More Time Spent on TV and Video Games, Less Time Spent Studying?

Makiko Nakamuro, Keio University
Ryoji Matsuoka, Waseda University
Tomohiko Inui, Gakushuin University

Time Spent Studying as an Input of Education Production Function

- The causal effect of time spent studying on academic achievements (Stinebricker & Stinebricker, 2008; Shinogaya & Akabayashi, 2011; Kawaguchi, 2012)

- Time spent studying is a proxy of child's "effort" to study and is (supposed to be) an crucial input of education production function (but had been merely examined).

TV/Games Rot the Child's Mind

- Stinebricker & Stinebricker (2008) took advantage of a unique natural experiment of an assignment of video games and found out that time spent studying has an *causal* effect on college student's educational outcomes.

- Ward(2012)utilized the exogenous timing of video game sales and found out that time spent studying has an *causal* effect on college student's human capital accumulation = one more hour to play video games is associated with the reduction in 28 minutes educational activities.

Significance of This Study

- More focus on younger children, who are more occupied by TV/video game activities (on average in Japan, 2 hours for TV and 1 hour for video games a day, while 1 hour for studying a day).
- The human capital investments at younger age affects various adulthood outcomes, such as educational attainments, earnings, and antisocial activities（Cameron & Heckman, 1998; 2001; and Heckman, Stixrud & Urzua, 2006, etc）.
- Try estimating the causal effect of time spent for TV or video games on time spent studying. Does child trade-off time spent studying to time spent for TV or video games?

Empirical Specification

- Education Production Function

$$y_{it} = \boldsymbol{X}_{it}\beta + +\gamma T_{it} + \delta V_{it} + \varepsilon_{it}$$

（y：Time spent studying；X：Individual and Child Characteristics；T：Time spent for TV；V：Time spent for video games）

Identification Strategies:

- Within Fixed Effects Model
- Within Fixed Effects＋Instrumental Variable
- Correlated Random Effects Tobit Model

Identification

- Within Fixed Effects Model
  - Control for time invariant unobserved heterogeneity
- Within Fixed Effects Model + IV
  - Control for time variant unobserved heterogeneity
  - IV：Third moment around the mean（Lewbel, 1997）
- Correlated Random Effects Tobit Model
  - Censored data, such as time spent studying
  - Apply Correlated Random Effects Approach to non-linearTobit Model (Wooldridge, 2011)
  - Correlation between Unobserved heterogeneity and key independent variable

Data

- Ministry of Health, Labour and Welfare, Longitudinal Survey of Newborns in the 21st Century
- The panel dataset to track down the total of 53,000 newborns who were born at the 2nd week of June and July, 2001.
- Used the wave 7 (G1) through Wave 10 (G10) after the subject kids were in elementary schools.
- Respondents are mostly mothers (92%).

変数

- Dependent variable：
  - Time spent studying a typical day（0-5）
- Key independent variables：
  - Time spent for TV a typical day（0-6）
  - Time spent for video games a typical day（0-6）
- Control variables：
  - # of siblings（0-10）
  - # of grand parents living together（0-4）

  } Family structure

  - Mother's working status（ref=not working）
  - Father's working status（ref=not working）

  } Parental employment status

  - Mother's commitment to child's study（0-8）
  - Father's commitment to child's study（0-8）
  - Access to the shadow education（ref=participate）

  } Parental enthusiasm toward child's education

Summary Stat

	Boy		Girl	
	Mean	SD	Mean	SD
Time spent studying a day	0.89	0.49	0.96	0.52
Time spent for TV a day	2.06	0.91	2.07	0.94
Time spent for video game a day	1.10	0.73	0.73	0.62
# of siblings	1.25	0.77	1.22	0.76
# of grandparents living together	0.38	0.73	0.37	0.72
Mother's working status				
1=Full-time	0.19	0.39	0.19	0.39
2=Part-time	0.37	0.48	0.37	0.48
3=Self-employed	0.06	0.24	0.06	0.24
Father's working status				
1=Full-time	0.84	0.37	0.84	0.36
2=Part-time	0.01	0.09	0.01	0.10
3=Self-employed	0.14	0.35	0.13	0.34
Mother's commitment to study	5.89	1.77	5.59	1.86
Father's commitment to study	2.63	2.04	2.35	1.97
Shadow education	0.34	0.47	0.35	0.48

Results (Boys)

	Linear			Non linear
	OLS	FE	FEIV	CRE Tobit
Time spent for TV a day (APEs)	−0.007*** (0.002)	−0.009** (0.004)	−0.006 (0.005)	−0.010*** (0.003) **−0.006**
Time spent for video games a day (APEs)	−0.021*** (0.003)	−0.016*** (0.004)	−0.016*** (0.006)	−0.017*** (0.004) **−0.010**

→One additional hours of TV or video games are associated with the reduction in 1.86 minutes for studying.

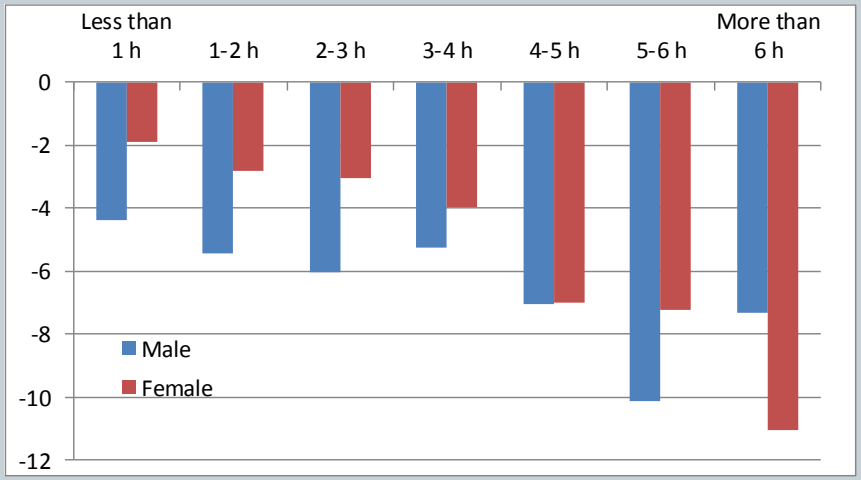
Results（Girls）

	Linear			Non-linear
	OLS	FE	FEIV	CRE Tobit
Time spent for TV a day (APEs)	0.003 (0.002)	−0.014*** (0.004)	−0.013** (0.005)	−0.014*** (0.004) **−0.008**
Time spent for video games a day (APEs)	−0.031*** (0.004)	−0.018*** (0.005)	−0.031*** (0.009)	−0.019*** (0.005) **−0.011**

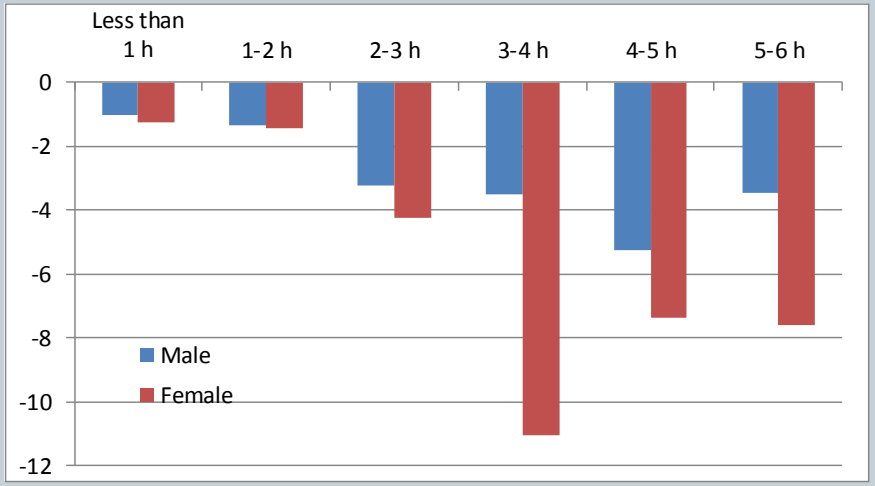
→One additional hours of TV or video games are associated with the reduction in 2.70 minutes for studying.

Non-linear effect of TV or video games

TV



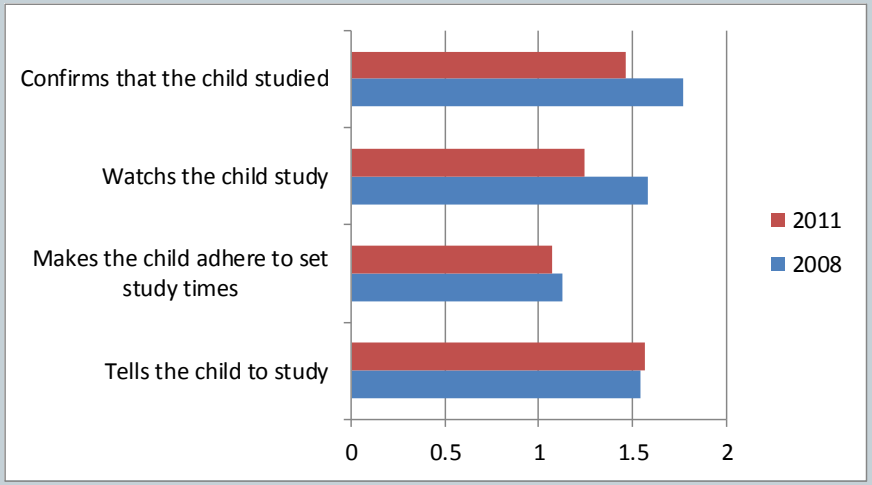
Video Games

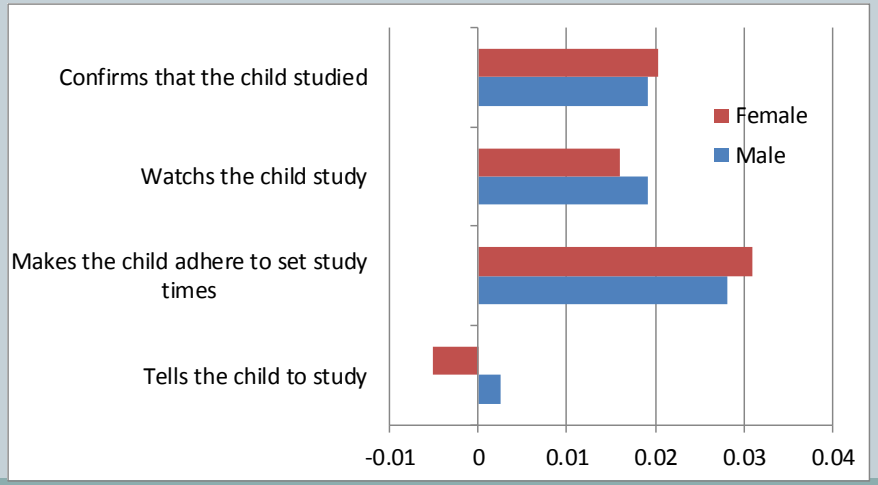


（注）TV視聴とゲーム使用をダミー変数化して効果の非線形性を調べたもの。係数はWithin-Fixed Effects Modelによる。

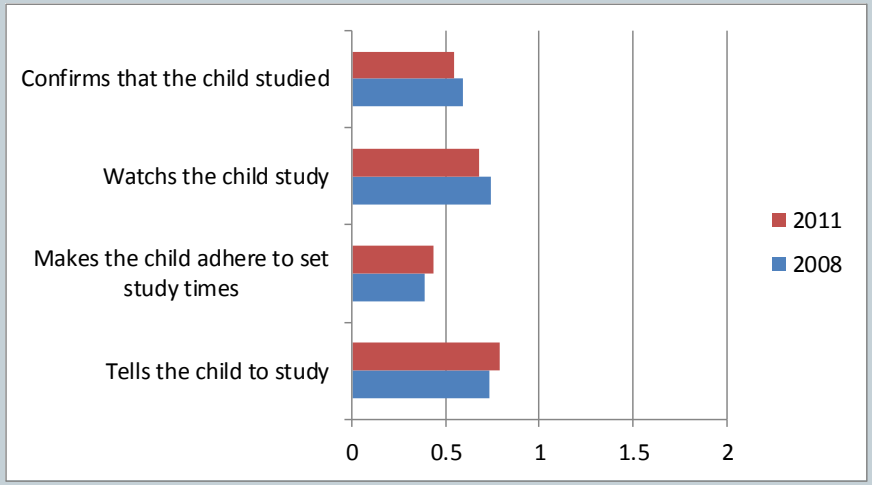
Commitment Effects?

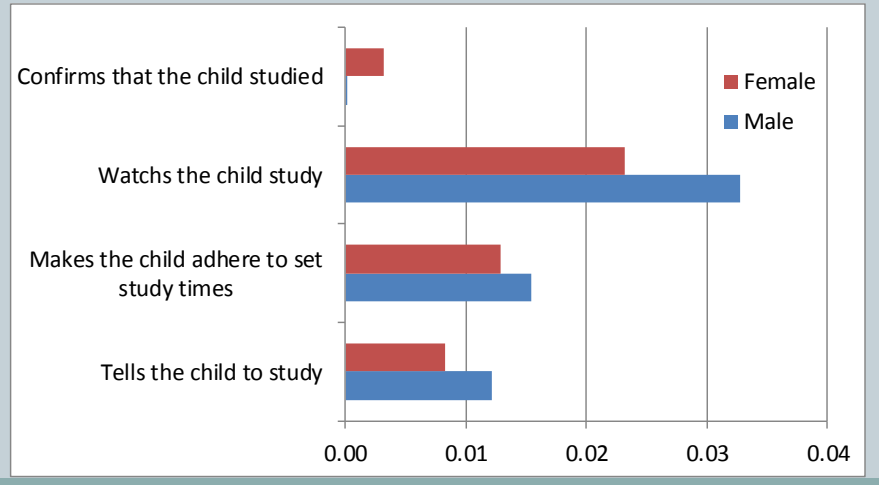
Mothers'





Fathers'





What kind of commitments?

- “Tells the child to study” is not worth doing. Rather, it makes girls worse.
- “Watch the child study” or “Make the child adhere to set study times” makes both boys and girls study more.
- Mother’s commitment is significant, but the return to the commitment is higher for father’s than mother’s.
- The same-sex combination (boys-fathers, girls-mothers) works well.

Conclusion

- Children didn't trade their time between time spent studying and for TV and video games. If parents throw TV and video games away, it doesn't make children study more.
- Interventions to change the child's environment (such as prohibit watching TV or video games, and stop working, living grandparents together) may not work to make children study more.
- The direct interplay with children is only way to make children study more. Parents must commit to children's study in some way, especially watching the child study or making them adhere to set the time.

政策的インプリケーション 1

- 親の働き方や家族構成は、学習時間に影響しない。
  - 母親が専業主婦でなく、労働市場に参加することは子どもの学習資本の形成にマイナスにはならない
- 「親のコミットメント」(=勉強するのを見たり、勉強する時間を守らせる)を学童保育や放課後教室でも実践
  - 両親のコミットメント以外に、「その他の同居者」のコミットメントについてもデータがあり、その他の同居者のコミットメントも両親と同様に学習時間を増加させる効果＝必ずしも「親」でなくともよい可能性
  - 「放課後子ども教室」(放課後、余裕教室を利用し、1教室あたり地域ボランティア1-30人による宿題の手助けや補習などを行う)の拡大を支援(H23年5月現在、全国で9,733箇所、文科省調べ)

政策的インプリケーション 2

- 「親による関与」の影響大＝家庭環境が学習時間・学力に与える影響が大（小塩 2011などでも同様の主張）＝学校での学習時間を減らすと、家庭格差が学習時間・学力格差になっていく可能性
  - 学校週5日制が始まる前後に、高所得者層で子どもの学習費（特に塾などへの支出）が増加（武内・中谷・松繁　2006）
  - 学校週5日制を見直し（川口　2012 も同様の主張）
- 「学校外教育」はプラスの効果
  - 塾・家庭教師・通信教育などの費用を（学校外教育バウチャーの付与などを通じて）補助