

Summary and Replication:

"Parents' Beliefs about Their Children's Academic
Ability: Implications for Educational Investments."

by Rebecca Dizon-Ross (2019)

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I. Summary of the article

The research by Rebecca Dizon-Ross, published in the American Economic Review in 2019 explores how parents' beliefs about their children's academic abilities affect educational investments, with a focus on low-income households. The author sets up a randomized controlled trial (RCT) in Malawi to investigate on information frictions which may lead parents to make sub-optimal decisions about their children's education. Dizon-Ross argues that these frictions are due to parents' inaccurate beliefs about their children's academic performance, which may in turn reflect on their investment choices.

1. Research questions and related literature

The author predicts that providing clear, accessible information about school performance can rectify these inaccurate beliefs and subsequently optimize – especially low-income household - parents' educational investments. The research additionally investigates the possibly disproportionate effects of information frictions on poorer families, thus raising concerns about the perpetuation of poverty (World Bank, 1998; Dizon-Ross, 2019, p. 1).

The article contributes to a multidisciplinary body of literature that has highlighted the impact of information on decision-making (Jensen, 2010; Dizon-Ross, 2019). Unlike research by Bettinger et al. (2012) or Nguyen (2008) which examined system-level factors - like school quality or returns to education-, Dizon-Ross studies individual-level misinformation at the household level (Dizon-Ross, 2019, p.4-7). Other novelties include establishing a causal link between misinformation and investment decisions on one hand, and on the other hand, inferring a correlation between poverty and information frictions.

2. Methodology

The study employs a theoretical framework which considers parents as utility-maximizing agents who invest in education based on their beliefs about their children's academic performance. The author argues that parents' inaccurate beliefs often cause their investments to deviate from the utility-maximizing function – this discrepancy thus leading to suboptimal educational investments (Dizon-Ross, 2019, p.7). Within the framework, an RCT was conducted in Malawi on a sample of 2,634 households with two children enrolled in primary school, randomly assigning them to either a treatment or control group. The former received detailed report cards of their children's performance coupled with an explanation of their content while the latter did not. Consequently, the author sought to understand how this information intervention influenced parental beliefs and investment choices in the short and long term (Dizon-Ross, 2019, p.10-11).

In the short-term, post treatment differences were measured through three experiments. First, the author assessed textbook difficulty selection: parents were given free textbooks for their children and were asked to choose the difficulty level (beginner, average, or advanced) for English and math. The

expectation was that following the intervention, parents in the treatment group would choose the books that were more suited to their children's actual performance. Second, regarding willingness to pay, the study tested the hypothesis that parents in the treatment group would be more inclined to invest in remedial materials for lower-performing children, demonstrating a post treatment shift towards a re-allocation of investments. Third, a real-stakes experiment was conducted where parents were provided with nine lottery tickets which represented the opportunity to secure four years of secondary school fees for one child. The objective was to observe how parents would assign the tickets between their two children, and more importantly, whether treatment group parents would invest more tickets in their higher-performing child (Dizon-Ross, 2019, p. 11-13).

Moreover, the study included a long-term assessment to measure the sustainability of the changes in educational investments over time. Thus, a year after the experiment, the author conducted a follow-up survey to assess non-experimental outcomes among which were school enrollment, attendance, and overall educational expenditures (Dizon-Ross, 2019, p.11). Additionally, the long-term evaluation allowed to determine whether information could have a lasting impact on investment choices and children's educational trajectories.

3. Results

The findings provide consistent evidence of information frictions' significant impact on parents' beliefs and educational investments in the short and long term. In the short term, the author first finds that baseline parental beliefs on their children's academic performance were significantly misaligned with children's true performance, a gap which was substantially reduced by the information intervention. Regarding the impact of information, a similar trend is found in textbook difficulty selection, where parents in the treatment group were notably more likely to choose textbooks suitable to their children's true performance (Dizon-Ross, 2019, p. 18). Moreover, regarding willingness to pay for remedial textbooks, the experiment highlighted that parents from the treatment group allocated their resources more efficiently by investing more in lower-performing children (Dizon-Ross, 2019, p.17). Similarly, in the secondary school lottery experiment, parents who had received information were more likely to allocate more tickets to their higher-performing children, signaling more rational investment decisions due to an improved understanding of their children's true capabilities.

Dizon-Ross's research additionally highlighted a correlation between poverty and information frictions. Based on the results, not only did poorer, less educated parents have less accurate baseline beliefs about their children's academic performance - and were thus more prone to investment mistakes-, but they also were more responsive to the information intervention and more likely to substantially shift their investment behavior post treatment.

In the longer term, the one-year follow-up assessment revealed the lasting effects of the information intervention with higher levels of school enrollment and attendance rates for higher-performing

children. A similar pattern was observed in educational expenditures as treatment group parents invested more in higher-performing students in the long term.

4. Critical assessment

In terms of the comprehensiveness of the study, the reliance on test scores as the sole metric for performance may overlook other important variables. Moreover, the focus on monetary decisions might abstract from non-monetary constraints which also play a role in determining educational outcomes. Additionally, the specificities of the Malawian socio-economic context may compromise the external validity of the results. Furthermore, the author assumes that parents are rational agents who act based on received information, however, behavioral factors such as emotional biases or risk aversion may still impact decision-making regardless of accurate information. Finally, an ethical concern revolves around the reallocation of resources to the benefit of higher performing children, and consequently, to the potential of such interventions to accentuate inequalities within households.

II. Description of the replication exercise

Table 1 – summary statistics (replication)

Table 1 indicates well-balanced results among the treatment and control groups across most variables such as household size, child age, and parental education, at the exception of the “baseline math score” variable which shows a statistically significant difference at the 5% level. Similarly to the author, we control for this variable in the regression analysis to ensure robustness.

Table 2 – information effects on beliefs and investments (replication)

Table 2 shows how the beliefs and investments are affected by the information intervention. The treatment group has a negative coefficient across the board, and combined with the positive interaction term with score, it suggests that the treatment leads to less attenuated beliefs and less investment mistakes.

Table 2 – extension by high and low ex-ante belief about score

This table extends on the original table 2, but now has the addition of ex-ante beliefs and all the interaction terms as explanatory variables for the endline beliefs and investment. We see that the coefficients for endline beliefs and investments are mutually consistent. A lot of the same effects as described in table 2 are retained. Furthermore, the table shows that the baseline beliefs are a strong indicator of endline beliefs, especially in the control group. The interaction term of treatment and beliefs suggests that the reduction in attenuation due to the information treatment is strengthened by higher ex ante beliefs.

Table 4 – heterogeneity by parental education (replication)

Panel A portrays that less-educated parents had less accurate beliefs about their children's performance and adjusted their beliefs more significantly after the information intervention. Furthermore, Panel B validates that receiving information had a larger impact on investment decisions for less-educated parents, particularly regarding textbook difficulty selection where their choices became more on par with their children's true performance.

Figure 3,4,5 - belief gaps and the impact of information

1. Figure 3 - Replication of belief results

The replication of figure 3(a) shows values identical to the author's, illustrating a significant gap between parents' beliefs and children's actual test scores, indicating belief inaccuracies in both groups. Similarly, the replication of figure 3(b) describing the attenuation of baseline beliefs among the two groups shows an almost identical result, with the slight differences due to our use of raw data, unlike the bootstrapped version used by the author. Regarding the gap between true test scores and endline beliefs, the replicated version of figure 3(c) slightly differs from the author's due to our omission of an unrealistic statistical outlier from the sample. However, it remains clear that the information intervention approximately halved the gap between parent's beliefs and their children's actual performance across groups. Aside from slight differences with the original figure due to the use of raw versus bootstrapped data, the replication of figure 3(d) shows that the slope of parents' beliefs on true performance was more than twice as steep for the treatment group, highlighting a significantly reduced attenuation.

2. Figure 4 - Gender heterogeneity

Figure 4(a) portrays the gap between true scores and baseline beliefs and shows relatively similar results across gender, indicating the absence of gender discrepancies in belief inaccuracies. This finding is consistent with figure 4(b) which shows baseline parental beliefs misaligned with children's actual performance across genders for the control group. Similarly, figure 4(b') suggests a homogenous improvement in the accuracy of parental beliefs for the treatment group across genders post-information intervention. Figure 4(c) shows that the information intervention almost halved the gap between endline beliefs and true scores for the treatment group similarly for men and women. Figure 4(d) focused on the control group shows a more attenuated slope for parental beliefs over true performance across genders. Similarly, no gender discrepancies are found for figure 4(d') showing a significantly less attenuated slope for parental beliefs over true performance following the information intervention. Thus, we can overall infer no significant heterogeneity in the findings across genders.

3. Figure 5 - Performance heterogeneity

Figure 5(a) portrays the gap between true scores and baseline beliefs across children's different performance levels and shows that although the gap is notable for both groups, it is significantly greater

for parents of low-performing children, pointing to heterogeneous findings: parents have a higher tendency to overestimate the scores of low-performing students compared to higher-performing ones. Figure 5(b) (control group) and 5(b') (treatment group) similarly portray more attenuated baseline parental beliefs relative to true score for both lower and higher performing children. Figure 5(c) depicts the gap between endline beliefs and true scores based on ex-ante school performance and shows that the gap is larger for low-performing children compared to higher-performing children in both the treatment and control groups, while the information intervention significantly reduces the gap for both performance levels. As expected, figure 5(d) which looked at the control group shows results almost identical to figure 5(b) as this group did not receive information, with no performance heterogeneity. Similarly to the findings in figure 4(d'), figure 5(d') shows a less attenuated slope for the endline beliefs of treatment group parents, with no heterogeneity across performance levels.

References

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