Conclusion: Policy Implications

- What does this all mean for policy?
- Policies that put a lot of emphasis on the *quantity* of food may be misguided, in terms of the benefits they bring: the poverty trap they try to solve is not really there...
- Better ideas:
- Subsidizing double fortified salt purchase, rather than offering free grain (most of which gets lots on the way anyway).
  - Making it as easy as possible to do the right thing: invent foods people like to eat, and which are good for you (e.g. yams rich in beta-carotene).
  - Make school meals rich in nutrition (e.g. sprinkle them with sachets)
  - Other ideas?
Nutrition: the Hidden traps
The Puzzle of Nutrition

- We saw that the poor did not appear particularly hungry for extra calorie, or extra nutrients
- And yet, by all accounts they are still not well nourished:
  - India, 2004, 33% of men and 36% of women were undernourished (BMI below 18.5)
  - Iron deficiency anemia is believed to affect up to 1 billion of people worldwide
- What could be happening?
The Role of Micronutrients

- Micronutrient deficiency has been described as “hidden hunger”
- A randomized experiment in Indonesia (WISE study):
  - Household were provided iron supplement OR a placebo (why the placebo)?
- Anemia was reduced
- Increase in yearly earnings for self-employed workers who got the supplement and were anemic at baseline: $40
- Cost of fortified Fish sauce for one year: $6
The Role of Good Nutrition in Childhood

- Good nutrition in adulthood makes the adult more productive now.
- But good nutrition during childhood is an investment, and may improve wages of the child every year in adulthood for two reasons:
  - Long term impact on health (body may not well recover from deficiencies during childhood)
  - Long term impact through education: children may learn better if they are well nourished.
An Example: Deworming

- Seventy-five of 89 rural primary schools in rural western Kenya (two divisions in Busia district) took part (Figure 1)
  - Broadly representative of rural Kenya in education, health, worms
- List randomization into three treatment groups:
  - Group 1: deworming drugs and health education in 1998-2003
  - Cost-sharing in random subset of schools in 2001

This study tracks down children who were in primary school during the deworming period (group 1 and 2=treatment, group 3=control) in 2007-2009
Figure 3:
Panel A: The distribution of log labor earnings in the last month, deworming treatment versus control (among those with positive labor earnings)
The **EXTRA WAGES EARNED BY STUDENT IN TREATMENT GROUP**

<table>
<thead>
<tr>
<th>Table 3: Deworming impacts on labor earnings (2007-2009)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Ln(Total labor earnings, past month)</td>
<td>0.191**</td>
<td>0.181**</td>
<td>0.242***</td>
<td>578**</td>
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<tr>
<td>(Dependent variable: Total labor earnings, past month)</td>
<td>(0.078)</td>
<td>(0.077)</td>
<td>(0.092)</td>
<td>(292)</td>
<td>(306)</td>
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<td>Deworming Treatment indicator</td>
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<tr>
<td>Deworming Treatment pupils within 6 km (in '000s), demeaned</td>
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<tr>
<td>Total pupils within 6 km (in '000s), demeaned</td>
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<tr>
<td>Additional controls</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>R²</td>
<td>0.060</td>
<td>0.169</td>
<td>0.175</td>
<td>0.056</td>
<td>0.115</td>
</tr>
<tr>
<td>Observations</td>
<td>710</td>
<td>710</td>
<td>710</td>
<td>710</td>
<td>710</td>
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<tr>
<td>Mean (s.d.) in the control group</td>
<td>7.81</td>
<td>7.81</td>
<td>7.81</td>
<td>3.531</td>
<td>3.531</td>
</tr>
<tr>
<td>(s.d.) in the control group</td>
<td>(0.86)</td>
<td>(0.86)</td>
<td>(0.86)</td>
<td>(3.611)</td>
<td>(3.611)</td>
</tr>
</tbody>
</table>

The mean in the **CONTROL GROUP** (in log)
Cost benefit Analysis

Figure 4: Labor market returns of childhood deworming treatment

- Increased earnings from wage gains (NPV), $700.09
- Increased earnings from greater hours worked (NPV), $422.61
- Cost of deworming pills and delivery, $0.65
- Additional primary school teacher salaries (plus tax deadweight loss), $6.33
- Opportunity cost of attending school, $23.29

Students earned about 20% extra PER YEAR, for a life time, when the cost is 0.65 cents
The Role of Nutrition in the Womb

- Conditions experienced in-utero have long lasting effects: The Barker Hypothesis
  - Doug Almond found that, in the US, people who were in utero during the big flu pandemics were sicker and more likely to die early
  - *Children of children* born during Chinese famine are smaller
  - Children who were in utero during ramadan earn less as adults
  - Field and Toreror: A campaign to provide Iodine supplementation to pregnant women in Tanzania: higher educational achievement for students who were in utero at the right place and time (when those supplements were distributed)
The Potential for Poverty Trap

- Nutritional investments in micronutrients in adulthood, childhood, and pregnancy, all have returns that are much larger than costs.
- If poor are less likely to undertake the investment, there is a potential for a poverty trap.
- Is it the case?
Are the Poor Less Likely to Get the Right Micronutrients?

- Most of the poor still consume a diet that is poor in iron
- The vast majority of the world’s children are not dewormed
- WHO estimates that 40% of pregnant women worldwide are anemic (not all that anemia is Iron deficiency anemia).
Is Money the Problem?

Very small costs seem to discourage people:

- Iron fortified fish sauce costs $6 for a year in Indonesia. If the returns is $40, it seems that that investment is worthwhile, and doable even for a poor family.
- When small cost-sharing was introduced in Kenya in some of the schools (a few cents) take up went almost to zero.
- In India, a free iron fortification program was introduced in some villages. But it was not at all millers in the villages.
  - Very few people switched to fortifying miller
  - And when they did, if miller stopped fortifying, they did not insist that they must continue.
Other Problems

- Will the workers reap the benefits?
  - In Indonesia, wages did not go up for people who worked for a wage: may be the employer does not perceive the increase in productivity. Why bother...

- Information:
  - Very difficult to find out on your own: as late as the 70s, scientists thought protein deficiency was the big nutritional problem, not iron or vitamins
  - Do you trust outsiders that give you information?
Consumption is a Decision

- Human beings maximize their utility, not their productivity...
- And utility is made of other things than how productive you can be
  - How good the food you have to eat every day tastes (hence, perhaps, the prevalence of sugar in the diet of the poor).
  - Your social status, which may be related to how you spend and other spend: “keeping up with the Jones” (funeral, but also large TV)
  - The diversity of goods you have (cell phones, TV, etc.).