

The Impact of Parental Income and Parental Education on the Schooling of Children

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Motivation

- Long history of research on intergenerational mobility in social science
 - Earnings elasticity of father and son's earnings:
 - 0.40 - 0.50 in US (Solon, 1999), 0.60 in UK (Dearden et al 1997)
 - International Comparisons:
 - Bratsberg, Roed, Raaum, Naylor, ,.... and Osterbacka (2007)
 - Elasticity of educational mobility:
 - 0.25 to 0.40 in UK (Dearden et al., 1997)
- Mechanism?
 - Is it causal?
 - Is it parental education or income or both that matters?
- UK policy context
 - Raising min SLA to 18, abolish child poverty

Wider context

- Private returns to education widely studied
 - High returns suggest possible underinvestment
 - So encouraging more human capital formation might be welfare improving
- Growing literature on social returns:
 - Health and education.
 - Deaton and Paxson (1999), Lleras-Muney (2002).
 - Currie and Moretti (2002) – Mother’s education and child birth weight in developing world and US.
 - “Social Capital” and Education.
 - Denny (2003), Milligan, *et al* (2003)
- Children’s human capital
 - An externality of sorts
 - Survey of correlation studies by Haverman and Wolfe (**JEL** 1995)
 - Suggest strong associations

Intergenerational Transfer: Nurture, Nature, or what?

- Better educated are better at parenting
 - Higher home productivity as well as in the paid marketplace
- Better educated make better investments
 - Including investing in the human capital of their children
- Better educated are better peers
 - Cultural transmission
- Better educated have better genes
 - Unobserved characteristics of the parents may be genetically transmitted to the children.

Literature Review

Children of identical twins

- Eliminates (half of) the nature effects?
 - As genetically alike as siblings
 - but cousins – so (slightly) different nurture
- Behrman and Rosenzweig (**AER** 2002, 2005) and Antonovics and Golberger (**AER** 2005)
 - Differences between the children of US MZ twins
 - Small effect of father's education, no effect of mother's
 - But terrible data
- Bingley and Jensen (**ESPE**, 2008)
 - Much better data
 - Conventional effects of DZ mother's education
 - no effect of MZ mothers

Literature Review

Adoptees

- Eliminates the nurture effect?
 - But selective adoption? Differential treatment?
- Mostly small samples
 - Sacerdote (2002), Dearden *et al* (1997)
 - Small effect of adoptive father's educ on adopted sons
 - About the same as on natural sons
- Two bigger datasets control for selection
 - Sacerdote (2007)
 - Korean adoptees randomly assigned to US parents
 - Some impact of adopted mother's education
 - But very small when father's education included
 - Bjorklund *et al* (**QJE** 2006)
 - Swedish data registers
 - Use pre-adoption info to control for selection
 - Finds post-adoption mother's education matters (a little)

Literature Review

Instrumental Variables

- Identifies causal (nurture) effect?
 - Most studies focus on RoSLA as an IV (Harmon & Walker, **AER**, 1995)
- Black, Devereux and Salvanes (**AER**, 2005)
 - Cross sectional variation in SLA in Norway
 - Uses completed schooling
 - OLS supports evidence of impact, IV does not
 - but (weak) evidence of mother/son influences
 - Effect of 0.12 years for low education sample
- Oreopoulos, Page and Stevens, (**JoLE** 2006)
 - Cross sectional variation in Min SLA in USA:
 - Outcome is grade repetition:
 - OLS and IV
 - Significant effects for **sum of** parent's educations
 - Insignificant when entered separately
- Other studies
 - Grade repetition in HE
 - Carneiro *et al* (2007)
 - Maurin and McNally (2008)
 - Suggestive of an effect that parental HE has an effect, but weak IVs

Does money matter?

- Shea (2000): union status as IV
 - big effects of income on child's subsequent wages (for low educated fathers)
- Carneiro/Heckman (2002): Credit constraints
 - long term factors (parental education) matter for college attendance
 - not current parental income
- Jenkins and Schluter (2002): school type
 - Correlation
 - later income matters more than early income
 - but small effect compared to parental education
- Dearden *et al* (2002) : EMA
 - Matched group evidence
 - Payment increases participation by about 6%

This paper

- Effects of parental education **and** income **on the probability dropping out** (at age 16)
 - Intermediate outcome, but an important one in the UK
 - Empirical work- QLFS
 - OLS – education and income have usual effects
- Endogeneity – **causal** effects of education **and** income
- Aim of study: **disentangle the effects!**
- IV estimates
 - Maternal education matters for daughters
 - Paternal earnings matters for sons (and maybe daughters)

Endogeneity and IV

- Parental schooling and the error term are correlated
 - RoSLA provides RD – no x-section variation but
 - control for smooth cohort effects in parental job
 - narrow the window around reform
 - LATE
 - Parental education affect only identified for those constrained to leave early or with lower taste for schooling
 - but still useful for policy
 - Chevalier *et al* (2003) show no major ripples took place in post-16 education – no signalling.
- Also use parental months of birth as IVs
 - Youngest in school cohort suffer penalty

Endogeneity and IV

- Parental income is endogenous.
 - Labour market productivity may be correlated with parenting ability?
- Need to instrument (again).
 - Use union membership, occupation and interactions
 - Assumes union membership etc is uncorrelated with child's outcome
 - union wage premium due to bargaining strength etc.
 - not to unobservables
- Difficult to incorporate maternal income separately because of zeroes
 - Assume HH income is pooled and estimate HH income effect from paternal income alone

Empirical model

- Mother's SLA:

- $S_M = \varphi_0 + \varphi_1 IV_M + g(\text{DoB}_M) + \varepsilon_{MS}$

- where $IV_M = \text{mob}_M$ and RoSLA_M

- Father's SLA:

- $S_F = \pi_0 + \pi_1 IV_F + h(\text{DoB}_f) + \varepsilon_{FS}$

- where $IV_F = \text{mob}_F$ and RoSLA_F

- Father's Log Earnings:

- $\ln Y_F = \delta_0 + \delta_1 \text{Age}_F + \delta_2 \text{Age}_F^2 + f(IV_Y) + e(X_H) + \varepsilon_{FY}$

- where $X_H = \text{regs, month, yr, Union}_F, \text{SEG}_F$, $IV_Y = \text{Union}_F * \text{SEG}_F$

- Child outcome

- $\text{Prob}(S_c > 15) = \alpha_0 + \alpha_1 S_M + \alpha_2 S_F + \alpha_3 \ln Y_F + \varepsilon_C$

UK Quarterly LFS: 1992-2007

- Rotating panel. Address remains in for 5 qtrs
 - Earnings data asked in Q5 (and in Q1 from 97)
 - Union information asked Q3 each year.
- 16*, 17 & 18 year olds
 - 96% live with at least one parent
 - * include 16's when interviewed **after** choice
 - 4% live away from parents, 3% with father only, 20% with mother only, 73% with both.
- Characteristics of parents mapped to child in HH
- Select if
 - Both parents present, father employee, not a migrant, not Scot, no missing/mis-coded data (mostly missing wage)

Data – outcome variables

- Probability of attending post compulsory schooling
 - Define as
 - in education at present
 - based on currently in education question
 - OR
 - in education between 16-18 even if now left school
 - based on age left full time education question
- Probability of 5+ GCSEs at grade A*-C
 - Similar story emerges.
- Can probably also estimate effects of parental background on A-level and university entrant
 - Exploit wave 5 information for those present in wave 1 at age 18

Descriptive statistics

	Living Away	Living with one	Living with both	Final sample
Age distribution %:				
16	2	11	10	10
17	34	49	47	47
18	64	41	43	43
Stayed on at 16	23	71	76	78
5+ GCSE A*-C	39	67	77	78
observations:	754	9181	31474	8596

Descriptive statistics

Girls: N=4142

$\text{Log } Y_F$

S_F

S_M

Age_F

Did not stay in
full time education 18%

6.05
(0.42)

15.93
(1.46)

15.93
(1.23)

45.41
(5.51)

Did stay in
full time education 82%

6.28
(0.46)

17.19
(2.53)

17.17
(2.19)

47.09
(5.08)

Whole sample

6.24
(0.46)

16.96
(2.5)

16.92
(2.11)

46.8
(5.19)

Descriptive statistics

Boys: N=4454

Log Y_F

S_F

S_M

Age $_F$

Did not stay in
full time education 18%

6.04
(0.43)

15.97
(1.48)

16
(1.25)

45.41
(5.51)

Did stay in
full time education 82%

6.29
(0.5)

17.41
(2.68)

17.32
(2.23)

47.09
(5.08)

Whole sample

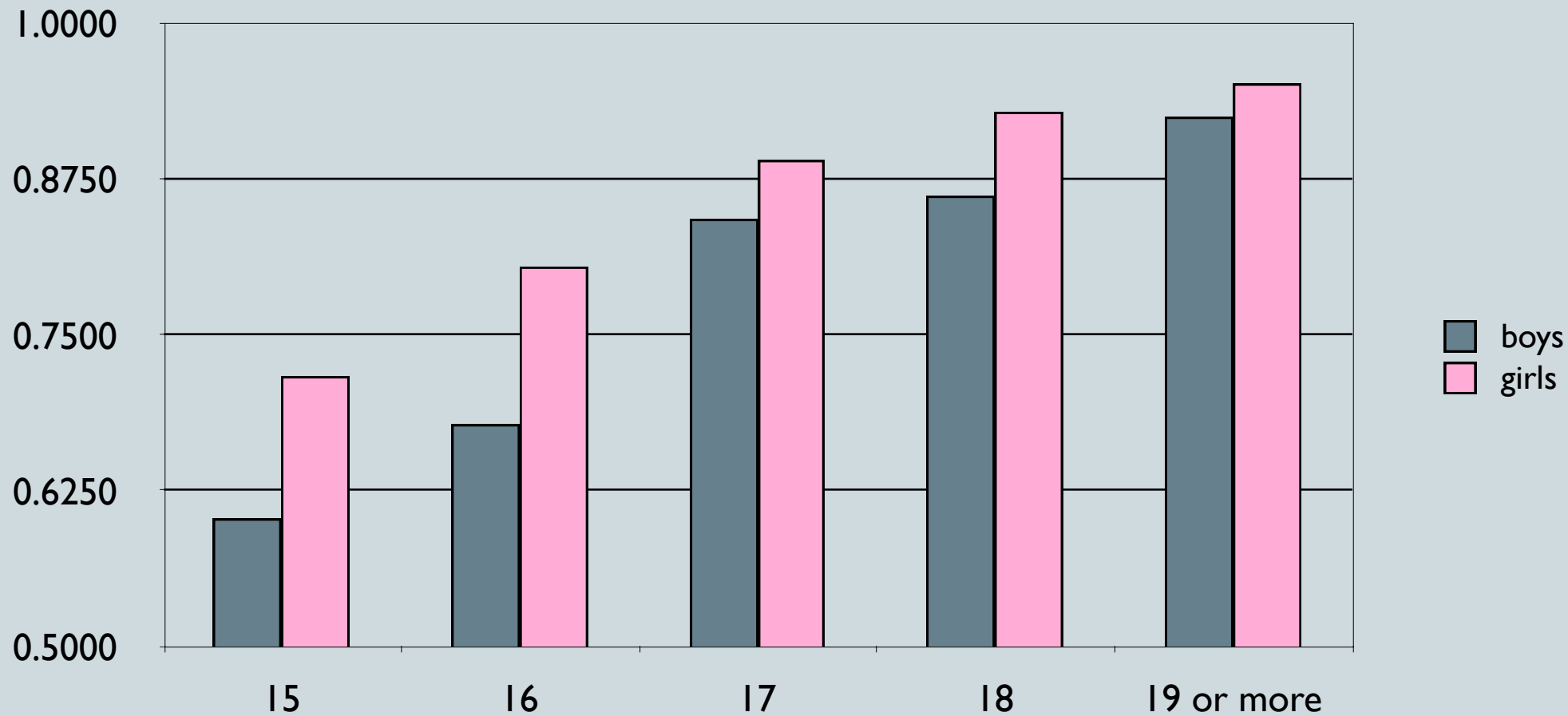
6.22
(0.46)

17.04
(2.5)

16.95
(2.15)

46.8
(5.19)

Proportion of children by S_F



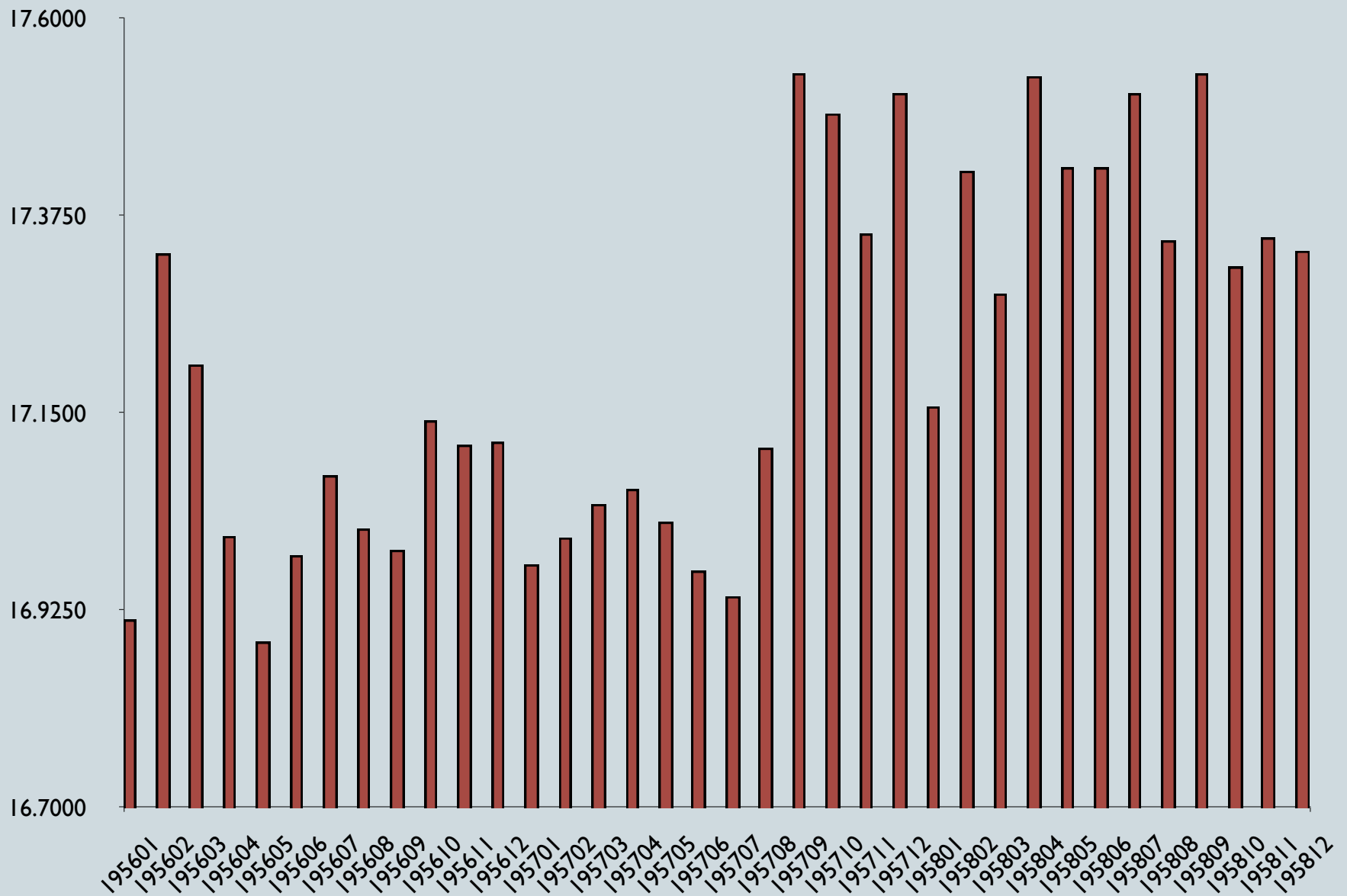
OLS:

Dependent Variable $S_c > 15$

	boys	girls	boys	girls	boys	girls
S_M	0.034	0.025			0.032	0.023
	<i>0.004</i>	<i>0.003</i>			<i>0.004</i>	<i>0.003</i>
S_F	0.024	0.016			0.017	0.011
	<i>0.003</i>	<i>0.003</i>			<i>0.003</i>	<i>0.003</i>
$\log Y_F$			0.193	0.139	0.12	0.093
			<i>0.014</i>	<i>0.013</i>	<i>0.015</i>	<i>0.014</i>
R^2	0.12	0.08	0.09	0.07	0.13	0.09

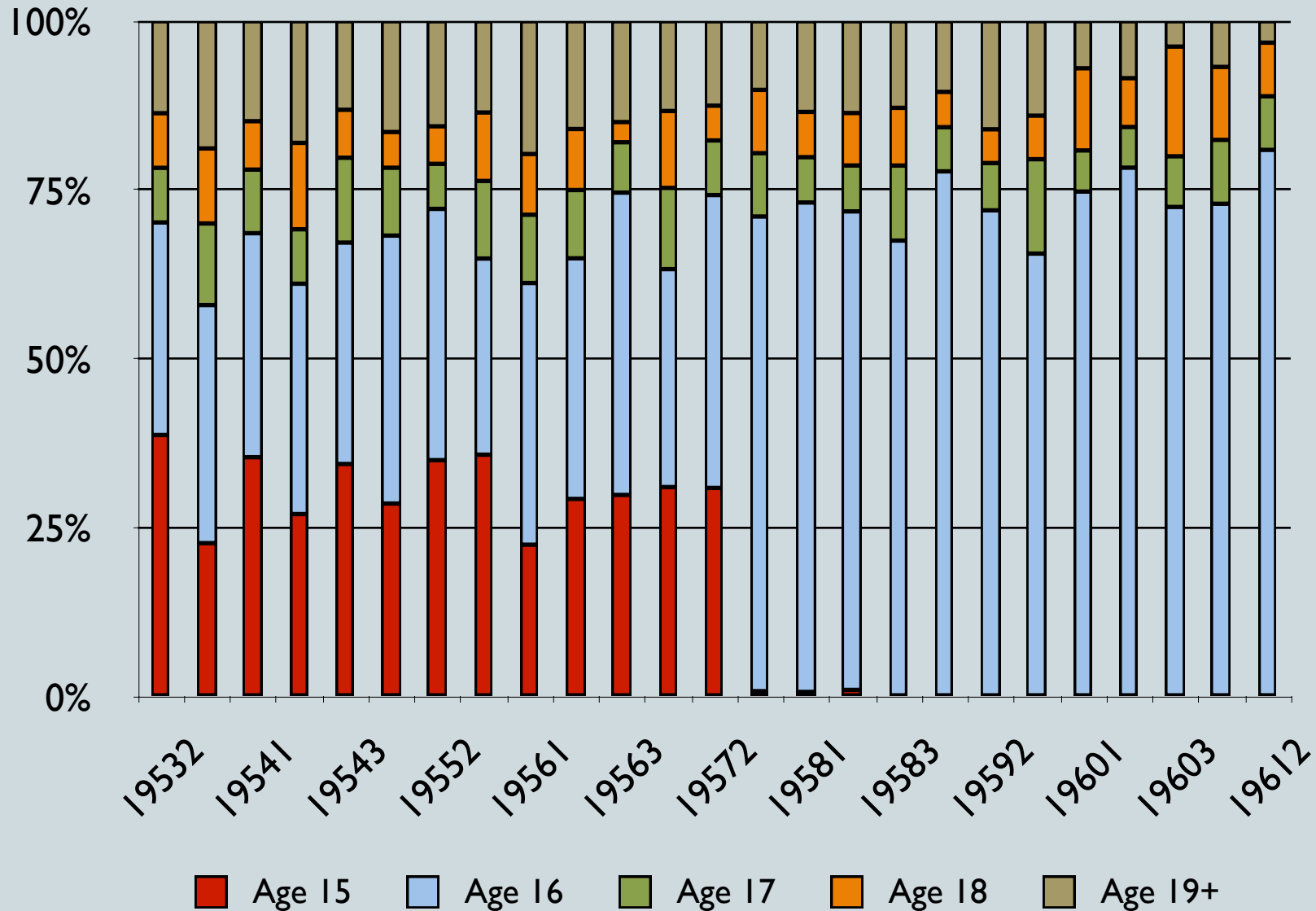
The Instruments

Raising of School Leaving Age - Fathers



The Instruments

Raising of School Leaving Age - Fathers



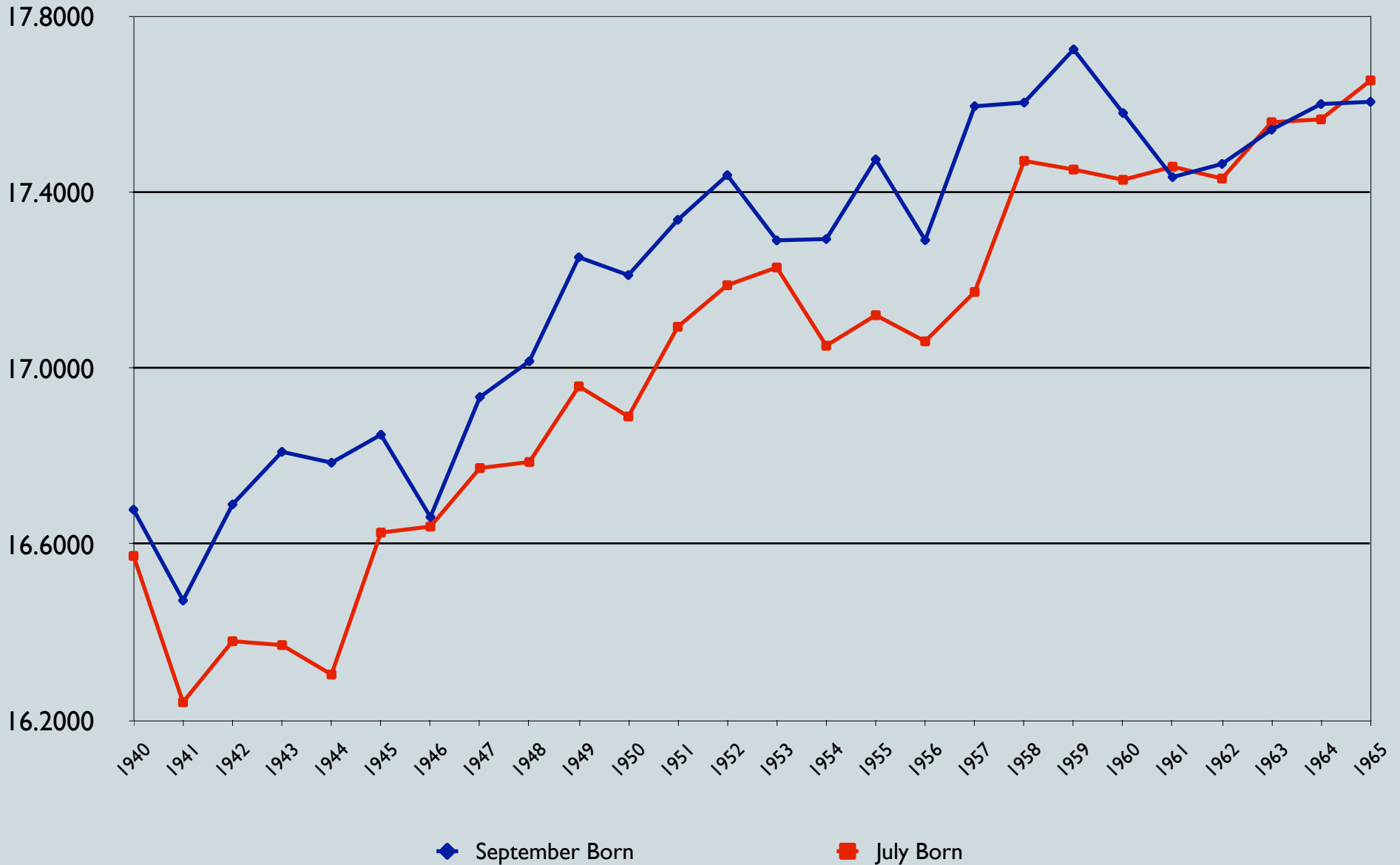
The Instruments

School entry policy in England and Wales

- Summer born penalised
 - Academic year starts in September
- Traditional policy – 1950's, 1960's
 - entry at start of term child turns 5.
- Flexibility - late 60's +
 - 3 points of entry Sept, Jan & April/May
 - e.g. August born starts in April/May
 - is youngest in class
 - Has two fewer terms in primary school than class mates
 - e.g. September born starts in September
 - Is oldest in class

The Instruments

Average SLA by year of birth - England & Wales



The Instruments

Are unionized fathers better parents?

	Union	Non Union
	%	%
“Needs of children more important than own”	23	18
% disagree with statement		
If school report poor, parent would very likely or likely to:		
Contact teacher	89	81
keep closer eye on child	87	91
talk with child	94	97
give more help with schoolwork	93	93

Source: NCDS

The Instruments

Are unionized fathers better parents?

	Union	Non-union
Hours spent watching TV		
on typical weekday (% with zero hours)	15	18
on typical weekend day (% with 2 or less hours per day)	60	62
Time spent with child – how often.....		
child eats meal with mother and father?	71	58
talks to child while busy?	57	52
reads stories to child?	83	88

Source: NCDS

Second Stage IV

Dependent Variable $S_c > 15$

	boys	girls	boys	girls	boys	girls
S_M	0.082	0.14			0.076	0.141
	<i>0.068</i>	<i>0.057</i>			<i>0.067</i>	0.056
S_F	0.066	0.041			0.003	-0.011
	<i>0.06</i>	<i>0.05</i>			<i>0.06</i>	<i>0.052</i>
$\text{Ln}Y_F$			0.425	0.31	0.458	0.337
			<i>0.026</i>	<i>0.024</i>	0.03	0.026
n	4451	4146	4451	4146	4451	4146

RoSLA effects about +0.4 years

MoB effect about -0.015 years per month

RoSLA_M and RoSLA_F F = 52

MoB_F and MoB_M F = 25

Joint MoB and RoSLA F = 99

Union*SEG F = 73

Robustness checks

- Money matters for sons
- S_M matters for daughters
- These conclusions robust to
 - Narrowing the window
 - Dropping MoB as IVs
 - Using Union as an IV
 - Using only 16 years olds or only 17 year olds
 - Dropping S_F
- No significant differences across time
 - New Labour vs Old Tory periods

Interpretation

- $\partial \text{Prob}(\text{dropout}) / \partial S_M = -0.14$
 - 1 extra S_M reduces dropout prob by 0.14
 - Dropouts have about 2 yrs less S_c
 - Increases S_c on average by about 0.3
 - Return to S about 0.1
 - So extra S_M raises wages of children by 0.03
 - PV of £15k compared to cost of £6k
- $\partial \text{Prob}(\text{dropout}) / \partial \text{Ln}Y_F = -0.46$
 - Extra 1 yr of S_F raises $\text{Ln}Y_F$ by 0.1
 - reduces sons (daughters) dropout prob by 0.05 (0.03)
 - PV of £6.5k compared to cost of £6k
 - And there will be other benefits too?
- But problem is - how to target the at-risk children?

Conclusion

- Examines effects of parental education and income on the probability of dropping out
- Education and income have usual effects in OLS
- Endogeneity – IV
 - Maternal education matters for daughters
 - Paternal earnings matter for sons (and daughters)
 - **Stronger** effects than for OLS
 - Suggesting LATE
- Symmetric results for probability of getting 5+ GCSE passes
- Policy implications
 - Child poverty addresses low achievement of boys
 - Raise min SLA to 18 addresses low achievement of girls