



The Great Recession, household income, and children's test scores

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Motivation

- **Economic downturns affect health and living conditions of population**
- **Income volatility often creates emotional stress and anxiety for parents**
- **Can also impact children's cognitive and socioemotional development via 2 major pathways:**
 - Resources (food insecurity, healthcare utilization, toys/books)
 - Family dynamics and functioning (stress, divorce, depression -> parenting behaviour and quality)



Literature Review

- **Ample evidence showing economic disadvantage is risk factor for poor cognitive development** (Aber et al. 1997)
- **Less evidence on how financial crisis affects outcomes**
 - Financial strain associated with:
 - higher levels of depressive symptoms and lower parenting quality for single moms (Jackson et al. 2000)
 - negative parent-adolescent relationships and parental school involvement, affecting academic achievement (Gutman and Eccles 1999)
 - 2008 crisis negatively impacted children's nutrition and increased child maltreatment in US; also increased mentally unhealthy days among adolescents (Rajmil et al. 2014)
 - 1 year of exposure to Ecuador's 1999 Crisis decreased vocab test scores by .32SD (Hidrobo 2014)
 - Conversely, positive income shocks (lottery winnings) increased educational attainment by 1 year in poorest households (Akee et al. 2010)



This Paper

- **The impact of the recession was particularly severe in Ireland**
- **Interesting to consider the extent to which children were affected**
- **GUI data provide opportunity to examine this question**
- **Different ways to measure this, we focus on changes in household income, which has advantages and disadvantages**

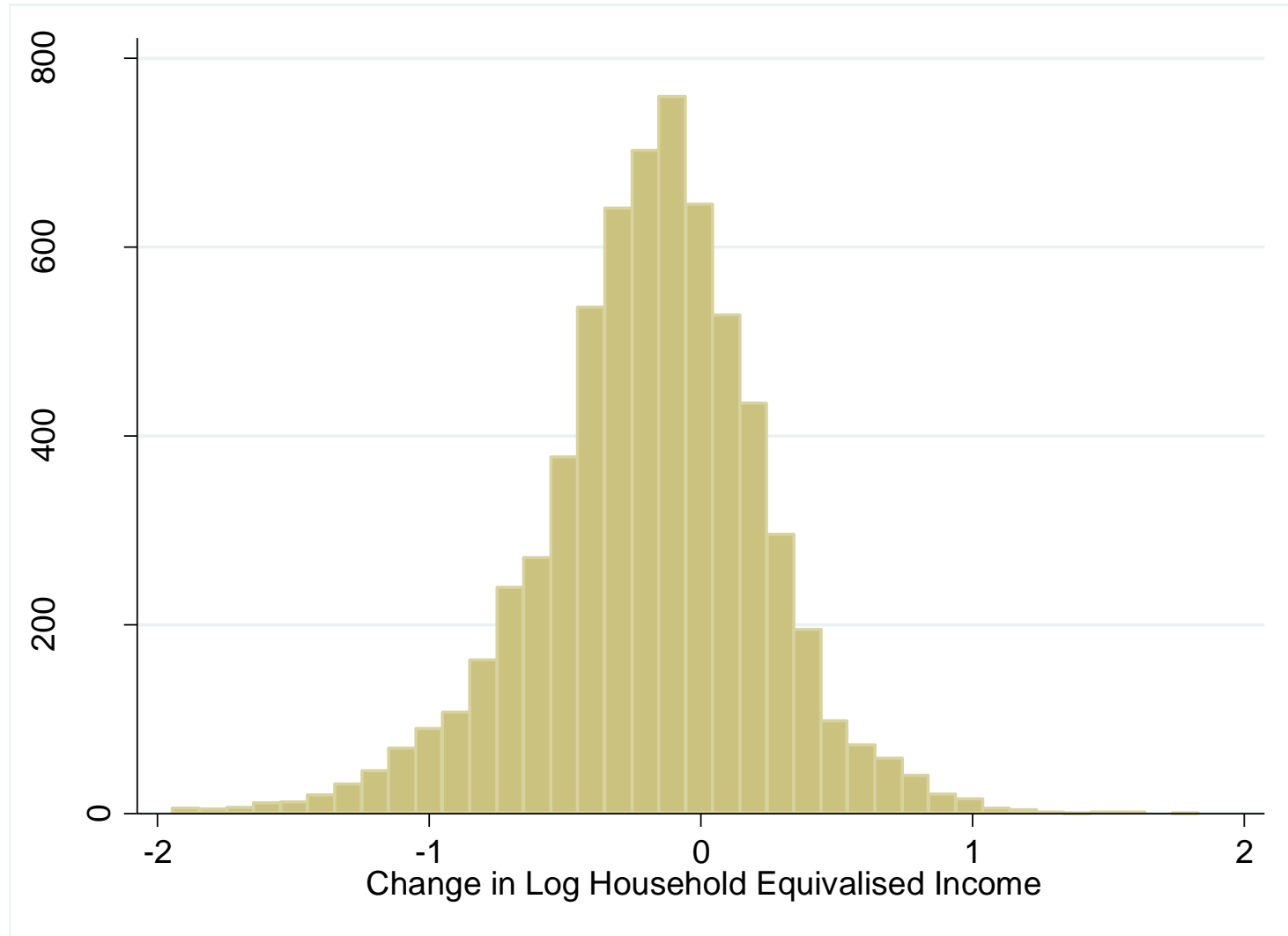


Approach

- **We examine whether household income is related to changes in children's test scores (reading and maths) over the course of the recession**
- **Combine the first two waves of the child cohort (age 9: 2007/8 and age 13: 2011/12)**
- **Focus on the sample of children present in both waves with valid test scores and household income data**
- **3,122 girls and 2,971 boys**



Change in Log HH Income (2007/8 – 2011/12)





Descriptive Statistics

Change in Equivalised Household Income (€)			
Percentile			
1	5	10	25
-38,655	-18,181	-13,276	-7,171
	50		
	-2,759		
75	90	95	99
1,132	5,060	8,138	17,966



Methodology

- **We implement panel models to exploit the longitudinal nature of the data**
- **Two approaches: random effects and fixed effects**
- **RE model assumes individual-level intercepts are independent of our X variables**
- **But household income is not randomly assigned**
- **So we may be worried that there are unmeasured confounders which are correlated with both test scores and household income**



Methodology

- **FE models account for all individual-specific time invariant factors (including those which are not measured)**
- **In data with two periods, equivalent to a regression using changes**
- **Can be implemented by including individual-specific indicator (FE) variables in OLS**
- **Also has its disadvantages**



Methodology

- **All our models are stratified by gender**
- **We use log household equivalised income as the exposure**
- **Outcomes are standardised Drumcondra maths and reading test scores**
- **Regression coefficients can be interpreted as the impact of 1% change in household income on standard deviation units of the test scores**



Methodology

- **Compare results from RE and FE models**
- **Time-invariant controls: Region, mother's age**
- **Time-varying controls: Wave, mother's marital status, mother's education, father's education, mother is employed, father is employed, number of books in household, household size**
- **We are interested in causal inference, so regressions are not weighted**



Results for Boys

Variables	Boys			
	Reading		Maths	
	RE	FE	RE	FE
Log Income	0.113***	0.0285	0.144***	0.0728*
	(0.0258)	(0.0362)	(0.0266)	(0.0393)
Controls	Y	Y	Y	Y
Observations	6,825	6,825	6,825	6,825
R-squared		0.032		0.383
Number of ID	3,941	3,941	3,941	3,941

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$



Results for Girls

Variables	Girls			
	Reading		Maths	
	RE	FE	RE	FE
Log Income	0.0951***	0.0255	0.0438*	-0.0707*
	(0.0237)	(0.0308)	(0.0243)	(0.0373)
Controls	Y	Y	Y	Y
Observations	7,211	7,211	7,211	7,211
R-squared		0.162		0.264
Number of ID	4,179	4,179	4,179	4,179

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1



Results Summary

- **RE models indicate impact of household income on children's test scores**
- **Magnitude appears substantial (1% increase in household income is associated with an increase in maths scores for boys of .14 standard deviations)**
- **Results for girls appear smaller**
- **But RE models have a limited causal interpretation**
- **FE models show no clear evidence that income affects test scores**



Why Would RE and FE Results Differ?

- **FE models account for (some) unobserved confounders, so RE models may be biased upwards**
- **Taking first differences exacerbates measurement error, especially relevant for income measures, which could bias FE results towards the null**
- **FE model is essentially examining short run shocks, where as RE model is more likely to be capturing long-run (permanent) family income**
- **These effects may differ**

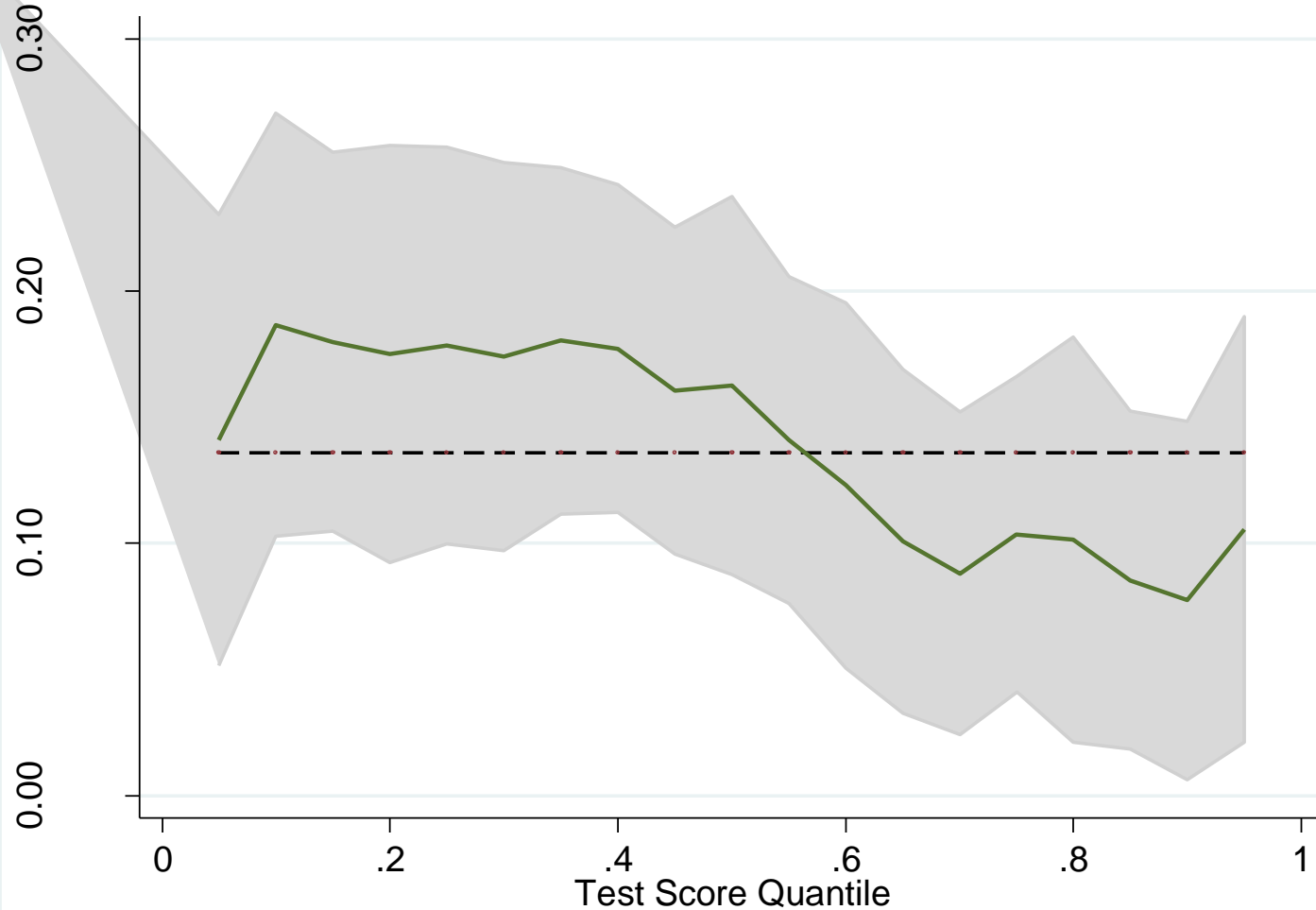


Quantile Estimates

- **We also implement quantile regression to examine whether the association of household income with test scores varies**
- **Roughly, allows us to obtain estimates of the association across the underlying distribution of ability**
- **Pooled model, also stratified by gender**

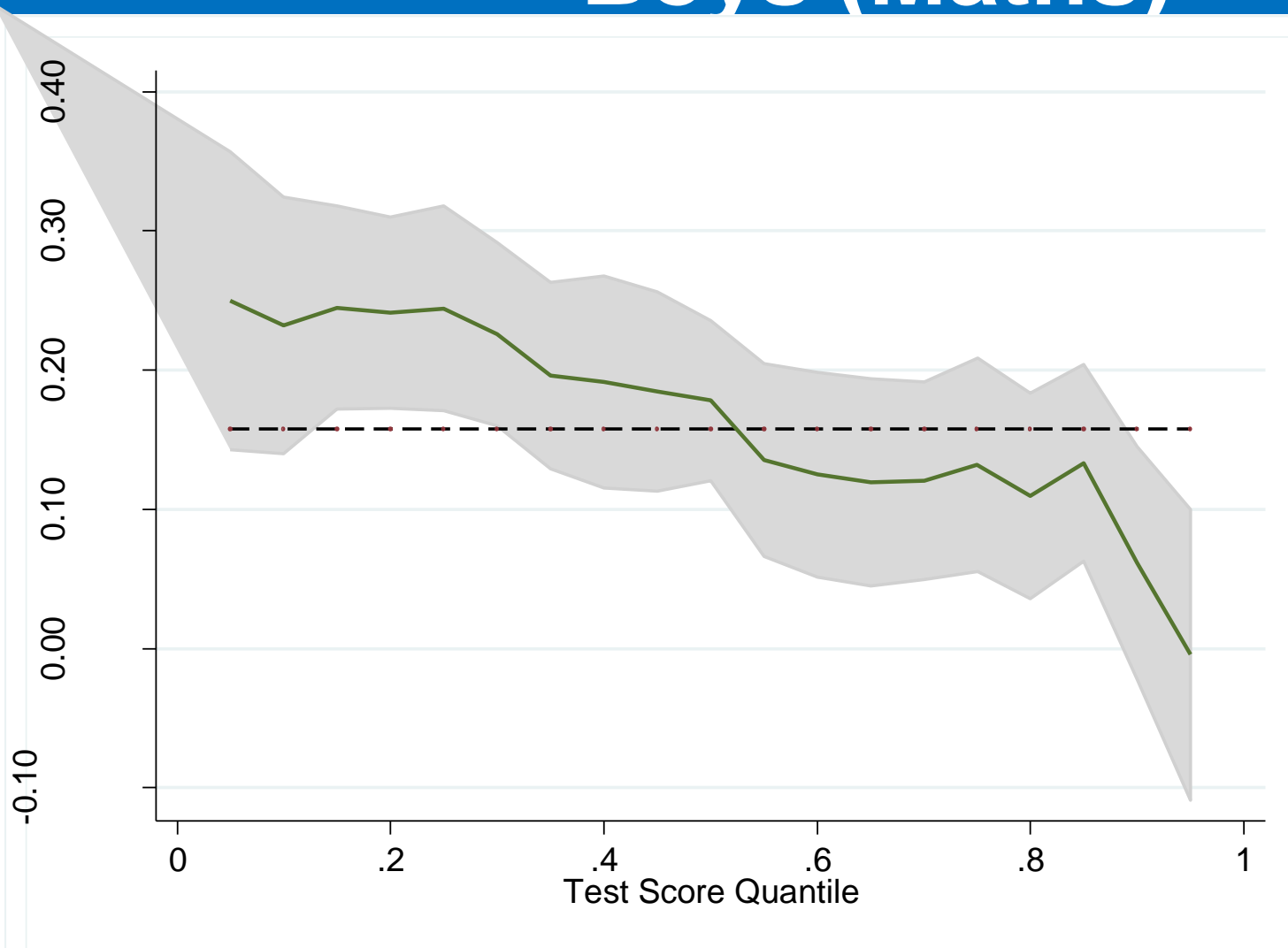


Quantiles Estimates Boys (Reading)



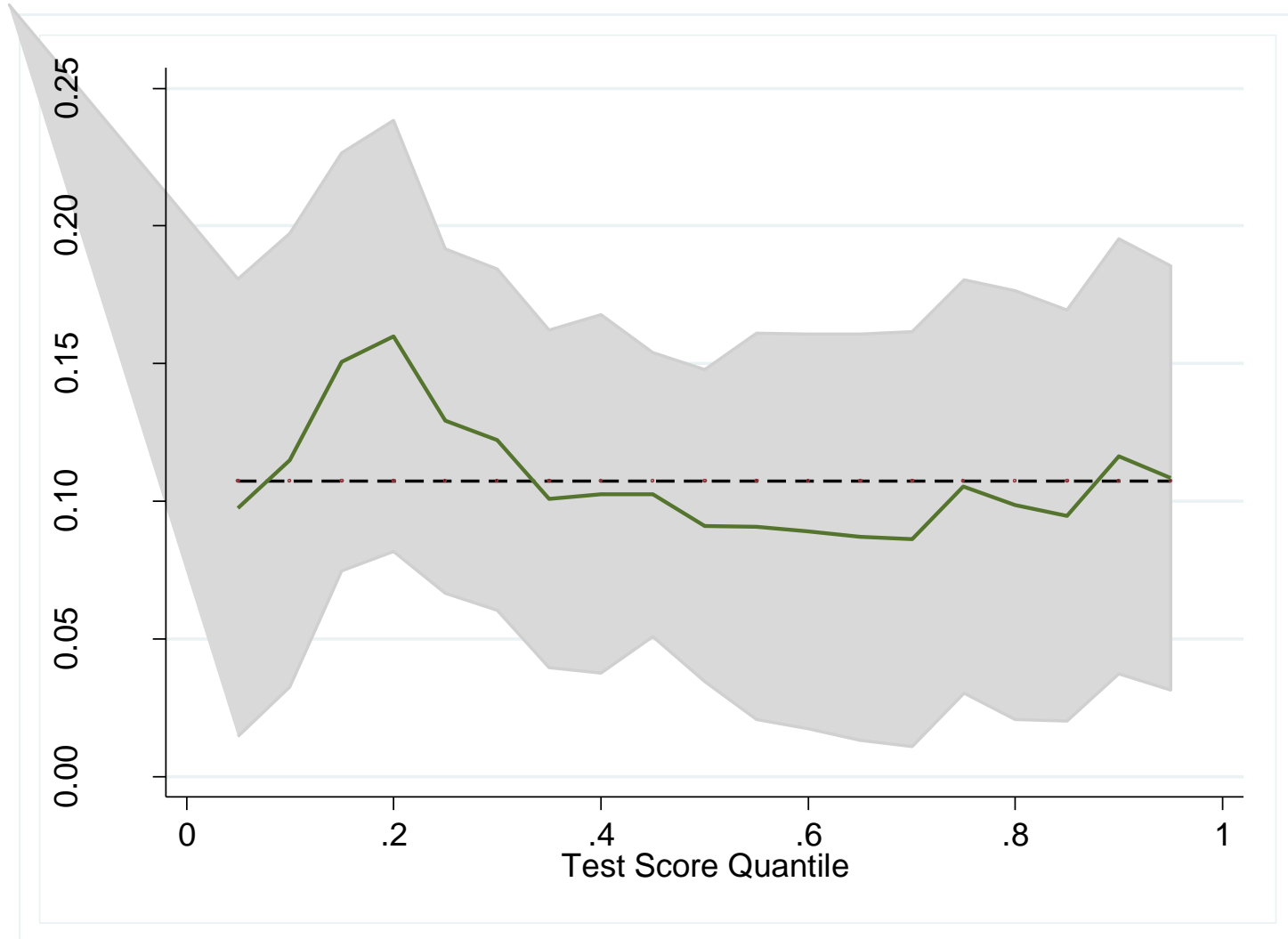


Quantiles Estimates Boys (Maths)



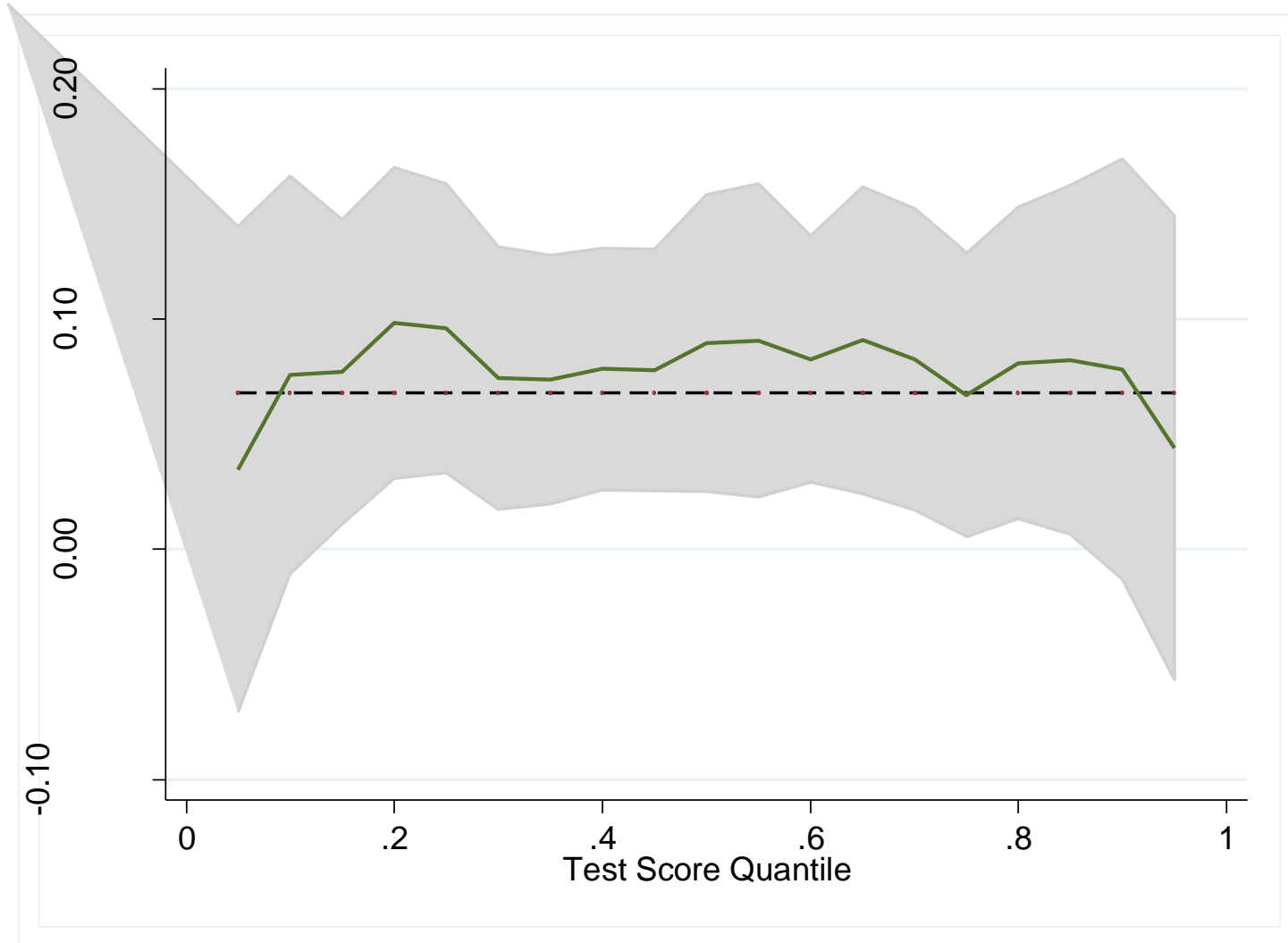


Quantiles Estimates Girls (Reading)





Quantiles Estimates Girls (Maths)





Conclusions

- **Preliminary!**
- **Results are not inconsistent with income having an important effect on children's test scores, but causal interpretation in RE models is limited without further data**
- **So far, not much evidence changes in income matter**
- **But it is important to account for a number of limitations, including potential non-linearity**
- **Other measures of the recession's impact**



Questions?

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