Does when you are born matter?

14th March 2012, Institute of Education
Motivation

• Children born at end of academic year have worse exam results, on average, than children born at start of academic year
  – Our previous work: August-borns are 5 percentage points (10%) less likely to achieve 5 A*-C grades at GCSE than September-borns
• This matters because educational attainment is known to have long-term consequences for a range of adult outcomes
  – Probability of being in work
  – Wages
  – Health
  – Criminal activity
• But other skills and behaviours have long-term consequences too, and may also matter for children’s wellbeing in the short-term...
Motivation

- We identify the effect of month of birth on a range of skills, behaviours and experiences amongst young people growing up in England today.
- Through the age at which children start school and sit academic tests – a child’s month of birth may affect other outcomes.
- For example, through the impact on attainment:
  - Enjoyment of school
  - Perseverance
  - Effort and peer group
    - Risky behaviours
- Or through other mechanisms:
  - Experience of bullying
Existing literature

- Being the youngest in the academic cohort is associated:
  - Negatively with **attainment** (Crawford, Dearden & Meghir, 2007)
  - Negatively with **leadership** positions (Dhuey & Lipscomb, 2008)
  - Positively with **SEN** provision (Crawford, Dearden & Meghir, 2007)
    - Only present when assessed by teachers (Sharp, 1995)
  - Positively with the probability of being **bullied** (TellUs survey, DfE, 2010; PIRLS, Mühlenweg, 2010)
Data

- Millennium Cohort Study (MCS)
  - Longitudinal study following around 18,500 children born in the UK around the millennium (we focus on approx. 12,000 born in England)
  - Interviews at 9 months, 3 years, 5 years and 7 years to date
- Avon Longitudinal Study of Parents and Children (ALSPAC)
- Longitudinal Study of Young People in England (LSYPE)
Data

- Millennium Cohort Study (MCS)
- Avon Longitudinal Study of Parents and Children (ALSPAC)
  - Longitudinal study following the children of around 14,000 pregnant women whose due date fell between 1 April 1991 and 31 December 1992, who were resident in the Avon area of England at that time
  - Surveyed via high frequency postal questionnaires; children also take part in clinic sessions during which they undertake a range of tests
- Longitudinal Study of Young People in England (LSYPE)
Data

- Millennium Cohort Study (MCS)
- Avon Longitudinal Study of Parents and Children (ALSPAC)
- Longitudinal Study of Young People in England (LSYPE)
  - Longitudinal study following around 16,000 young people in England who were in Year 9 (aged 13/14) in 2003–04
  - Data collected annually, with information up to age 18/19 available
Methodology

• Simple regression models, including:
  – **Month of birth**: entered using a series of binary variables indicating whether or not a child was born in a particular month; here we focus on the effect of being born in August relative to September
  – **Month of interview**: entered linearly; included to recreate the scenario in which all survey outcomes are recorded on the same day, as is the case for national achievement tests
  – **Individual and family background characteristics**: included to ensure that the children we compare are as similar as possible
    • e.g. gender, ethnicity, parent’s education and socio-economic status, etc
Methodology: month of interview

Note: solid lines show the mean age at wave 3 interview, dashed lines show mean age at FSP.
Methodology: month of interview

Note: solid lines show the mean age at wave 2 interview.
Outcomes presented today

- Academic and cognitive skills and behaviours
- Non-cognitive skills and behaviours
Outcomes presented today

• Academic and cognitive skills and behaviours
  – National achievement test scores;
  – Other measures of cognitive skills, e.g. British Ability Scale test scores;
  – Post-compulsory education participation decisions;
  – Parent, teacher and child perceptions of academic ability.

• Non-cognitive skills and behaviours
Outcomes presented today

- Academic and cognitive skills and behaviours
- Non-cognitive skills and behaviours
  - Children’s perceptions of their own well-being, including whether or not they have been bullied;
  - Parent and teacher perceptions of children’s socio-emotional development;
  - Children’s engagement in a range of risky behaviours;
  - Whether parents respond differently to children born in different months of year, e.g. in terms of child’s home learning environment.
Academic and cognitive skills and behaviours
National achievement test results

- As measured by:
  - Foundation Stage Profile (age 5): total score from teacher assessments of child’s performance across domains including communication, language and literacy
  - Key Stage 1 (age 7): average score from tests in reading, writing and maths (teacher assessed in the MCS; externally assessed in ALSPAC)
  - Key Stage 2 (age 11) and Key Stage 3 (age 14): average score from externally assessed tests in English, maths and science
  - Key Stage 4 (age 16): average score based on eight best results in externally assessed GCSE or equivalent exams

- All scores standardised to have mean zero, standard deviation one
  - Differences reported in standard deviations
National achievement tests: performance of August-borns relative to September-borns

![Bar chart showing standard deviations for different age groups and studies.](chart.png)
Other measures of cognitive skills

• As measured by:
  – Average scores on the British Ability Scale, covering:
    • Vocabulary at age 3
    • Vocabulary, picture similarity and pattern construction at age 5
    • Word reading, pattern construction and maths at age 7
  – Compared to differences in FSP (age 5) and KS1 (age 7) scores
• All scores standardised to have mean zero, standard deviation one
  – Differences reported in standard deviations
Other measures of cognitive skills: performance of August-borns relative to September-borns

- BAS (age 3)
- FSP (age 5)
- BAS (age 5)
- KS1 (age 7)
- BAS (age 7)

Standard deviations

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What if children are tested at the same age?
What if children are tested at the same age?
Aspirations for and participation in post-compulsory education

- As measured by:
  - Binary indicator for whether the young person plans to stay in full-time education beyond age 16, reported at age 14
  - Binary indicator for whether the young person is in full-time education at age 17 (first post-compulsory year)
  - Binary indicators for whether the young person is enrolled on a vocational or an academic course (not mutually exclusive)

- Differences reported in percentage points
Aspirations for and participation in post-compulsory education: beliefs and actions of August-borns relative to September-borns

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Aspirations for and participation in higher education

• As measured by:
  – Binary indicators for whether the young person thinks they are “very likely” to apply to university (or college in ALSPAC) at some point in future, reported from age 14 onwards
  – Binary indicator for whether the young person goes to university at age 19 (the first year in which they are eligible)
  – Binary indicator for whether the young person attends a Russell Group institution at age 19

• Differences reported in percentage points
Aspirations for and participation in higher education: beliefs and actions of August-borns relative to September-borns

Very likely to apply (age 14)

Very likely to apply (age 14)

Very likely to apply (age 16)

Very likely to apply (age 18)

Goes to university (age 19)

Russell Group university (age 19)

Percentage points

ALSPAC

LSYPE
Parent and teacher perceptions of academic ability

• As measured by:
  – Binary indicators of whether the child’s class teacher reports that they are below average in reading, writing and maths at age 7
  – Binary indicators of whether the child’s parent reports that they have difficulty with reading, writing or maths at age 7

• Differences reported in percentage points
Parent and teacher perceptions of academic ability: August-borns relative to September-borns

- Teacher: below average in reading
- Teacher: below average in writing
- Teacher: below average in maths
- Parent: difficulty reading
- Parent: difficulty in maths

Percentage points

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Child’s perception of themselves and value of school

• As measured by:
  – Scholastic competence: total score created from child’s responses to statements such as “Some children are slow to finish their school work”
  – Ability beliefs: total score created from children’s responses to questions such as “How good are you at maths?”
  – Self-worth: total score created from child’s responses to statements such as “Some children are very happy the way they are”
  – Locus of control: total score created from child’s responses to statements such as “Planning ahead makes good things happen”
  – Value of school: total score created from child’s responses to statements such as “School work was usually worth doing”

• All scores standardised to have mean zero, standard deviation one
  – Differences reported in standard deviations
Child’s perception of themselves and value of school: August-borns relative to September-borns

- Scholastic competence (age 8)
- Ability beliefs (age 14)
- Self-worth (age 8)
- Locus of control (age 8)
- Locus of control (age 15)
- Value of school (age 17)

Standard deviations

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Summary

- Large and significant differences between August- and September-borns in terms of academic and cognitive skills
  - Slightly larger in national achievement tests than in other measures such as the British Ability Scales (though not significantly so)
  - Particularly pronounced when performance is teacher assessed
  - Absolute magnitude decreases as children get older, suggesting August-borns are ‘catching up’ with their September-born peers

- Reflected in young people’s beliefs about their own ability and the extent to which they are able to control their own lives
  - But not in self-worth or perceived value of schooling

- Also reflected in choice of qualifications during post-compulsory education and type of university attended
  - May leave August-born pupils at a disadvantage in their working lives
Non-cognitive skills and behaviours
Non-cognitive skills and behaviours

• We consider month of birth differences in:
  – Children’s perceptions of their own well-being, including whether or not they have been bullied;
  – Parent and teacher perceptions of children’s socio-emotional development;
  – Children’s engagement in a range of risky behaviours;
  – Whether parents respond differently to children born in different months of year, e.g. in terms of child’s home learning environment.
Child’s feelings about school

• As measured by:
  – Binary indicators for whether the child reports not liking school at ages 7 and 8 or liking school at age 14
  – Binary indicators for whether the child reports being unhappy at school at ages 7 and 14
  – Binary indicator for whether the child has ever played truant by age 14

• Differences reported in percentage points
Child’s feelings about school: experience of August-borns relative to September-borns

- Doesn’t like school (age 7)
- Doesn’t like school (age 8)
- Doesn’t like being at school (age 14)
- Always unhappy at school (age 7)
- Unhappy at school (age 14)
- Plays truant (age 14)

Percentage points

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Incidence of bullying

- As measured by:
  - Binary indicator of whether the parent reports that their child has been bullied several or many times at school at age 7
  - Binary indicators for whether the child reports that they are bullied “sometimes” or “always” at age 7
  - Binary indicator for whether the child has experienced events such as being hit which indicate bullying at ages 8 and 10
  - Binary indicator for whether the child scores in the top 25% of a bullying scale – created using responses to questions such as “have you ever been called names?” – at ages 14 and 16
- Differences reported in percentage points
Incidence of bullying: experience of August-borns relative to September-borns

- Parent: sometimes (age 7)
- Child: always (age 7)
- Child: always or sometimes (age 7)
- Child: always (age 8)
- Child: always (age 10)
- Child: always (age 14)
- Child: always (age 16)

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Socio-emotional development

- As measured by:
  - Parent and teacher reports of the child’s socio-emotional development based on the Strengths and Difficulties Questionnaire
  - Total score based on responses to questions on: emotional development, conduct, hyperactivity and relationships with peers
  - We reverse this score to make it a measure of “strengths” rather than “difficulties”
- All scores standardised to have mean zero, standard deviation one
  - Differences reported in standard deviations
Socio-emotional development: performance of August-borns relative to September-borns
Smoking, drinking and cannabis use

As measured by:

- Binary indicators for whether the young person smokes at least sometimes at ages 14 and 16
- Binary indicators for whether the young person has drunk alcohol at least once a month over the past year, reported from ages 14 to 18
- Binary indicators for whether the young person has ever tried cannabis by ages 14, 16 and 18

Differences reported in percentage points
Smoking and cannabis use: behaviour of August-borns relative to September-borns

- **Smokes sometimes**
  - Age 14
  - Age 14
  - Age 16

- **Has ever tried cannabis**
  - Age 14
  - Age 14
  - Age 16
  - Age 18

- ALSPAC
- LSYPE

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Alcohol consumption: behaviour of August-borns relative to September-borns
Parental investments

- As measured by:
  - Home learning environment: total score created from responses to the frequency with which parents undertake various activities – such as reading, painting and drawing, telling stories or singing – with their child at ages 3, 5 and 7
    - All scores standardised to have mean zero, standard deviation one
    - Differences reported in standard deviations
  - Binary indicators for whether the parent paid for extra lessons in school subjects – including English and maths – at ages 7 and 14 to 16
    - Differences reported in percentage points
Home learning environment: experience of August-borns relative to September-borns

![Bar chart showing standard deviations for different ages and datasets (MCS, ALSPAC).]
Paying for extra lessons for child: experience of August-borns relative to September-borns

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Can high-SES families offset disadvantage?

Wave 3: Total BAS

- Lowest income quintile
- 95% CI
- Highest income quintile
- 95% CI
Can high-SES families offset disadvantage?

Wave 4: Total BAS

- Lowest income quintile
- 95% CI
- 95% CI
- Highest income quintile
- 95% CI
- 95% CI
Summary

• We find significant month of birth differences in a range of non-cognitive skills and behaviours

• Relative to September-borns, August-borns are:
  – Reported to have lower socio-emotional development by both parents and teachers
  – More likely to report that they are unhappy at school and subject to bullying – but only at younger ages (the differences do not persist)
  – Less likely to have smoked, drunk alcohol or ever tried cannabis as young teenagers – but these differences tend to decrease over time

• Parents of August-borns also provide a richer home learning environment than parents of September-borns at ages 5 and 7
  – Suggests parents may be ‘compensating’ for the disadvantages faced by their August-born children in school
Conclusions

• We find significant differences between the outcomes of children born in August and September across a range of cognitive and non-cognitive skills and behaviours

• This is of concern for at least two reasons:
  – Some outcomes – such as unhappiness at school or experience of bullying – matter for children’s wellbeing in the short-term
    • Suggests the government should be concerned about the wider educational experience of summer-born children for reasons other than test scores alone
  – Some outcomes – such as the choice between academic and vocational qualifications, the quality of university attended or the extent to which you believe you control your own destiny – have implications for the chance of being in work and subsequent wages
    • Suggests that August-born children may end up doing worse throughout their working lives, simply because of the month in which they were born
Next steps

- What drives the month of birth differences we observe?
  - Age of sitting the test (absolute age);
  - Age of starting school;
  - Length of schooling;
  - Age position (relative age).

- Will provide insight into the most appropriate policy responses to help summer-born children; expect to report results in 2012.

- Also planning to investigate whether month of birth affects outcomes into adulthood using “Understanding Society”