# Effect of Credit Constraints on Children's Academic Performance in Vietnam

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## Abstract

This paper investigate the effect of credit constraints on children's academic performances in Vietnam. To estimate precise effect, this paper measures the credit constraints directly and address endogeneity of credit constraints. The results tell us that credit constraints have more effect on academic performance of child in younger age.

## Introduction

- Parents' decision about child human capital investment depend on the credit constraints
- If households cannot insure their income against income shocks, parents smooth the consumption and child human capital investment decreases. If households can secure their income by borrowing in financial market, child human capital accumulation might not be affected by income shock. (Becker and Tomes, 1994).
- Many literatures have measured the credit constraints effect on education (e.g. Carneiro and Heckman (2002); Jacoby and Skoufias (1997))
- Empirical studies results vary: not significant (Carneiro and Heckman, 2002), significant (Attanasio and Kaufmann, 2009)
- Two challenges on the estimation of credit constraints effect:
  - indirect measure of credit constraints
  - potential bias due to the endogeneity of credit constraints
- Contribution of this paper: Measure the credit constraints directly, address the endogeneity of credit constraints by using 2SLS. measure the effect of early credit constraints on later child human capital investment

## Theoretical Framework

**Optimal Life Cycle Investment model from Caucutt and Lochner (2012):**

Suppose Three time periods. During childhood that is period 1 and 2, the problem for parents is:

$$U = \max_{c_1, c_2, i_1, i_2, a_3} u(c_1) + \beta u(c_2) + \beta^2 V_3(a_3, f(i_1, i_2, \theta))$$

Subject to the budget constraints:

$$a_{t+1} = Ra_t + y_t - i_t - c_t, \text{ for } t = 1, 2,$$

And the borrowing constraints:

$$a_{t+1} \geq -L_t, \text{ for } t = 1, 2,$$

After FOCs and algebras:

$$f_1(i_1^*(\theta), i_2^*(\theta), \theta) > f_1(i_1^u(\theta), i_2^u(\theta), \theta) = \frac{R^2}{w}$$

, iff any borrowing constraints bind.

$$f_2(i_1^*(\theta), i_2^*(\theta), \theta) > f_2(i_1^u(\theta), i_2^u(\theta), \theta) = \frac{R}{w}$$

, if the second period borrowing constraints binds.

- When there is credit constraints during early period, there is under-investment during the period.
- There is under-investment in at least one period or both if any credit constraints binds

## Data

**Young Lives Data in Vietnam**

- Educational outcomes: Peabody Picture Vocabulary Test(PPVT), Cognitive Development Assessment (CDA), and Mathematics Achievement test
- Other covariates: gender, age, mother's education, father's education, household income, lives in rural area, and household size

| Four Sub Samples | Round 2 (2006) | Round 3 (2009) |
|---|---|---|
| Younger Cohorts (born 2001-02) | PPVT/CDA 4-5 yrs | PPVT/Math 7-8 yrs |
| Older cohorts (born 1994-5) | PPVT/Math 11-12 yrs | PPVT/Math 14-15yrs |

**Credit Constraints measure**

- Direct measures of credit constraints: this paper classifies a household as not credit constrained if it answers ``Yes'' to following question:

*"Would your household be able to raise 300,000 VND (in Round 3, for Round 2 the figure was 230,000 VND) in one week if you needed it? "*

## Methodology

**OLS**

- Effect of current credit constraints on children's current test score:

$$y_{ihct} = \alpha \ CC_{hct} + \sum_{i=1}^{l} \beta \ X_{ihct} + \delta_c + \varepsilon_{ihct}$$

- Effect of past credit constraints on children's late test score:

$$y_{ihct} = \alpha \ CC_{hct-1} + \sum_{i=1}^{l} \beta \ X_{ihct} + \delta_c + \varepsilon_{ihct}$$

**2SLS**

- The first stage of above equations:

$$CC_{h,c,t} = \sum_{i=1}^{l} \gamma COMIV_{i,c,t} + \sum_{i=1}^{l} \delta HHIV_{i,h,c,t} + + \sum_{i=1}^{l} \theta_i X_{i,h,c,t}$$

- The instrumental variables are:
  - Community level : the existence of government supported credit program, other supported credit program and/or a savings cooperatives in the community)
  - Household level instrumental variables (existence of relatives in community, the amount of remittances received)

## Results

- Credit constraints decrease younger cohort's test score: 37.9 points for PPVT and 1.45 points for CDA in Round 2. 124.3 points for PPVT and 11.34 points of Math test in Round 3.
- No significant effect for older cohorts in Round 3 (14-15 years old). Credit constraints affect child test score when child is young.)
- Early credit constraints negatively affects child test score when only the individual covariates are added

**Table 1. Effect of current credit constraints using OLS**

| VARIABLES | (1) PPVT | (2) PPVT | (3) CDA(Math) | (4) CDA(Math) |
|---|---|---|---|---|
| *Round 2 (Younger cohorts)* | | | | |
| Probably can raise | -1.561 | -0.565 | -0.492*** | -0.249* |
| | (1.006) | (0.753) | (0.165) | (0.128) |
| Can not raise | -3.711** | -2.520** | -0.956*** | -0.611*** |
| | (1.532) | (0.973) | (0.280) | (0.202) |
| *Round 2 (Older cohorts)* | | | | |
| Probably can raise | 2.970 | 2.874** | -0.0879 | -0.0939 |
| | (1.967) | (1.343) | (0.156) | (0.157) |
| Can not raise | -0.295 | -0.924*** | -0.138 | -0.0472 |
| | (3.150) | (0.210) | (0.226) | (0.266) |
| *Round 3 (Younger cohorts)* | | | | |
| Probably can raise | -1.908 | -1.537 | -0.458 | -0.922*** |
| | (2.351) | (1.881) | (0.379) | (0.313) |
| Can not raise | -3.524 | -4.746* | -0.794 | -1.940*** |
| | (3.800) | (2.639) | (0.600) | (0.599) |
| *Round 3 (Older cohorts)* | | | | |
| Probably can raise | -2.659 | -0.834 | 0.212 | 0.0147 |
| | (2.109) | (1.814) | (0.605) | (0.628) |
| Can not raise | 5.104** | 3.579 | 0.779 | 0.776 |
| | (2.262) | (2.636) | (1.094) | (1.044) |
| Individual Covariates | Y | Y | Y | Y |
| Community FE | N | Y | N | Y |

Credit Constraints : "Can raise 300,000 VND" is omitted.
Standard errors clustered within village in parentheses. *** p<0.01.** p<0.05. * p<0.1.

- The 2SLS results tell us that credit constraints lowers younger cohorts' PPVT score by 23 times of a standard deviation and CDA test score by 4 times of a standard deviation in Round 2. In Round 3, credit constraints decreases younger cohorts PPVT score by 45 times of a standard deviation.
- Instrumental variables have mixed effect on credit constraints. The value of remittance does not seem to have any effect on household's credit constraints. The existence of relatives in the community also does not significantly affect household's credit status. The existence of other subsidized credit program in the community has positive effect on household's credit constraints.

**Table 2. Effect of current credit constraints using 2SLS**

| VARIABLES | (1) PPVT | (2) PPVT | (3) Math | (4) Math |
|---|---|---|---|---|
| *Round 2: Younger Cohorts* | | | | |
| Can raise money (1=Yes, 2=Probably, 3=No) | -36.95*** | -4.237 | -5.929*** | 1.886 |
| | (8.977) | (13.31) ) | (1.360) | (2.332) |
| *Round 2: Older Cohorts* | | | | |
| Can raise money (1=Yes, 2=Probably, 3=No) | 9.922 | -18.22 | -0.413 | -0.588 |
| | (6.819) | (19.69) | (0.470) | (1.378) |
| *Round 3: Younger Cohorts* | | | | |
| Can raise money (1=Yes, 2=Probably, 3=No) | -45.86* | 6.684 | 3.425 | -3.444 |
| | (25.51) | (17.53) | (4.191) | (3.992) |
| *Round 3: Older Cohorts* | | | | |
| Can raise money (1=Yes, 2=Probably, 3=No) | -151.7 | -64.78 | 14.78 | 7.756 |
| | (115.4) | (105.5) | (13.70) | (19.14) |
| Individual Covariates | Y | Y | Y | Y |
| Community FE | N | Y | N | Y |

Standard errors clustered within village in parentheses. *** p<0.01.** p<0.05. * p<0.1.

## Discussion

- The empirical results using OLS and 2SLS tell us that the credit constraints have negative effect on child educational investment when the child is in young age. This result is supported by other literatures emphasizing the importance of early intervention to enhance human capital accumulation (e.g. Curie et al. 1998, Cunha and Heckman 2012).
- The effect of credit constraints in earlier age to later test score does not have robust effect on child test score. The effect disappears when community fixed effect is controlled.
- There is several issues left in this paper:
  - Measurement of credit constraints: Is it liquidity constraints? Any other variable in the data possible to measure credit constraints better (e.g. interest rate, loan application data, reason of rejection in loan)?
  - Better instrumental variable is needed.

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