Free Access to Child Care, Labor Supply, and Child Development

UCL and IFS – Orazio Attanasio, Pedro Carneiro

Brazil – Ricardo Paes de Barros, Lycia Lima, Rosane Mendonca,…

World Bank – David Evans, Pedro Olinto

IDB – Norbert Schady

Question

- Public child care is often seen as promoting female employment

- It also potentially provides nurturing and stimulating environments for poor children

- In middle income countries (like Brazil) formal child care centres are favoured by many governments, especially in urban areas

- But they are also expensive to build and run, and frequently have low quality.

  - **How effective are universal child care programs of low quality in poor settings?**
  - **Do they foster female employment?**

In this paper (things to remember in **bold**):

- **Experimental** evaluation of the impact of access to **formal child care** from ages 0 to 3 on **child development** (measured **4-5 years** after) and **household outcomes** (e.g., **income, labor supply**).

  - Creches = Child Care Centers for 0-3

  - We focus on poor children living mainly in the Favelas of Rio de Janeiro, Brazil (**poor urban areas/slums in a middle income country**).

- This is a **major program**, not a small scale intervention. There are more than 400 creches serving 64142 children, and the municipality is still expanding services. **Quality is fairly low.**

In this paper:

- There is excess demand for child care places so, from 2008-2011, these were allocated through a **lottery**. We use the 2008 lottery.
  - There were 10000 new slots in 2008 which were allocated across 25000 applicants
  - Winning the lottery is a strong (but imperfect) predictor of Creche attendance
- We collect original and detailed data on child development and maternal/household outcomes

Pre-School Education in Brazil

- Pre-school education is a responsibility of the municipality. Available child care arrangements vary a lot across the country.
- Ages 0-3 (Creche) vs 4-5 (Pre-Escola):
  - High 4-5 coverage (>60%), low 0-3 (<20%)
  - Especially low 0-3 coverage for poor (<10%), although this is not true anymore in Rio
  - The 2009 constitution made age 4 the mandatory school starting age in Brazil
  - Recent increases in coverage of both age groups

What do Creches offer?

- Full day care for low income children aged 0 to 3 (making it possible for mothers to work)
- Integrated services: fulltime daycare, health services, food, provision of instructional toys and materials to children, parental involvement
- High teacher student ratios
    - The average for creches is 26 in Brazil
    - Do not know ratio for Rio
        - But here are 2471 early childhood teachers serving 64142 children age 0-3 and 72431 aged 4-5…

Quality is low when measured by international scales

Figure 3: Quality of creches and pre-schools in six capital municipalities
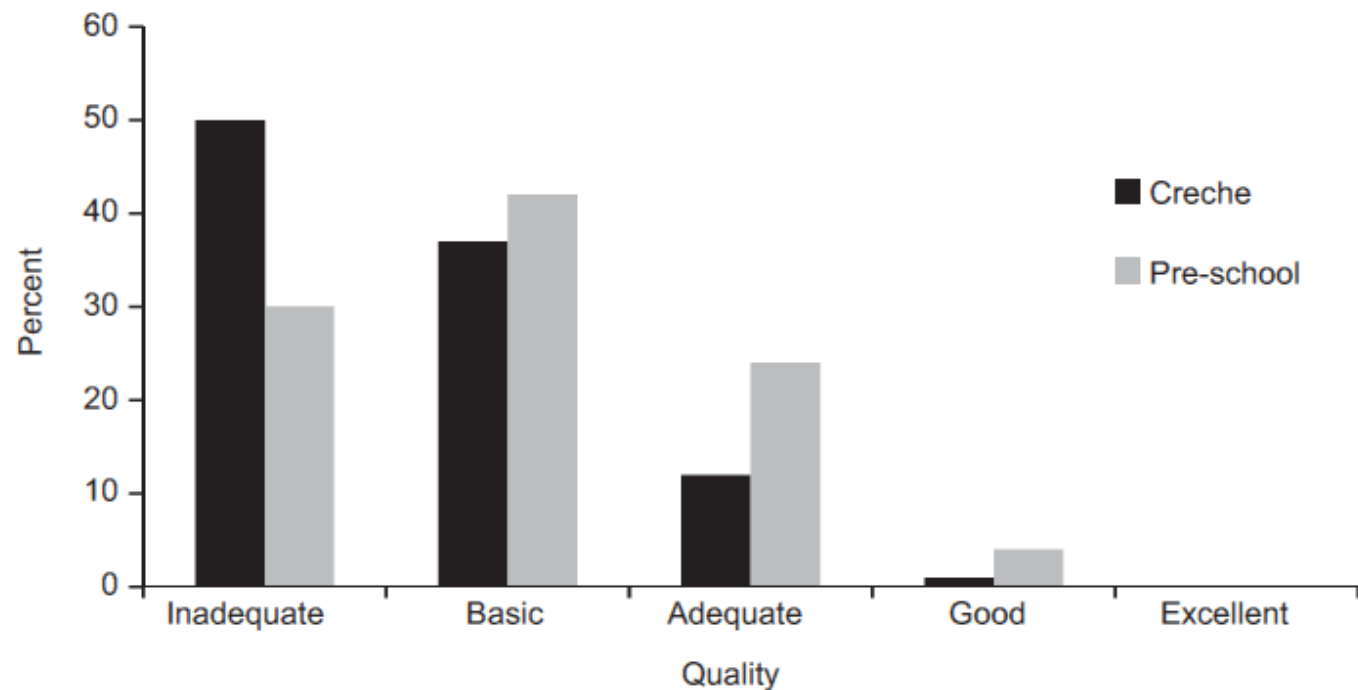
- Ex: There is no Early Head Start center in the EHS evaluation with a rating below Good

Lottery – 2007/2008

- Two-day application window
- All applicants with special needs have priority access up to two per class. One or two children with special needs count as five vacancies.
- Each daycare center director could fill, during the application window, up to 10% of their vacancies or at least 4 slots using whatever subjective criteria they wish
  - Before the lottery was implemented they had discretion over all the slots

Lottery – 2007/2008

- All remaining vacancies were randomly allocated among the applicants fulfilling at least one of the objective criteria established by the municipality:
    - Mother need the daycare center services to work
    - Total family income below 2 minimum wages
    - Any member of the family has a chronic disease
    - Any member of the family has a alcohol problem or is a drug user
    - Children in families with episodes of domestic violence
    - Any member of the family is in trouble with the Law.

Lottery – 2007/2008

- 11640 new slots in Creches divided across 4 age groups: 0-1, 1-2, 2-3, 3-4
  - Roughly 1600 reserved for children with special needs, and for directors' discretion
  - Remaining 10000 allocated through lottery
- 25000 applicants
  - 24000 eligible (meet vulnerability criteria)
- Each applicant applies for a slot in a creche - age group combination
  - The lottery is creche – age group specific

Data

- Short questionnaire collected in mid-2008 covering contact information, maternal labor supply, and maternal depression (N=3777)
- Large scale survey collected in second half of 2012, 4-5 years after initial enrolment (N=1462 – more coming) – talk will focus on this dataset
  - Each household visited by 2 enumerators
  - One was a student of psychology, administering developmental assessments to children
  - The other one would conduct a household survey with a single household respondent

Household Survey

- Demographics
- Labor Income and Labor Supply
- Time use (for child "guardian" figure)
- Basic expenditure (e.g., food)
- Basic assets and durables
- Child care history
- HOME environments
- Maternal depression

Child Assessments

- Directly administered to children
    - PPVT – Verbal Reasoning
    - Woodcock-Johnson Memory for Names and Visual Integration – Memory, Visual-Spatial
    - Executive Function (Inhibitory Control) – Pencil Tapping, Stroop, HTKS
- Maternal report
    - CBQ (child behavior), ASQ (several dimensions of development)
- Also administer PPVT to mothers

Child Assessments

Measurement	Age Range
1. Executive Function	
1.1. Pencil Tapping	36-71 Months
1.2. Stroop	36-71 Months
1.3. Head Toes Knees Shoulder	72-96 Months
2. Peabody Picture Vocabulary Test	All Ages
3. Ages and Stages Questionnaire - Third Edition	51-66 Months
4. Woodcock-Johnson-Munoz	
4.1. Visual Integration	All Ages
4.2 Memory for Names	All Ages
5. Child Behavior Questionnaire	All Ages
6. Height	All Ages
7. Weight	All Ages

Descriptives – 2012 (USD$1=R$2.15)

Variable - Mother		Variable - Household	
% Basic Education or Less	0.6028	Household Size	4.6726
	(0.4895)		(1.7129)
% Employed	0.6818	Monthly Income (Wages)	1138.87
	(0.4659)		(955.95)
Hours Worked Last Week	26.0362	Food Expenditure	459.48
	(22.3346)		(234.47)
Monthly Wage Income	456.11	% with Bank Account	0.5677
	(458.89)		(0.4955)

Balance: differences between lottery winners and losers

Variable	Diff. W-L	Variable	Diff. W-L
Male Child	0.0035	Planned Pregnancy	0.0170
	(0.0262)		(0.0285)
White Child	0.0032	First Child	-0.0170
	(0.0254)		(0.0265)
Black Child	0.0228	Pre-Natal Checks	-0.0024
	(0.0219)		(0.0106)
Mixed Race Child	-0.0341	Pre-Term	0.0400**
	(0.0271)		(0.0187)
Age of Child	-0.0532	Breastfed	0.0238
	(0.0328)		(0.0226)
Birth Weight of Child	-0.0015	Maternal TVIP	0.0429
	(0.0358)		(0.0615)

Lottery Status and Creche Enrolment

- The 2007/2008 lottery only affects enrolment in 2008. Enrolling in subsequent years means facing a new and independent lottery.

- We can estimate the impact of enrolling a child in a public day care center during 2008

- Compliance is imperfect – lottery as IV

- However, the subsequent schooling history of each child could be also affected by the 2008 enrolment
  - This could be a mechanism through which the lottery affects family and child outcomes

Lottery Status and Day Care Attendance

Variable	N	Losers	Winners	Difference
Creche in 2008 (reported in 2008)	1412	0.505	0.938	0.434***
		(0.500)	(0.241)	(0.022)
Creche in 2008 (reported in 2012)	1433	0.527	0.731	0.206***
		(0.500)	(0.444)	(0.0303)
Ever in Creche (reported in 2012)	1462	0.737	0.896	0.160***
		(0.441)	(0.305)	(0.0251)
Semesters in Creche (reported in 2012)	1462	3.430	4.458	1.046***
		(2.712)	(2.434)	(0.152)

- Outside option: staying home with a carer
  - The mother is the carer in 80% of cases
  - Others: fathers, uncles, brothers, grandparents

Lottery Status and History of Day Care Attendance (20%*4Sem=0.8)
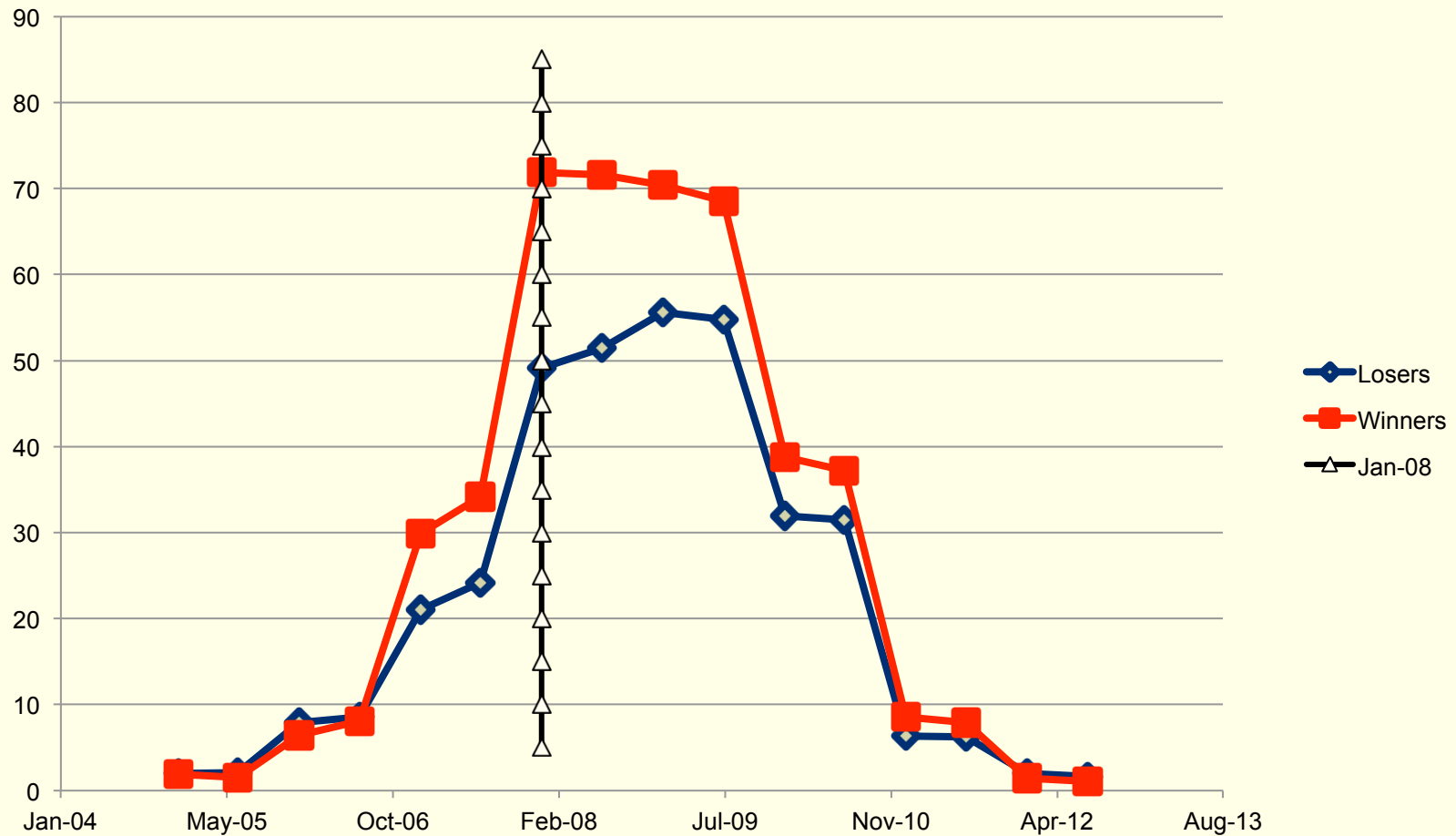
Lottery Status and History of Preschool Attendance
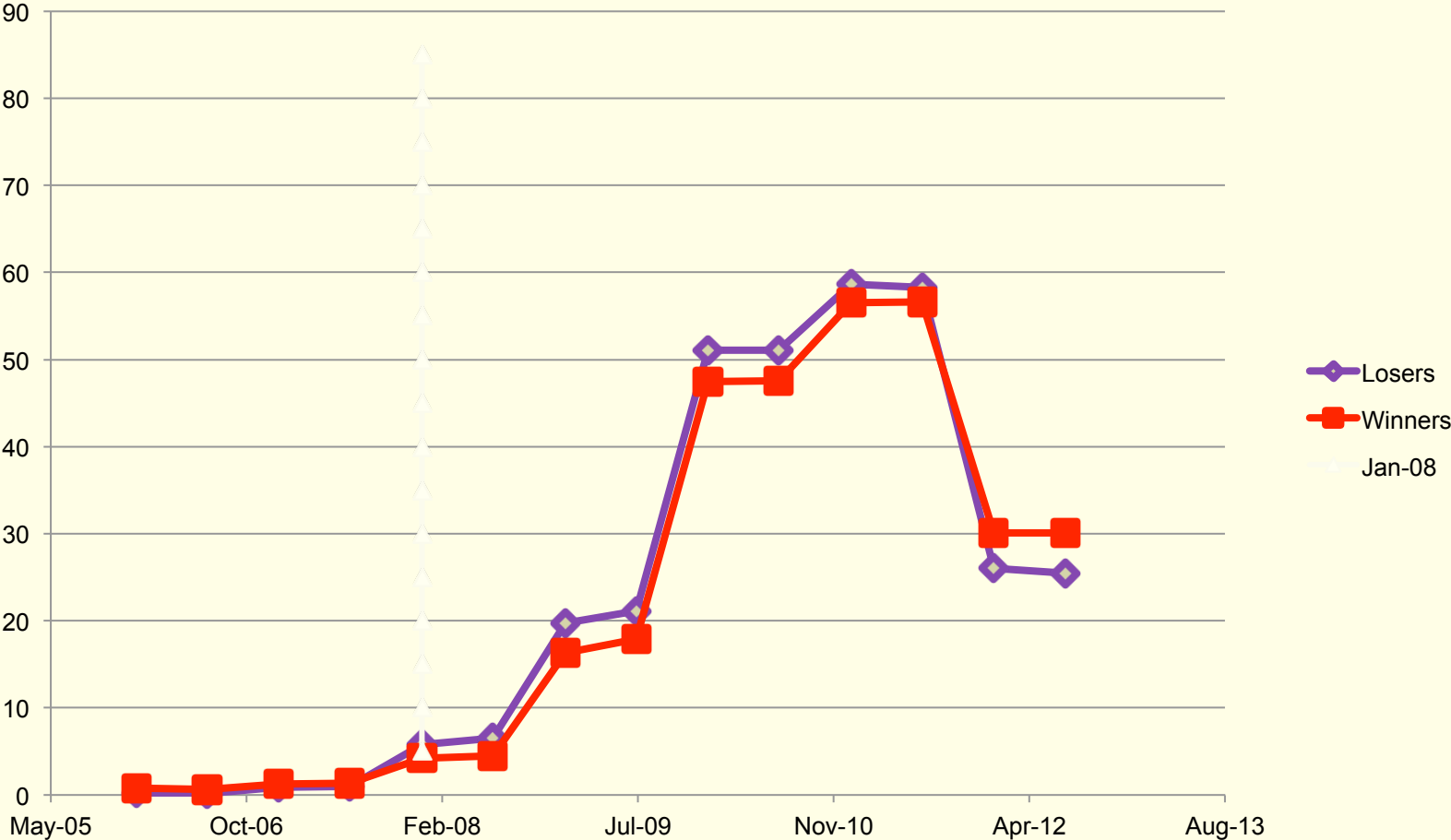
Results

- Household/Mother/Carer Outcomes
  - Employment and Income
  - Assets/Durables and Expenditure
  - Home Environments / Stimulation
- Child Outcomes
  - Direct Assessments
  - Maternal Reports
- Will not present IV results today
  - ITT = Impact of 1 extra semester in creche
  - Control for creche-age group fixed effects

Household Income and Expenditure

Variable	Loser	Winner	**Difference**
MONTHLY INCOME	1094.6	1180.8	**94.35****
	(888.2)	(1014.8)	**(39.39)**
% ADULTS WORKING	0.697	0.709	**0.0116**
	(0.313)	(0.313)	**(0.0164)**
MONTHLY FOOD EXPENDITURE	448.0	470.3	**22.07***
	(225.7)	(242.1)	**(13.25)**
% BANK ACCOUNT	0.534	0.599	**0.0626****
	(0.499)	(0.490)	**(0.0280)**

Employment and Income of Carer (with creche – age group f.e.)

Variable	Loser	Winner	Difference	Diff. 2008
				(Barros et al, 2008)
CURRENTLY EMPLOYED	0.572	0.622	**0.0424***	**0.042****
	(0.495)	(0.485)	**(0.0256)**	**(0.016)**
HOURS WORKED LAST WEEK	20.02	22.59	**2.375****	
	(21.54)	(22.23)	**(1.112)**	
MONTHLY INCOME	363.5	410.2	**44.48***	**39.6****
	(434.7)	(480.1)	**(25.10)**	**(15.4)**
PAYS SOCIAL SECURITY	0.331	0.358	**0.0161**	
	(0.471)	(0.480)	**(0.0260)**	

- Who are the carers? Mothers (81%), Fathers (5%), Sisters (2%), Grandmothers (9%), Others (3%)

Impacts on Employment and Income of Different Household Members

Variable	PARENT	SIBLING	UNCLE	GRAND-PARENT	OTHER
CURRENTLY EMPLOYED	0.0068	0.0411*	-0.0536	0.191***	-0.0637
	(0.0174)	(0.0245)	(0.0779)	(0.0679)	(0.0807)
HOURS WORKED LAST WK	0.744	1.101	2.458	10.18***	-2.518
	(0.933)	(1.052)	(4.014)	(3.375)	(4.064)
MONTHLY INCOME	27.12	8.295	13.71	174.2**	-30.71
	(20.89)	(12.49)	(73.26)	(75.66)	(92.94)
PAYS SOCIAL SECURITY	-0.0087	0.0222	-0.0129	0.237***	-0.0638
	(0.0225)	(0.0160)	(0.0696)	(0.0616)	(0.0880)

- 43% of grandparents are between 45 and 55; the strongest labor supply impact is for them

Housing / Durables

Variable	Loser	Winner	Difference
WATER FILTER	0.586	0.632	**0.0349**
	(0.493)	(0.483)	**(0.0259)**
STOVE	0.997	0.999	**0.0008**
	(0.0529)	(0.0364)	**(0.0028)**
REFRIGERATOR	0.983	0.989	**0.0064**
	(0.129)	(0.103)	**(0.0069)**
FREEZER	0.177	0.203	**0.0325**
	(0.382)	(0.403)	**(0.0219)**
WASHER	0.596	0.627	**0.0362**
	(0.491)	(0.484)	**(0.0272)**
COLORT TV	0.985	0.997	**0.0123****
	(0.123)	(0.0515)	**(0.0054)**
COMPUTER	0.431	0.483	**0.0477***
	(0.496)	(0.500)	**(0.0254)**
INTERNET	0.322	0.370	**0.0449***
	(0.467)	(0.483)	**(0.0240)**
LAND LINE (PHONE)	0.451	0.463	**0.0163**
	(0.498)	(0.499)	**(0.0222)**
CELL PHONE	0.921	0.952	**0.0254****
	(0.269)	(0.214)	**(0.0106)**
CAR	0.135	0.158	**0.0263**
	(0.342)	(0.365)	**(0.0175)**

Home Environments/Stimulation

Variable	Loser	Winner	Difference
YEARS SINCE LAST TOY	0.212	0.214	**0.0084**
	(0.376)	(0.357)	**(0.0211)**
TOLD STORIES REGULARLY	0.632	0.694	**0.0590****
	(0.483)	(0.461)	**(0.0243)**
DAYS READ TO LAST WEEK	1.091	1.185	**0.0235**
	(4.036)	(5.289)	**(0.289)**
NUMBER BOOKS AT HOME	6.164	6.730	**0.569***
	(6.290)	(6.664)	**(0.311)**
% PAINTING MATERIAL	0.961	0.967	**0.0082**
	(0.195)	(0.180)	**(0.0102)**
HOURS TV LAST WEEK	14.94	15.06	**0.0782**
	(8.010)	(7.936)	**(0.427)**

Direct Assessments – Visual, Memory, Verbal, Anthropometrics

Variable	Loser	Winner	**Difference**
WJM - VISUAL INTEGRATION (1462)	-0.0012	0.0117	**0.0268**
	(1.023)	(0.976)	**(0.0495)**
WJM - MEMORY FOR NAMES (1462)	-0.0441	0.0419	**0.0914**
	(1.015)	(0.982)	**(0.0562)**
PPVT (1462)	-0.0452	0.0429	**0.102***
	(1.017)	(1.003)	**(0.0529)**
AGE STANDARDIZED WEIGHT (1458)	-0.0560	0.0531	**0.13****
(1 SD = 3-5 kg)	(0.992)	(1.003)	**(0.0540)**
AGE STANDARDIZED HEIGHT (1455)	-0.0567	0.0538	**0.114****
(1 SD = 4-6 cm)	(0.985)	(1.009)	**(0.0567)**

Direct Assessments – Executive Function (Mean = 0, SD = 1)

Variable	Loser	Winner	Difference
PENCIL TAPPING (N= 368)	0.045	-0.0341	**-0.0095**
	(0.968)	(1.024)	**(0.0106)**
STROOP NIGHT-DAY (N=368)	-0.0385	0.0312	**0.0928**
	(0.961)	(1.029)	**(0.123)**
HEAD-TOES-KNEES-SHOULDER (1107)	-0.0325	0.0321	**0.0566**
	(0.992)	(1.006)	**(0.0627)**

Indices of Tests

Variable	Loser	Winner	**Difference**
COGNITIVE ASSESSMENTS	-0.0420	0.0399	**0.0915***
	(1.012)	(0.985)	**(0.0544)**
EXECUTIVE FUNCTION	-0.0248	0.0234	**0.0472**
	(0.973)	(1.023)	**(0.0555)**
PHYSICAL ASSESSMENTS	-0.0613	0.0581	**0.132****
	(0.985)	(1.009)	**(0.0554)**
MATERNAL SELF- REPORT	0.0098	-0.0093	**-0.0066**
	(1.017)	(0.981)	**(0.0551)**
MENTAL + PHYSICAL ASSESSMENTS	-0.0654	0.0621	**0.140*****
	(0.996)	(0.998)	**(0.0515)**
MENTAL + PHYSICAL + MATERNAL REP.	-0.0203	0.0187	**0.0455****
	(0.425)	(0.431)	**(0.0227)**

Attrition

- Sample from 2007-2008 lottery: 4348
  - 50% treatment, 50% control
- Sample from 2008 survey (6 months): 3777 (13%)
  - 50.6% treatment, 49.4% control
- Starting in June 2012 (4.5 years after) we attempted to contact 2126 of these children
  - 50.8% treatment, 49.2% control
- We found 1486 (30% attrition)
  - 51% treatment, 49% control
- Large attrition, but urban slums, and long time period
  - Not that much worse than other studies with long follow-ups
  - Were able to keep numbers balanced – but composition?

Attrition (Child) – compare interviewed vs not interviewed among winners and losers

	Lottery Losers		Lottery Winners		
	No Int.	Int.	No Int.	Int.	**Diff in Diff**
Male child	0.496	0.504	0.558	0.543	**-0.0232**
	(0.501)	(0.500)	(0.497)	(0.498)	**(0.0502)**
Age of the child in months	30.26	30.95	30.61	31.11	**-0.189**
	(10.13)	(10.50)	(10.46)	(10.14)	**(1.037)**
Birthweight in quilos	3.181	3.184	3.185	3.174	**-0.0151**
	(0.633)	(0.654)	(0.646)	(0.654)	**(0.0653)**
Birth height in centimetres	48.82	48.23	48.40	48.86	**1.055**
	(6.594)	(7.626)	(7.169)	(6.135)	**(0.693)**

Attrition (Carer) – compare interviewed vs not interviewed among winners and losers

	Lottery Losers		Lottery Winners		
	No Int.	Int.	No Int.	Int.	**Diff in Diff**
Carer's Schooling	4.657	4.853	4.890	4.669	**-0.417**
	(2.463)	(2.394)	(2.458)	(2.376)	**(0.257)**
Household size	4.424	4.633	4.522	4.664	**-0.0670**
	(1.741)	(1.782)	(1.779)	(1.891)	**(0.183)**
Household income	588.4	598.0	651.7	653.4	**-7.915**
	(409.6)	(402.7)	(424.6)	(570.7)	**(47.84)**
Carer is employed	0.409	0.401	0.493	0.478	**-0.00712**
	(0.493)	(0.491)	(0.501)	(0.500)	**(0.0501)**

Summary

- Low income population in urban slums
- Full time day care of low quality
- Children participate in lottery for a day care spot
- Follow-up 4.5-5 years after the lottery
- One additional semester in day care leads to:
  - 8% increase in hh earnings, 5% increase in food
  - 6% increase in probability of child being read to, 9% increase in number of books at home
  - 0.1 SD increase in cognitive tests, inhibitory control, weight, height (compare to teacher effects; better than Perry or Head Start)