Early Childhood Interventions in Developing Countries

Peter Leighton

Institute for Fiscal Studies (EDePo)

January 5th, 2018
Outline

1 Part 1: Early Childhood Development as a Policy Issue
   - What is ECD?
   - Why are economists interested in ECD?
   - Key Policy Issues

2 Part 2: The use of RCT’s
   - The identification problem
   - Using RCT’s
   - Limitations

3 Part 3: Early Childhood Development Research at IFS
   - Case Study 1: Colombia

4 Summary
Part 1: Early Childhood Development as a Policy Issue
- What is ECD?
  - Why are economists interested in ECD?
  - Key Policy Issues

Part 2: The use of RCT’s
- The identification problem
- Using RCT’s
- Limitations

Part 3: Early Childhood Development Research at IFS
- Case Study 1: Colombia

Summary
Background to ECD

- Period of life from birth to 5 years of age
Background to ECD

- Period of life from birth to 5 years of age
- Time of important developments across multiple domains:
  - Cognitive
  - Socio-emotional
  - Language
  - Motor
  - Health
Background to ECD

- Period of life from birth to 5 years of age
- Time of important developments across multiple domains:
  - Cognitive
Background to ECD

- Period of life from birth to 5 years of age
- Time of important developments across multiple domains:
  - Cognitive
  - Socio-emotional
Background to ECD

- Period of life from birth to 5 years of age
- Time of important developments across multiple domains:
  - Cognitive
  - Socio-emotional
  - Language
Background to ECD

- Period of life from birth to 5 years of age
- Time of important developments across multiple domains:
  - Cognitive
  - Socio-emotional
  - Language
  - Motor
Background to ECD

- Period of life from birth to 5 years of age
- Time of important developments across multiple domains:
  - Cognitive
  - Socio-emotional
  - Language
  - Motor
  - Health
Investments in ECD

- This is also a period when specific “investments” from parents and others are extremely important.
Investments in ECD

- This is also a period when specific “investments” from parents and others are extremely important
  - Stimulating environments (psycho-social stimulation)
Investments in ECD

This is also a period when specific “investments” from parents and others are extremely important

- Stimulating environments (psycho-social stimulation)
  - Creative play, availability of play materials
Investments in ECD

- This is also a period when specific “investments” from parents and others are extremely important
  - Stimulating environments (psycho-social stimulation)
    - Creative play, availability of play materials
    - Quantity and quality of verbal interactions
This is also a period when specific “investments” from parents and others are extremely important

- Stimulating environments (psycho-social stimulation)
  - Creative play, availability of play materials
  - Quantity and quality of verbal interactions
  - Loving Relationships
Investments in ECD

- This is also a period when specific “investments” from parents and others are extremely important
  - Stimulating environments (psycho-social stimulation)
    - Creative play, availability of play materials
    - Quantity and quality of verbal interactions
    - Loving Relationships
  - Healthy environments and lifestyle
Investments in ECD

- This is also a period when specific “investments” from parents and others are extremely important
  - Stimulating environments (psycho-social stimulation)
    - Creative play, availability of play materials
    - Quantity and quality of verbal interactions
    - Loving Relationships
  - Healthy environments and lifestyle
    - Nutrition
Investments in ECD

This is also a period when specific “investments” from parents and others are extremely important

- Stimulating environments (psycho-social stimulation)
  - Creative play, availability of play materials
  - Quantity and quality of verbal interactions
  - Loving Relationships

- Healthy environments and lifestyle
  - Nutrition
  - Physical activity
Investments in ECD

This is also a period when specific “investments” from parents and others are extremely important

- Stimulating environments (psycho-social stimulation)
  - Creative play, availability of play materials
  - Quantity and quality of verbal interactions
  - Loving Relationships

- Healthy environments and lifestyle
  - Nutrition
  - Physical activity
  - Immunisations
Investments in ECD

- This is also a period when specific “investments” from parents and others are extremely important
  - Stimulating environments (psycho-social stimulation)
    - Creative play, availability of play materials
    - Quantity and quality of verbal interactions
    - Loving Relationships
  - Healthy environments and lifestyle
    - Nutrition
    - Physical activity
    - Immunisations
    - Pathogens
Outline

1 Part 1: Early Childhood Development as a Policy Issue
   - What is ECD?
   - Why are economists interested in ECD?
   - Key Policy Issues

2 Part 2: The use of RCT’s
   - The identification problem
   - Using RCT’s
   - Limitations

3 Part 3: Early Childhood Development Research at IFS
   - Case Study 1: Colombia

4 Summary
1. Early Years are Important

- During the earliest years of life the brain develops faster than at any subsequent life stage.
1. Early Years are Important

- During the earliest years of life the brain develops faster than at any subsequent life stage.
- Period of “synaptic pruning”; we shed old synapses to make room for higher quality connections that can support more complex mental function
1. Early Years are Important

- During the earliest years of life the brain develops faster than at any subsequent life stage.
- Period of “synaptic pruning”; we shed old synapses to make room for higher quality connections that can support more complex mental function
  - “Use it or lose it”- frequently used synapses develop strongly, whereas those rarely used are eliminated
1. Early Years are Important

- During the earliest years of life the brain develops faster than at any subsequent life stage.
- Period of “synaptic pruning”; we shed old synapses to make room for higher quality connections that can support more complex mental function
  - “Use it or lose it”- frequently used synapses develop strongly, whereas those rarely used are eliminated
  - Hence stimulation of the brain in these years is important
1. Early Years are Important

- During the earliest years of life the brain develops faster than at any subsequent life stage.
- Period of “synaptic pruning”; we shed old synapses to make room for higher quality connections that can support more complex mental function
  - “Use it or lose it”- frequently used synapses develop strongly, whereas those rarely used are eliminated
  - Hence stimulation of the brain in these years is important
1. Early Years are Important

- During the earliest years of life the brain develops faster than at any subsequent life stage.
- Period of “synaptic pruning”; we shed old synapses to make room for higher quality connections that can support more complex mental function
  - “Use it or lose it”- frequently used synapses develop strongly, whereas those rarely used are eliminated
  - Hence stimulation of the brain in these years is important
1. Early Years are Important

- As a result, what happens here lays the foundations for productivity and wellbeing in the rest of life.

Evidence from the USA shows most of the gaps in cognitive abilities at age 18 (which help explain adult achievement) are already present at age five (Heckman 2008).

Such gaps often occur along familiar lines of income and wealth, a cycle that perpetuates inequality and the intergenerational transmission of poverty.
1. Early Years are Important

- As a result, what happens here lays the foundations for productivity and wellbeing in the rest of life.
- Also a period when large inequalities open up between children.
1. Early Years are Important

- As a result, what happens here lays the foundations for productivity and wellbeing in the rest of life.
- Also a period when large inequalities open up between children.
  - Evidence from the USA shows most of the gaps in cognitive abilities at age 18 (which help explain adult achievement) are already present at age five (Heckman 2008)
1. Early Years are Important

- As a result, what happens here lays the foundations for productivity and wellbeing in the rest of life.
- Also a period when large inequalities open up between children.
  - Evidence from the USA shows most of the gaps in cognitive abilities at age 18 (which help explain adult achievement) are already present at age five (Heckman 2008)
- Such gaps often occur along familiar lines of income and wealth, a cycle that perpetuates inequality and the intergenerational transmission of poverty.
1. Early Years are Important

![Graph showing Bayley cognitive scores (standardised) vs Age in months for Bogota's poorest and richest quartiles.](image-url)
2. Early Years are Malleable

- The paths of children’s development and the gaps that open up between children are not pre-determined.
2. Early Years are Malleable

- The paths of children’s development and the gaps that open up between children are not pre-determined
- They are instead heavily affected by environment and so can be significantly altered by policy or behaviour change
2. Early Years are Malleable

- The paths of children’s development and the gaps that open up between children are not pre-determined.
- They are instead heavily affected by environment and so can be significantly altered by policy or behaviour change.
- Effects of these policies or behaviour changes could last a lifetime.
3. Targeted and well-designed interventions can be very effective.

- Intervening during the earliest years of life, particularly for very disadvantaged children, can have very positive effects which are sustained into adulthood.
3. Targeted and well-designed interventions can be very effective.

- Intervening during the earliest years of life, particularly for very disadvantaged children, can have very positive effects which are sustained into adulthood.
- Impressive results from famous study in Jamaica in the 1980’s (Grantham-McGregor et al (1991)):
3. Targeted and well-designed interventions can be very effective.

- Intervening during the earliest years of life, particularly for very disadvantaged children, can have very positive effects which are sustained into adulthood.

- Impressive results from famous study in Jamaica in the 1980’s (Grantham-McGregor et al (1991)):
  - Weekly home visits focusing on psychosocial stimulation for children aged 9-24 months
3. Targeted and well-designed interventions can be very effective.

- Intervening during the earliest years of life, particularly for very disadvantaged children, can have very positive effects which are sustained into adulthood.

- Impressive results from famous study in Jamaica in the 1980’s (Grantham-McGregor et al (1991)):
  - Weekly home visits focusing on psychosocial stimulation for children aged 9-24 months
  - Large initial effect on IQ, significant effect still maintained into adulthood
3. Targeted and well-designed interventions can be very effective.

- Intervening during the earliest years of life, particularly for very disadvantaged children, can have very positive effects which are sustained into adulthood.
- Impressive results from famous study in Jamaica in the 1980’s (Grantham-McGregor et al (1991)):
  - Weekly home visits focusing on psychosocial stimulation for children aged 9-24 months
  - Large initial effect on IQ, significant effect still maintained into adulthood
  - Latest results also show that those who received the intervention earn 25% higher 20 years on; substantial economic return (Gertler et al 2014)
3. Targeted and well-designed interventions can be very effective.

- Intervening during the earliest years of life, particularly for very disadvantaged children, can have very positive effects which are sustained into adulthood.

- Impressive results from famous study in Jamaica in the 1980’s (Grantham-McGregor et al (1991)):
  - Weekly home visits focusing on psychosocial stimulation for children aged 9-24 months
  - Large initial effect on IQ, significant effect still maintained into adulthood
  - Latest results also show that those who received the intervention earn 25% higher 20 years on; substantial economic return (Gertler et al 2014)
  - However very small sample size, only 127...
3. Targeted and well-designed interventions can be very effective.
3. Targeted and well-designed interventions can be very effective.

- The rate of return (inc. employment earnings, tax and welfare, crime...) on human capital investment early in life may be higher than investing on capital at any subsequent stage.
3. Targeted and well-designed interventions can be very effective.

- The rate of return (inc. employment earnings, tax and welfare, crime...) on human capital investment early in life may be higher than investing on capital at any subsequent stage.
- This is because skills and abilities in these different domains and gained over different time periods reinforce one another through:
  - Self productivity
  - Dynamic complementarities
  - Skill multipliers

However, highly stylized framework

What is it missing?

Peter Leighton (IFS)
3. Targeted and well-designed interventions can be very effective.

- The rate of return (inc. employment earnings, tax and welfare, crime...) on human capital investment early in life may be higher than investing on capital at any subsequent stage.
- This is because skills and abilities in these different domains and gained over different time periods reinforce one another through:
  - Self productivity
3. Targeted and well-designed interventions can be very effective.

- The rate of return (inc. employment earnings, tax and welfare, crime...) on human capital investment early in life may be higher than investing on capital at any subsequent stage.
- This is because skills and abilities in these different domains and gained over different time periods reinforce one another through:
  - Self productivity
  - Dynamic complementarities

However.. highly stylized framework

What is it missing?
3. Targeted and well-designed interventions can be very effective.

- The rate of return (inc. employment earnings, tax and welfare, crime...) on human capital investment early in life may be higher than investing on capital at any subsequent stage.
- This is because skills and abilities in these different domains and gained over different time periods reinforce one another through:
  - Self productivity
  - Dynamic complementarities
  - Skill multipliers

However, this highly stylized framework may be missing:

Peter Leighton (IFS)
ECD Interventions
January 5th, 2018 13 / 47
3. Targeted and well-designed interventions can be very effective.

- The rate of return (inc. employment earnings, tax and welfare, crime...) on human capital investment early in life may be higher than investing on capital at any subsequent stage.
- This is because skills and abilities in these different domains and gained over different time periods reinforce one another through:
  - Self productivity
  - Dynamic complementarities
  - Skill multipliers
- However.. highly stylized framework
3. Targeted and well-designed interventions can be very effective.

- The rate of return (inc. employment earnings, tax and welfare, crime...) on human capital investment early in life may be higher than investing on capital at any subsequent stage.
- This is because skills and abilities in these different domains and gained over different time periods reinforce one another through:
  - Self productivity
  - Dynamic complementarities
  - Skill multipliers
- However, highly stylized framework
  - What is it missing?
3. Targeted and well-designed interventions can be very effective.

- The rate of return (inc. employment earnings, tax and welfare, crime...) on human capital investment early in life may be higher than investing on capital at any subsequent stage.
- This is because skills and abilities in these different domains and gained over different time periods reinforce one another through:
  ▶ Self productivity
  ▶ Dynamic complementarities
  ▶ Skill multipliers
- However.. highly stylized framework
  ▶ What is it missing?
3. Targeted and well-designed interventions can be very effective.

- The rate of return (inc. employment earnings, tax and welfare, crime...) on human capital investment early in life may be higher than investing on capital at any subsequent stage.
- This is because skills and abilities in these different domains and gained over different time periods reinforce one another through:
  - Self productivity
  - Dynamic complementarities
  - Skill multipliers
- However.. highly stylized framework
  - What is it missing?

[Diagram: Rates of return to human capital investment initially setting investment to be equal across all ages]
4. ECD is especially important in developing countries

**Figure:** Children under 5 at risk of not fulfilling their developmental potential (exposure to stunting or extreme poverty)
4. ECD is especially important in developing countries

- High absolute poverty rates: parents struggle to provide nutritious food, play and learning materials
4. ECD is especially important in developing countries

- High absolute poverty rates: parents struggle to provide nutritious food, play and learning materials
- Infrastructure is poor: designing and implementing policies is difficult in terms of staffing, transport, getting materials
4. ECD is especially important in developing countries

- High absolute poverty rates: parents struggle to provide nutritious food, play and learning materials
- Infrastructure is poor: designing and implementing policies is difficult in terms of staffing, transport, getting materials
- Low education levels: lack of knowledge about children's developmental needs
4. ECD is especially important in developing countries

- High absolute poverty rates: parents struggle to provide nutritious food, play and learning materials
- Infrastructure is poor: designing and implementing policies is difficult in terms of staffing, transport, getting materials
- Low education levels: lack of knowledge about children's developmental needs
- Infectious disease
Outline

1 Part 1: Early Childhood Development as a Policy Issue
   - What is ECD?
   - Why are economists interested in ECD?
   - Key Policy Issues

2 Part 2: The use of RCT’s
   - The identification problem
   - Using RCT’s
   - Limitations

3 Part 3: Early Childhood Development Research at IFS
   - Case Study 1: Colombia

4 Summary
Central Policy Questions?

• How can you improve ECD outcomes in a cost effective and sustainable way?
Central Policy Questions?

- How can you improve ECD outcomes in a cost effective and sustainable way?
- How can you encourage parents to invest more in the development of their children?
Central Policy Questions?

- How can you improve ECD outcomes in a cost effective and sustainable way?
- How can you encourage parents to invest more in the development of their children?
- How do you ensure that ECD gains are transferred into long run economic outcomes?
Central Policy Questions?

- How can you improve ECD outcomes in a cost effective and sustainable way?
- How can you encourage parents to invest more in the development of their children?
- How do you ensure that ECD gains are transferred into long run economic outcomes?
Central Policy Questions?

- How can you improve ECD outcomes in a cost effective and sustainable way?
- How can you encourage parents to invest more in the development of their children?
- How do you ensure that ECD gains are transferred into long run economic outcomes?

Answering all of these questions requires gathering sufficient evidence... how?
Outline

1. Part 1: Early Childhood Development as a Policy Issue
   - What is ECD?
   - Why are economists interested in ECD?
   - Key Policy Issues

2. Part 2: The use of RCT’s
   - The identification problem
   - Using RCT’s
   - Limitations

3. Part 3: Early Childhood Development Research at IFS
   - Case Study 1: Colombia

4. Summary
The basic problem...

Suppose that the government of Malawi introduces a policy providing reading books to poorly performing kindergartens.
How to see if it works?

1. Compare schools with and without books
How to see if it works?

1. Compare schools with and without books
   ▶ Problems?
How to see if it works?

1. Compare schools with and without books
   ▶ Problems?
2. Compare outcomes before and after the introduction of the policy
How to see if it works?

1. Compare schools with and without books
   - Problems?
2. Compare outcomes before and after the introduction of the policy
   - Problems?
How to see if it works?

1. Compare schools with and without books
   ▶ Problems?
2. Compare outcomes before and after the introduction of the policy
   ▶ Problems?
3. Compare outcomes before and after between schools with and without books (differences in differences)
How to see if it works?

1. Compare schools with and without books
   ▶ Problems?

2. Compare outcomes before and after the introduction of the policy
   ▶ Problems?

3. Compare outcomes before and after between schools with and without books (differences in differences)
   ▶ Problems?
Formally

What's the problem here?

\[ \text{outcome}_{i,j} = \alpha + \beta \times \text{books}_j + \epsilon_{i,j} \]  \hfill (1)
Formally

What’s the problem here?

\[ \text{outcome}_{i,j} = \alpha + \beta \times \text{books}_j + \epsilon_{i,j} \]  

(1)

Correlation between \( \epsilon_{i,j} \) and \( \text{books}_j \)
Outline

1. Part 1: Early Childhood Development as a Policy Issue
   - What is ECD?
   - Why are economists interested in ECD?
   - Key Policy Issues

2. Part 2: The use of RCT’s
   - The identification problem
   - Using RCT’s
   - Limitations

3. Part 3: Early Childhood Development Research at IFS
   - Case Study 1: Colombia

4. Summary
Parallel Universes

The key challenge is in identifying the correct counterfactual. What would have happened to the same Kindergarten that received books in an alternative universe where they didn’t receive them?
Parallel Universes

The key challenge is in identifying the correct counterfactual. What would have happened to the same Kindergarten that received books in an alternative universe where they didn’t receive them?
Learning from Medical Trials

One way to approximate this parallel universe is to conduct a “randomised control trial” (RCT).

Randomly assign half of the schools to get textbooks (“treatment group”) and half to not (“control group”). In expectation there should be no systematic differences between the two groups. Hence the control group provides a valid counterfactual. Then can simply compare means between the two groups and get a valid estimate of the “causal” effect of books.
One way to approximate this parallel universe is to conduct a “randomised control trial” (RCT).

- Randomly assign half of the schools to get textbooks (“treatment group”) and half to not (“control group”).
One way to approximate this parallel universe is to conduct a “randomised control trial” (RCT).

- Randomly assign half of the schools to get textbooks (“treatment group”) and half to not (“control group”)
  - In expectation there should be no systematic differences between the two groups.
Learning from Medical Trials

One way to approximate this parallel universe is to conduct a “randomised control trial” (RCT).

- Randomly assign half of the schools to get textbooks (“treatment group”) and half to not (“control group”)
  - In expectation there should be no systematic differences between the two groups.
  - Hence the control group provides a valid counterfactual
One way to approximate this parallel universe is to conduct a “randomised control trial” (RCT).

- Randomly assign half of the schools to get textbooks (“treatment group”) and half to not (“control group”)
  - In expectation there should be no systematic differences between the two groups.
    - Hence the control group provides a valid counterfactual
- Then can simply compare means between the two groups and get a valid estimate of the “causal” effect of books
Learning from Medical Trials

One way to approximate this parallel universe is to conduct a “randomised control trial” (RCT).

- Randomly assign half of the schools to get textbooks (“treatment group”) and half to not (“control group”)
  - In expectation there should be no systematic differences between the two groups.
    - Hence the control group provides a valid counterfactual

- Then can simply compare means between the two groups and get a valid estimate of the “causal” effect of books

- Additional considerations (see here)
What does this mean about $\epsilon_i$?

\[
outcome_{i,j} = \alpha + \beta \times textbooks_j + \epsilon_{i,j}
\] (2)
What does this mean about $\epsilon_i$?

\[
\text{outcome}_{i,j} = \alpha + \beta \times \text{textbooks}_j + \epsilon_{i,j}
\] (2)

\[
\text{Corr}(\epsilon_{i,j}, \text{books}_j) = 0
\]
The “Gold standard” of evidence

- In practice RCT’s can lead to very different conclusions from observational studies

- Example: The effect of pedagogical materials
  - Observational studies have shown that inputs into education: textbooks, flipcharts etc are beneficial for student learning (why could this be the case? Think about Corr (ε_i, j, books_j))
  - However results from RCT’s have found no significant impacts (see Glewwe et al (2004), Glewwe, Kremer and Moulin (2009), Sabarwal, Evans and Marshak (2014)
  - A number of different reasons for this
    - Materials not at the correct level for students
    - Being stored and not used by teachers
The “Gold standard” of evidence

- In practice RCT’s can lead to very different conclusions from observational studies
- Example: The effect of pedagogical materials

- Materials not at the correct level for students
- Being stored and not used by teachers
The “Gold standard” of evidence

- In practice RCT’s can lead to very different conclusions from observational studies
- Example: The effect of pedagogical materials
  - Observational studies have shown that inputs into education: textbooks, flipcharts etc are beneficial for student learning (why could this be the case? Think about $Corr(\epsilon_{i,j}, \text{books}_j)$)
The “Gold standard” of evidence

- In practice RCT’s can lead to very different conclusions from observational studies
- Example: The effect of pedagogical materials
  - Observational studies have shown that inputs into education: textbooks, flipcharts etc are beneficial for student learning (why could this be the case? Think about $\text{Corr}(\epsilon_{i,j}, books_j)$)
  - However results from RCT’s have found no significant impacts (see Glewe et al (2004), Glewwe, Kremer and Moulin (2009), Sabarwal, Evans and Marshak (2014))
The “Gold standard” of evidence

- In practice RCT’s can lead to very different conclusions from observational studies
- Example: The effect of pedagogical materials
  - Observational studies have shown that inputs into education: textbooks, flipcharts etc are beneficial for student learning (why could this be the case? Think about $\text{Corr}(\epsilon_{i,j}, books_j)$)
  - However results from RCT’s have found no significant impacts (see Glewwe et al (2004), Glewwe, Kremer and Moulin (2009), Sabarwal, Evans and Marshak (2014))
  - A number of different reasons for this
The “Gold standard” of evidence

- In practice RCT’s can lead to very different conclusions from observational studies
- Example: The effect of pedagogical materials
  - Observational studies have shown that inputs into education: textbooks, flipcharts etc are beneficial for student learning (why could this be the case? Think about $\text{Corr}(\epsilon_{i,j}, \text{books}_j)$ )
  - However results from RCT’s have found no significant impacts (see Glewwe et al (2004), Glewwe, Kremer and Moulin (2009), Sabarwal, Evans and Marshak (2014)
  - A number of different reasons for this
    - Materials not at the correct level for students
The “Gold standard” of evidence

- In practice RCT’s can lead to very different conclusions from observational studies
- Example: The effect of pedagogical materials
  - Observational studies have shown that inputs into education: textbooks, flipcharts etc are beneficial for student learning (why could this be the case? Think about $\text{Corr}(\epsilon_{i,j}, \text{books}_j)$)
  - However results from RCT’s have found no significant impacts (see Glewwe et al (2004), Glewwe, Kremer and Moulin (2009), Sabarwal, Evans and Marshak (2014)
  - A number of different reasons for this
    - Materials not at the correct level for students
    - Being stored and not used by teachers
Outline

1. Part 1: Early Childhood Development as a Policy Issue
   - What is ECD?
   - Why are economists interested in ECD?
   - Key Policy Issues

2. Part 2: The use of RCT's
   - The identification problem
   - Using RCT's
   - Limitations

3. Part 3: Early Childhood Development Research at IFS
   - Case Study 1: Colombia

4. Summary
Limitations

Do you know about any RCTs that provide evidence that we should use RCTs?
Limitations

- Treatment and control groups are only balanced in expectation - need not be true in small samples
Limitations

- Treatment and control groups are only balanced in expectation - need not be true in small samples
- Internal vs external validity

Peter Leighton (IFS)
Limitations

- Treatment and control groups are only balanced in expectation - need not be true in small samples
- Internal vs external validity
  - RCT’s high on internal validity
Limitations

- Treatment and control groups are only balanced in expectation - need not be true in small samples
- Internal vs external validity
  - RCT’s high on internal validity
  - However - to what extent can findings from one intervention be applied elsewhere?
Limitations

- Treatment and control groups are only balanced in expectation - need not be true in small samples
- Internal vs external validity
  - RCT’s high on internal validity
  - However - to what extent can findings from one intervention be applied elsewhere?
  - Small geographical areas, less diverse samples than larger observational studies
Limitations

- Treatment and control groups are only balanced in expectation - need not be true in small samples
- Internal vs external validity
  - RCT’s high on internal validity
  - However - to what extent can findings from one intervention be applied elsewhere?
  - Small geographical areas, less diverse samples than larger observational studies
  - Theory is also needed to understand mechanisms and generalise findings

Not all interesting questions can be answered by RCT’s due to practical or ethical concerns

- A change in the interest rate? An increase in foreign aid?
- Large cost in both time and money
Limitations

- Treatment and control groups are only balanced in expectation - need not be true in small samples
- Internal vs external validity
  - RCT’s high on internal validity
  - However - to what extent can findings from one intervention be applied elsewhere?
  - Small geographical areas, less diverse samples than larger observational studies
  - Theory is also needed to understand mechanisms and generalise findings
- Not all interesting questions can be answered by RCT’s due to practical or ethical concerns
Limitations

- Treatment and control groups are only balanced in expectation - need not be true in small samples

- Internal vs external validity
  - RCT’s high on internal validity
  - However - to what extent can findings from one intervention be applied elsewhere?
  - Small geographical areas, less diverse samples than larger observational studies
  - Theory is also needed to understand mechanisms and generalise findings

- Not all interesting questions can be answered by RCT’s due to practical or ethical concerns
  - A change in the interest rate? An increase in foreign aid?
Limitations

- Treatment and control groups are only balanced in expectation - need not be true in small samples
- Internal vs external validity
  - RCT’s high on internal validity
  - However - to what extent can findings from one intervention be applied elsewhere?
  - Small geographical areas, less diverse samples than larger observational studies
  - Theory is also needed to understand mechanisms and generalise findings
- Not all interesting questions can be answered by RCT’s due to practical or ethical concerns
  - A change in the interest rate? An increase in foreign aid?
- Large cost in both time and money
Outline

1. Part 1: Early Childhood Development as a Policy Issue
   - What is ECD?
   - Why are economists interested in ECD?
   - Key Policy Issues

2. Part 2: The use of RCT’s
   - The identification problem
   - Using RCT’s
   - Limitations

3. Part 3: Early Childhood Development Research at IFS
   - Case Study 1: Colombia

4. Summary
Research Questions

1. Can impressive findings of Jamaica study be replicated elsewhere?

- Colombia context potentially very different

2. Can home visiting interventions be delivered in a cost-effective and scalable way?

- Previous interventions have been intensive and not embedded in existing infrastructure of the country

- Important if there is to be wide scale roll out of these policies
1. Can impressive findings of Jamaica study be replicated elsewhere?
   - Colombia context potentially very different
Research Questions

1. Can impressive findings of Jamaica study be replicated elsewhere?
   - Colombia context potentially very different

2. Can home visiting interventions be delivered in a cost-effective and scalable way?
Research Questions

1. Can impressive findings of Jamaica study be replicated elsewhere?
   - Colombia context potentially very different

2. Can home visiting interventions be delivered in a cost-effective and scalable way?
   - Previous interventions have been intensive and not embedded in existing infrastructure of the country
Research Questions

1. Can impressive findings of Jamaica study be replicated elsewhere?
   - Colombia context potentially very different

2. Can home visiting interventions be delivered in a cost-effective and scalable way?
   - Previous interventions have been intensive and not embedded in existing infrastructure of the country
   - Important if there is to be wide scale roll out of these policies
96 small towns in 3 regions of Colombia
Sample

- 96 small towns in 3 regions of Colombia
- Participants from the bottom quintile of the income distribution
Sample

- 96 small towns in 3 regions of Colombia
- Participants from the bottom quintile of the income distribution
- Relatively low starting point in terms of developmental outcomes (especially cognitive and language development), compared to internationally.
Sample

- 96 small towns in 3 regions of Colombia
- Participants from the bottom quintile of the income distribution
- Relatively low starting point in terms of developmental outcomes (especially cognitive and language development), compared to internationally.
- Mothers had, on average, 7.7 years of education. Big variation.

Anaemia and other conditions caused by micronutrient deficiencies are fairly prevalent amongst young children.
Sample

- 96 small towns in 3 regions of Colombia
- Participants from the bottom quintile of the income distribution
- Relatively low starting point in terms of developmental outcomes (especially cognitive and language development), compared to internationally.
- Mothers had, on average, 7.7 years of education. Big variation.
- Anaemia and other conditions caused by micronutrient deficiencies are fairly prevalent amongst young children.
1. Weekly Home Visits:

- Lasting for 1 hour
- Delivered by specially trained “Madre Lideres” (community representatives from an existing cash transfer program)
- Designed to be more scalable
- Based on the original Jamaican curriculum, adapted to the Colombian context and the intervention reality

2. Micronutrient supplementation:

- Tasteless sprinkles, which are a mix of vitamins, iron and zinc

The interventions lasted for 18 months, starting in Feb-May 2010
Intervention

1. Weekly Home Visits:
   ▶ Lasting for 1 hour

The interventions lasted for 18 months, starting in Feb-May 2010.
Intervention

1. Weekly Home Visits:
   - Lasting for 1 hour
   - Delivered by specially trained “Madre Lideres” (community representatives from an existing cash transfer program) - designed to be more scalable

2. Micronutrient supplementation:
   - Tasteless sprinkles, which are a mix of vitamins, iron and zinc

The interventions lasted for 18 months, starting in Feb-May 2010.
Intervention

1. Weekly Home Visits:
   - Lasting for 1 hour
   - Delivered by specially trained “Madre Lideres” (community representatives from an existing cash transfer program) - designed to be more scalable
   - Based on the original Jamaican curriculum, adapted to the Colombian context and the intervention reality

2. Micronutrient supplementation:
   - Tasteless sprinkles, which are a mix of vitamins, iron and zinc

The interventions lasted for 18 months, starting in Feb-May 2010
1. Weekly Home Visits:
   - Lasting for 1 hour
   - Delivered by specially trained “Madre Lideres” (community representatives from an existing cash transfer program) - designed to be more scalable
   - Based on the original Jamaican curriculum, adapted to the Colombian context and the intervention reality

2. Micronutrient supplementation:
Intervention

1. Weekly Home Visits:
   - Lasting for 1 hour
   - Delivered by specially trained “Madre Lideres” (community representatives from an existing cash transfer program) - designed to be more scalable
   - Based on the original Jamaican curriculum, adapted to the Colombian context and the intervention reality

2. Micronutrient supplementation:
   - Tasteless sprinkles, which are a mix of vitamins, iron and zinc
Intervention

1. Weekly Home Visits:
   - Lasting for 1 hour
   - Delivered by specially trained “Madre Lideres” (community representatives from an existing cash transfer program) - designed to be more scalable
   - Based on the original Jamaican curriculum, adapted to the Colombian context and the intervention reality

2. Micronutrient supplementation:
   - Tasteless sprinkles, which are a mix of vitamins, iron and zinc
   - The interventions lasted for 18 months, starting in Feb-May 2010
Randomisation

- 4 groups:
Randomisation

- 4 groups:
Randomisation

- 4 groups:

  - Stimulation
  - Micronutrient Suppl.
  - Stimulation + Micronutrient Suppl.
  - Control
Promote cognitive and language development
The Curriculum

- Promote cognitive and language development
- Mother focused: support the mother to promote her child’s development
The Curriculum

- Promote cognitive and language development
- Mother focused: support the mother to promote her child’s development
- Teach through play: rich in play materials
The Curriculum

- Promote cognitive and language development
- Mother focused: support the mother to promote her child’s development
- Teach through play: rich in play materials
- Incorporate concepts/skills to be taught in daily routines
The Curriculum

- Promote cognitive and language development
- Mother focused: support the mother to promote her child’s development
- Teach through play: rich in play materials
- Incorporate concepts/skills to be taught in daily routines
- Organised by weeks to match the developmental level of the child to the extent possible
The Curriculum

- Promote cognitive and language development
- Mother focused: support the mother to promote her child’s development
- Teach through play: rich in play materials
- Incorporate concepts/skills to be taught in daily routines
- Organised by weeks to match the developmental level of the child to the extent possible
- Keep costs down: use home-made toys, rotating toys
Intervention
Results

- Positive effect on cognitive and language skills
Results

- Positive effect on cognitive and language skills
Results

- Positive effect on cognitive and language skills

<table>
<thead>
<tr>
<th></th>
<th>Cognition (Bayley)</th>
<th>Receptive Language (Bayley)</th>
<th>Expressive Language (Bayley)</th>
<th>Number Words (MacArthur)</th>
<th>Difficult Child (Bates)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stimulation</strong></td>
<td>0.251** (0.073)</td>
<td>0.188** (0.080)</td>
<td>0.0592 (0.073)</td>
<td>3.830+ (2.008)</td>
<td>-0.541+ (0.288)</td>
</tr>
<tr>
<td><strong>Stim + Micronutrient</strong></td>
<td>0.205** (0.070)</td>
<td>0.163* (0.073)</td>
<td>0.0826 (0.083)</td>
<td>4.238* (2.116)</td>
<td>-0.161 (0.251)</td>
</tr>
<tr>
<td><strong>Micronutrients</strong></td>
<td>0.0467 (0.059)</td>
<td>0.0393 (0.084)</td>
<td>0.0836 (0.087)</td>
<td>3.634+ (1.911)</td>
<td>-0.0597 (0.262)</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>1,267</td>
<td>1,267</td>
<td>1,267</td>
<td>1,325</td>
<td>1,325</td>
</tr>
</tbody>
</table>

*Significant at 5%, **significant at 1%
Results

- Effects important in magnitude - equivalent to closing 1/3rd of the gap between rich and poor
Results

- Effects important in magnitude - equivalent to closing 1/3rd of the gap between rich and poor
Results

- Effects important in magnitude - equivalent to closing 1/3rd of the gap between rich and poor

![Graph showing Bayley cognitive scores over age for different groups.](image)
Moving Beyond Average Treatment Effects

- As discussed, there is only so much that you can know from an RCT impact evaluation alone.
Moving Beyond Average Treatment Effects

- As discussed, there is only so much that you can know from an RCT impact evaluation alone
  - Do not know mechanisms of why it worked, how much would apply elsewhere etc
Moving Beyond Average Treatment Effects

- As discussed, there is only so much that you can know from an RCT impact evaluation alone
  - Do not know mechanisms of why it worked, how much would apply elsewhere etc
- To address this, researchers incorporated the RCT into a more structural model
Moving Beyond Average Treatment Effects

- As discussed, there is only so much that you can know from an RCT impact evaluation alone
  - Do not know mechanisms of why it worked, how much would apply elsewhere etc
- To address this, researchers incorporated the RCT into a more structural model
  - Write down a model of human capital formation and parental decisions (real life use of micro 101!!) - then take to the data to estimate
Moving Beyond Average Treatment Effects

- As discussed, there is only so much that you can know from an RCT impact evaluation alone
  - Do not know mechanisms of why it worked, how much would apply elsewhere etc
- To address this, researchers incorporated the RCT into a more structural model
  - Write down a model of human capital formation and parental decisions (real life use of micro 101!!) - then take to the data to estimate
  - Good example of combining multiple approaches
As discussed, there is only so much that you can know from an RCT impact evaluation alone

- Do not know mechanisms of why it worked, how much would apply elsewhere etc

To address this, researchers incorporated the RCT into a more structural model

- Write down a model of human capital formation and parental decisions (real life use of micro 101!!) - then take to the data to estimate
- Good example of combining multiple approaches
- Not as opposing as often thought! (Many blogs on the “Randomista’s vs others arguments for example see: here)
A Human Capital Production Function

Assume a production function of human capital where $H_{i,t}$ is human capital, $X_{i,t}$ are parental investments in human capital, and $Z_{i,t}$ are background characteristics for individual $i$ at time $t$:

$$H_{i,t+1} = f_{i,t}(H_{i,t}, X_{i,t}, Z_{i,t}, \epsilon_{i,t})$$

(3)
A Human Capital Production Function

- Assume a production function of human capital where $H_{i,t}$ is human capital, $X_{i,t}$ are parental investments in human capital, and $Z_{i,t}$ are background characteristics for individual $i$ at time $t$:

  \[ H_{i,t+1} = f_{i,t}(H_{i,t}, X_{i,t}, Z_{i,t}, \epsilon_{i,t}) \]  

- There are two possible ways with which the intervention could have impacted child outcomes

  1. Increasing parental investments - $X_{i,t}$
  2. Each unit of investment is more productive due to changes in the production function - $f_{i,t}$
A Human Capital Production Function

Assume a production function of human capital where $H_{i,t}$ is human capital, $X_{i,t}$ are parental investments in human capital, and $Z_{i,t}$ are background characteristics for individual $i$ at time $t$:

$$H_{i,t+1} = f_{i,t}(H_{i,t}, X_{i,t}, Z_{i,t}, \epsilon_{i,t}) \quad (3)$$

There are two possible ways with which the intervention could have impacted child outcomes:

1. Increasing parental investments - $X_{i,t}$
A Human Capital Production Function

- Assume a production function of human capital where $H_{i,t}$ is human capital, $X_{i,t}$ are parental investments in human capital, and $Z_{i,t}$ are background characteristics for individual $i$ at time $t$:

$$H_{i,t+1} = f_{i,t}(H_{i,t}, X_{i,t}, Z_{i,t}, \epsilon_{i,t})$$ (3)

- There are two possible ways with which the intervention could have impacted child outcomes
  1. Increasing parental investments - $X_{i,t}$
  2. Each unit of investment is more productive due to changes in the production function - $f_{i,t}$
A Human Capital Production Function

- Assume a production function of human capital where $H_{i,t}$ is human capital, $X_{i,t}$ are parental investments in human capital, and $Z_{i,t}$ are background characteristics for individual $i$ at time $t$:

$$H_{i,t+1} = f_{i,t}(H_{i,t}, X_{i,t}, Z_{i,t}, \epsilon_{i,t}) \quad (3)$$

- There are two possible ways with which the intervention could have impacted child outcomes:
  1. Increasing parental investments - $X_{i,t}$
  2. Each unit of investment is more productive due to changes in the production function - $f_{i,t}$

- Could also be a combination of both
A Human Capital Production Function

- Assume a production function of human capital where $H_{i,t}$ is human capital, $X_{i,t}$ are parental investments in human capital, and $Z_{i,t}$ are background characteristics for individual $i$ at time $t$:

$$H_{i,t+1} = f_{i,t}(H_{i,t}, X_{i,t}, Z_{i,t}, \epsilon_{i,t})$$

(3)

- There are two possible ways with which the intervention could have impacted child outcomes:
  1. Increasing parental investments - $X_{i,t}$
  2. Each unit of investment is more productive due to changes in the production function - $f_{i,t}$

- Could also be a combination of both

- To distinguish between these two factors it is necessary to estimate the production functions
Estimating a Production Function

Challenges:

1. Getting Functional Form correct
Estimating a Production Function

Challenges:

1. Getting Functional Form correct
   - Specify a flexible functional form - CES

Potential endogeneity of investments (correlated with $\epsilon$)
- Use control function approach - similar to instrumental variables using local prices.

Human capital isn't actually observed
- Latent factor approach to estimate distribution
Estimating a Production Function

Challenges:

1. Getting Functional Form correct
   - Specify a flexible functional form - CES

2. Potential endogeneity of investments (correlated with $\epsilon$)
Estimating a Production Function

Challenges:

1. **Getting Functional Form correct**
   - Specify a flexible functional form - CES

2. **Potential endogeneity of investments** (correlated with $\epsilon$)
   - Use control function approach - similar to instrumental variables using local prices.
Estimating a Production Function

Challenges:

1. Getting Functional Form correct
   - Specify a flexible functional form - CES

2. Potential endogeneity of investments (correlated with $\epsilon$)
   - Use control function approach - similar to instrumental variables using local prices.

3. Human capital isn’t actually observed
Challenges:

1. Getting Functional Form correct
   - Specify a flexible functional form - CES

2. Potential endogeneity of investments (correlated with $\epsilon$)
   - Use control function approach - similar to instrumental variables using local prices.

3. Human capital isn’t actually observed
   - Latent factor approach to estimate distribution
Results

1. Production function does not differ between treatment and control group
Results

1. Production function does not differ between treatment and control group
2. Impact instead occurs due to increased parental investments
Results

1. Production function does not differ between treatment and control group
2. Impact instead occurs due to increased parental investments
   - Open question: are there easier ways to encourage behaviour change?

Material investments are most important for cognitive skills, and time investments for noncognitive skills

Evidence of self productivity and dynamic complementarities - "skills beget skills"
Results

1. Production function does not differ between treatment and control group
2. Impact instead occurs due to increased parental investments
   - Open question: are there easier ways to encourage behaviour change?
3. Material investments are most important for cognitive skills, and time investments for noncognitive skills
Results

1. Production function does not differ between treatment and control group
2. Impact instead occurs due to increased parental investments
   - Open question: are there easier ways to encourage behaviour change?
3. Material investments are most important for cognitive skills, and time investments for noncognitive skills
4. Evidence of self productivity and dynamic complementarities - “skills beget skills”
Results

### Estimates of the CES production function for cognitive skill

<table>
<thead>
<tr>
<th></th>
<th>Without control function</th>
<th>With control function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline cognitive skills</td>
<td>0.707*</td>
<td>0.646*</td>
</tr>
<tr>
<td></td>
<td>[0.664,0.778]</td>
<td>[0.606,0.761]</td>
</tr>
<tr>
<td>Baseline non-cognitive skills</td>
<td>0.028</td>
<td>0.045</td>
</tr>
<tr>
<td></td>
<td>[-0.056,0.138]</td>
<td>[-0.042,0.153]</td>
</tr>
<tr>
<td>Mother's cognitive skills</td>
<td>0.103*</td>
<td>-0.123</td>
</tr>
<tr>
<td></td>
<td>[0.038,0.182]</td>
<td>[-0.174,0.126]</td>
</tr>
<tr>
<td>Mother's non-cognitive skills</td>
<td>0.119*</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>[0.026,0.184]</td>
<td>[-0.018,0.152]</td>
</tr>
<tr>
<td>Material investments</td>
<td>0.056*</td>
<td>0.277*</td>
</tr>
<tr>
<td></td>
<td>[0.02,0.084]</td>
<td>[0.005,0.315]</td>
</tr>
<tr>
<td>Time investments</td>
<td>-0.021</td>
<td>0.065</td>
</tr>
<tr>
<td></td>
<td>[-0.056,0.012]</td>
<td>[-0.09,0.178]</td>
</tr>
<tr>
<td>Number of children in household</td>
<td>0.007</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td>[-0.012,0.022]</td>
<td>[-0.008,0.042]</td>
</tr>
<tr>
<td>Control function for material investments</td>
<td>-</td>
<td>-0.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[-0.295,0.049]</td>
</tr>
<tr>
<td>Control function for time investment</td>
<td>-</td>
<td>-0.097</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[-0.229,0.07]</td>
</tr>
<tr>
<td>Complementarity parameter</td>
<td>0.027</td>
<td>0.094</td>
</tr>
<tr>
<td></td>
<td>[-0.156,0.263]</td>
<td>[-0.053,0.243]</td>
</tr>
<tr>
<td>Elasticity of substitution</td>
<td>1.027*</td>
<td>1.104*</td>
</tr>
<tr>
<td></td>
<td>[0.865,1.356]</td>
<td>[0.949,1.321]</td>
</tr>
<tr>
<td>Productivity parameter (A)</td>
<td>0.996*</td>
<td>0.986*</td>
</tr>
<tr>
<td></td>
<td>[0.986,1.008]</td>
<td>[0.978,1.004]</td>
</tr>
<tr>
<td>Productivity parameter interacted with treatment</td>
<td>0.064*</td>
<td>-0.022</td>
</tr>
<tr>
<td></td>
<td>[0.006,0.128]</td>
<td>[-0.055,0.102]</td>
</tr>
</tbody>
</table>

Note: 90% confidence intervals in brackets based on 200 bootstraps. * significant at the 10% level.
### Estimates of the CES production function for non-cognitive skill

<table>
<thead>
<tr>
<th></th>
<th>Without control function</th>
<th>With control function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline cognitive skills</td>
<td>0.156*</td>
<td>0.148*</td>
</tr>
<tr>
<td></td>
<td>[0.102,0.277]</td>
<td>[0.03,0.291]</td>
</tr>
<tr>
<td>Baseline non-cognitive skills</td>
<td>0.611*</td>
<td>0.536*</td>
</tr>
<tr>
<td></td>
<td>[0.424,0.705]</td>
<td>[0.371,0.678]</td>
</tr>
<tr>
<td>Mother’s cognitive skills</td>
<td>-0.047</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>[-0.09,0.034]</td>
<td>[-0.27,0.21]</td>
</tr>
<tr>
<td>Mother’s non-cognitive skills</td>
<td>0.134*</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td>[0.02,0.27]</td>
<td>[-0.072,0.184]</td>
</tr>
<tr>
<td>Material investments</td>
<td>0.073*</td>
<td>-0.319</td>
</tr>
<tr>
<td></td>
<td>[0.035,0.105]</td>
<td>[-0.418,0.09]</td>
</tr>
<tr>
<td>Time investments</td>
<td>0.048*</td>
<td>0.578*</td>
</tr>
<tr>
<td></td>
<td>[0.014,0.085]</td>
<td>[0.198,0.724]</td>
</tr>
<tr>
<td>Number of children in household</td>
<td>0.025</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>[-0.008,0.077]</td>
<td>[-0.014,0.087]</td>
</tr>
<tr>
<td>Control function for material investments</td>
<td>-</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[-0.008,0.509]</td>
</tr>
<tr>
<td>Control function for time investment</td>
<td>-</td>
<td>-0.564</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[-0.738,-0.16]</td>
</tr>
<tr>
<td>Complementarity parameter</td>
<td>-0.107</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>[-0.29,0.15]</td>
<td>[-0.072,0.056]</td>
</tr>
<tr>
<td>Elasticity of substitution</td>
<td>0.904*</td>
<td>1.013*</td>
</tr>
<tr>
<td></td>
<td>[0.775,1.176]</td>
<td>[0.933,1.059]</td>
</tr>
<tr>
<td>Productivity parameter</td>
<td>1.005*</td>
<td>1.000*</td>
</tr>
<tr>
<td></td>
<td>[0.989,1.023]</td>
<td>[0.991,1.009]</td>
</tr>
<tr>
<td>Productivity parameter interacted with treatment</td>
<td>-0.009</td>
<td>-0.09</td>
</tr>
<tr>
<td></td>
<td>[-0.04,0.027]</td>
<td>[-0.176,0.023]</td>
</tr>
</tbody>
</table>

Note: 90% confidence intervals in brackets based on 200 bootstraps. * significant at the 10% level.
Early childhood development is extremely important in determining future life outcomes.
Early childhood development is extremely important in determining future life outcomes

As a result well targeted interventions can significantly alter the life trajectories of children in developing countries
Early childhood development is extremely important in determining future life outcomes.

As a result, well-targeted interventions can significantly alter the life trajectories of children in developing countries.

RCT’s represent an effective way of evaluating ECD interventions.
Summary

- Early childhood development is extremely important in determining future life outcomes.
- As a result, well-targeted interventions can significantly alter the life trajectories of children in developing countries.
- RCT's represent an effective way of evaluating ECD interventions.
  - But need to be aware of the limitations and how to best complement them with other methods.

Evidence from IFS work in Colombia shows that it is possible to deliver these interventions in a relatively cheap and scalable way. Future research aims to better understand delivery at scale, parental behaviour change, and interactions with policy in later years.
Summary

- Early childhood development is extremely important in determining future life outcomes.
- As a result, well-targeted interventions can significantly alter the life trajectories of children in developing countries.
- RCT’s represent an effective way of evaluating ECD interventions.
  - But need to be aware of the limitations and how to best complement them with other methods.
- Evidence from IFS work in Colombia shows that it is possible to deliver these interventions in a relatively cheap and scalable way.
Summary

- Early childhood development is extremely important in determining future life outcomes.
- As a result, well-targeted interventions can significantly alter the life trajectories of children in developing countries.
- RCT’s represent an effective way of evaluating ECD interventions.
  - But need to be aware of the limitations and how to best complement them with other methods.
- Evidence from IFS work in Colombia shows that it is possible to deliver these interventions in a relatively cheap and scalable way.
- Future research aims to better understand delivery at scale, parental behaviour change, and interactions with policy in later years.
Accessible blogs/articles for further reading

- A nice summary of the Jamaican intervention [here](#)
Accessible blogs/articles for further reading

- A nice summary of the Jamaican intervention [here](#)
- The argument for investing in ECD from Nobel laureate James Heckman [here](#)
Accessible blogs/articles for further reading

- A nice summary of the Jamaican intervention here
- The argument for investing in ECD from Nobel laureate James Heckman here
- ECD in the popular press here
Accessible blogs/articles for further reading

- A nice summary of the Jamaican intervention [here](#)
- The argument for investing in ECD from Nobel laureate James Heckman [here](#)
- ECD in the popular press [here](#)
- Arguments on RCT’s [here](#)
Accessible blogs/articles for further reading

- A nice summary of the Jamaican intervention [here](#)
- The argument for investing in ECD from Nobel laureate James Heckman [here](#)
- ECD in the popular press [here](#)
- Arguments on RCT’s
  - Blogs: Lant Pritchett [here](#) vs Blattman [here](#)
Accessible blogs/articles for further reading

- A nice summary of the Jamaican intervention [here](#)
- The argument for investing in ECD from Nobel laureate James Heckman [here](#)
- ECD in the popular press [here](#)
- Arguments on RCT’s
  - Blogs: Lant Pritchett [here](#) vs Blattman [here](#)
  - Academic papers: Deaton’s critique [here](#) vs Banerjee and Duflo [here](#)
Accessible blogs/articles for further reading

- A nice summary of the Jamaican intervention [here](#)
- The argument for investing in ECD from Nobel laureate James Heckman [here](#)
- ECD in the popular press [here](#)
- Arguments on RCT’s
  - Blogs: Lant Pritchett [here](#) vs Blattman [here](#)
  - Academic papers: Deaton’s critique [here](#) vs Banerjee and Duflo [here](#)
- A blog on some of EDePo’s work [here](#)
RCT Additional Considerations

- Individual or cluster level randomisation?
RCT Additional Considerations

- Individual or cluster level randomisation?
- Method of randomisation - stratification
RCT Additional Considerations

- Individual or cluster level randomisation?
- Method of randomisation - stratification
- Power calculations
RCT Additional Considerations

- Individual or cluster level randomisation?
- Method of randomisation - stratification
- Power calculations
- Use of baseline controls
RCT Additional Considerations

- Individual or cluster level randomisation?
- Method of randomisation - stratification
- Power calculations
- Use of baseline controls
- Back to main