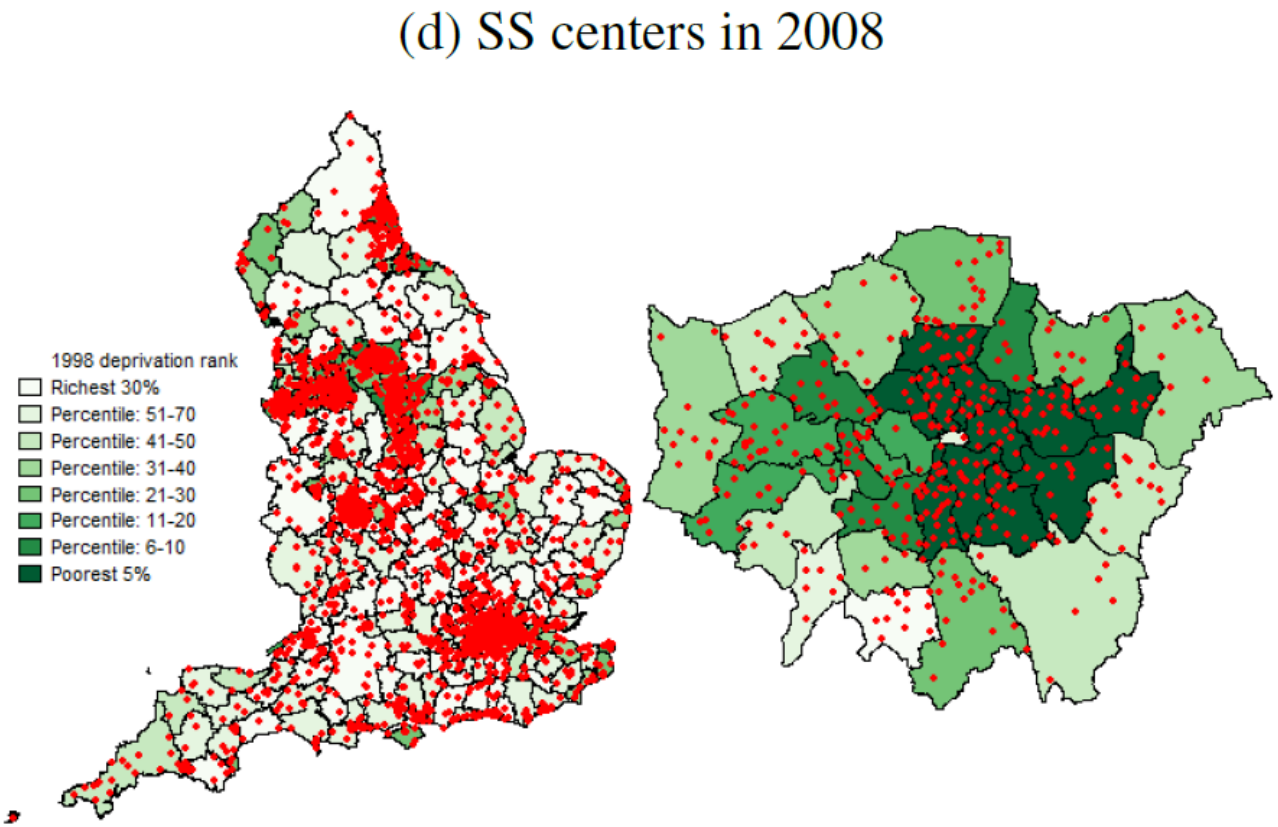


Staggered rollout of Sure Start

Many early years programmes are rolled out at different speeds in different areas

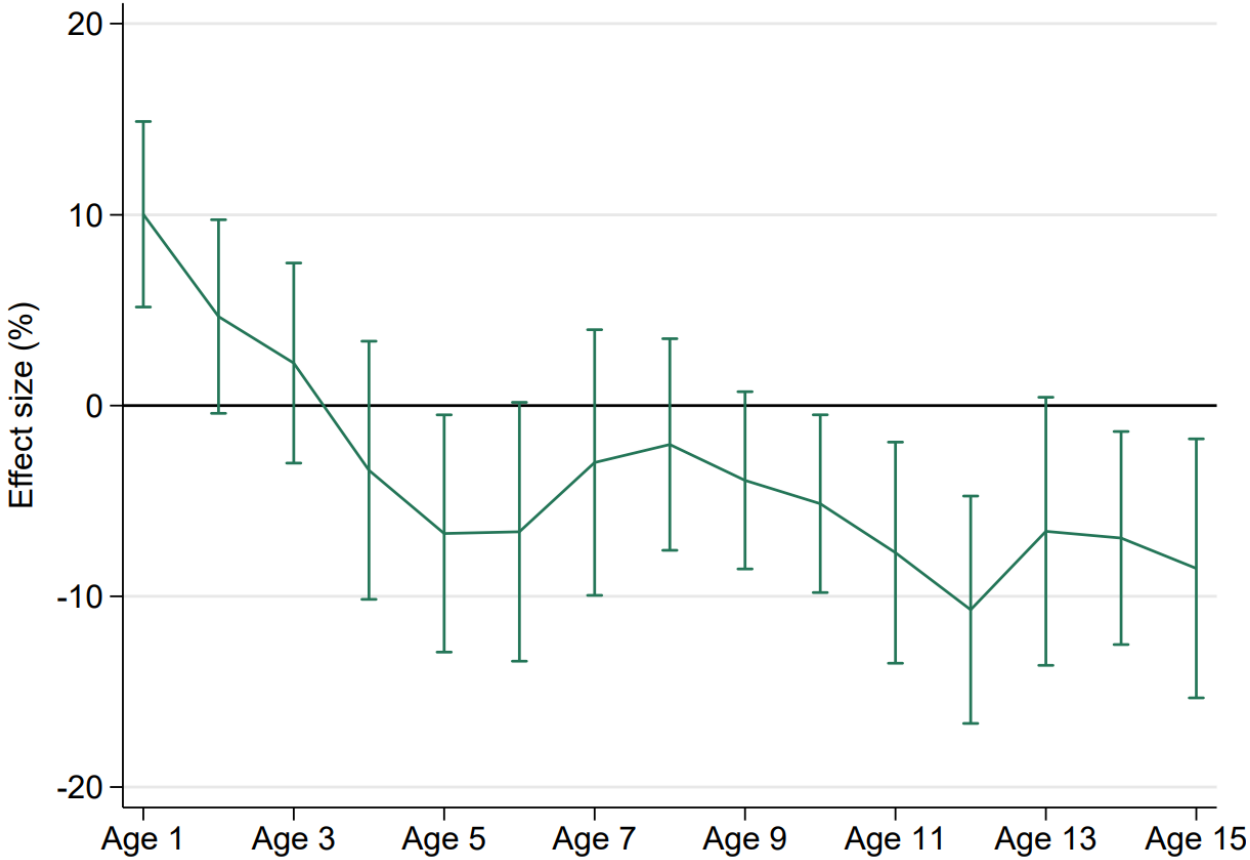
Idea: exploit the *geographic* and *temporal* variation in access to Sure Start

Diff-in-diff: compare different cohorts of children within the same area AND account for differences in outcomes between cohorts (e.g. due to educational, economy-wide changes)

- Key assumption: **common trends**
  - **CT1:** Conditional on observables, different rollout speeds in different areas otherwise unrelated to children's outcomes
  - **CT2:** No spillovers into control group
  - Families don't choose where to live based on the rollout speed

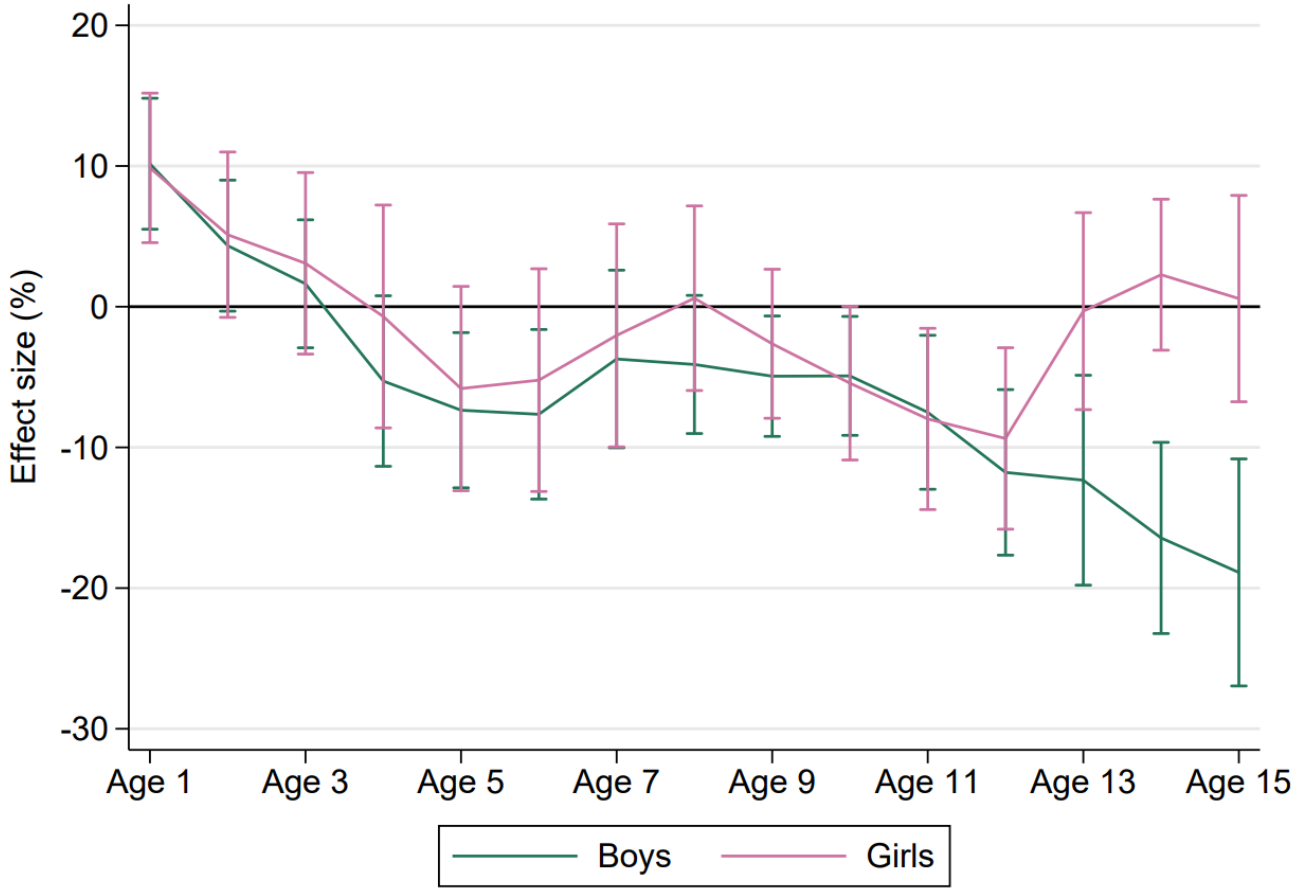
Dynamic treatment effects

Figure 3: Effect of an increase in Sure Start coverage on probability of any hospitalization in the neighborhood, rescaled by baseline probability



Heterogeneous effects

Figure 7: Effect of an increase in Sure Start coverage on probability of any hospitalization, rescaled by baseline probability: Differences by gender



Case study 2: health impact of Sure Start

- Initial increases in hospitalisations at age 1
- Followed by declines over ages 11 to 15
- Reductions more pronounced amongst boys and in poorest areas

Lessons

- Potential mechanisms:
  - Behavioural problems more frequent amongst boys – impacts socio-emotional development?
  - Reductions in preventable injuries suggest reductions in child maltreatment
- Importance of studying medium- and long-run effects
- Successfully brings US programme to the UK: external validity

Thank you!

Public economics lectures

9th January 2025

@TheIFS

Economic and Social Research Council

Inequalities early in life matter

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Table 2. Associations between early development and later outcomes

	Millennium Cohort Study (age 17)		1970 British Cohort Study (age 42)			
	5 GCSEs A*–C	Emotional and behavioural difficulties	University degree	Weekly earnings (incl. 0 for unemployed)	Obese	Ever divorced
Panel A. Unconditional correlations						
Cognitive skills	0.126*** (0.010)	–0.104*** (0.014)	0.117*** (0.006)	53.870*** (4.860)	–0.030*** (0.006)	–0.005 (0.004)
Emotional and behavioural difficulties	–0.083*** (0.011)	0.399*** (0.015)	–0.036*** (0.006)	–18.841*** (4.884)	0.031*** (0.006)	0.009*** (0.004)
R-squared	0.13	0.187	0.072	0.028	0.012	0.001
Panel B. Controlling for characteristics of the child, family and environment						
Cognitive skills	0.079*** (0.009)	–0.068*** (0.015)	0.078*** (0.006)	38.522*** (4.592)	–0.019*** (0.006)	–0.002 (0.004)
Emotional and behavioural difficulties	–0.046*** (0.010)	0.295*** (0.019)	–0.011* (0.006)	–12.245** (4.975)	0.020*** (0.007)	0.010*** (0.005)
R-squared	0.246	0.234	0.181	0.204	0.031	0.017
Panel C. Controlling for characteristics of the child, family, environment, and skills measured in adolescence						
Cognitive skills	0.067*** (0.008)	–0.034*** (0.012)	0.039*** (0.006)	25.880*** (4.642)	–0.013** (0.006)	0.002 (0.004)
Emotional and behavioural difficulties	–0.019* (0.011)	0.081*** (0.017)	–0.003 (0.006)	–7.254 (5.002)	0.018*** (0.007)	0.008 (0.005)
R-squared	0.277	0.503	0.307	0.229	0.035	0.021
Observations	6,592	5,889	5,938	5,444	5,378	7,717
Mean	0.708	–0.180	0.29	377.4	0.21	0.13

Different skills matter for different outcomes

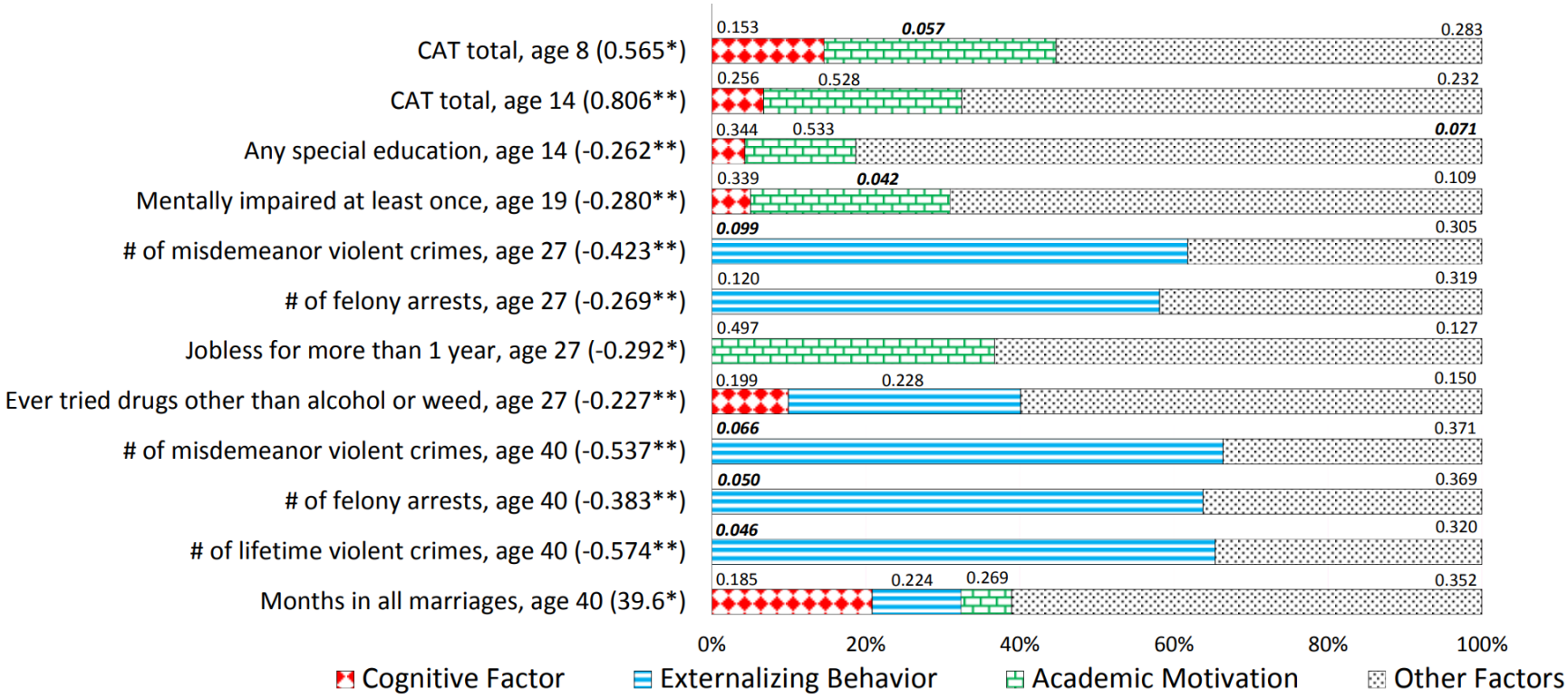

FIGURE 7. DECOMPOSITIONS OF TREATMENT EFFECTS ON OUTCOMES, FEMALES

Source: Heckman et al. (2012)

Evidence-based early years interventions

- Parenting programmes e.g. **Incredible Years** (Scott et al., 2010; 2014)
- Health visiting e.g. **Family Nurse Partnership**
- Early education and childcare e.g. **Perry preschool**, **Free Entitlement** (e.g. EPPSE, 2014; Blanden et al., 2016)
- Integrated family services e.g. **Headstart** (e.g. Garces et al., 2002; Carneiro and Ginja, 2014) **Sure Start** (e.g. Cattan et al. 2022; Anderson et al. , 2023)
- Employment/income e.g. **earned income tax credit** (Bastian and Michelmore, 2018)