

# Sheepskin Effects in Thailand

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# Introduction

## ◆ **Sheepskin effects in returns to education**

- » Earnings associated with the degree completion
- » Individuals received degree will earn more than those didn't

## ◆ **Empirical works testing the existence of sheepskin effects**

- » US (Hungerford and Solon, 1987); Canada (Ferrer and Riddell, 2002)
- » Philippines (Schady, 2003); China (Xiu and Gunderson, 2013)

## Introduction (cont'd)

- ◆ **Several studies on the returns to education in Thailand, but none of these studies explicitly focus on the sheepskin effects**
- ◆ **Most studies do not account for “ability bias” (Card, 1999) as a result of omitted ability from estimated equation**
- ◆ **One exception is Warunsiri and McNown (2010)**

# Objectives

- ◆ **Estimating the sheepskin effects in returns to education in Thailand**
- ◆ **Addressing the “ability bias” in the sheepskin effect estimation**
- ◆ **Investigating the sheepskin effects across education levels and gender**

# Data and Variables

- ◆ **National Labor Force Survey (LFS) from the National Statistical Office of Thailand (NSO)**
  - » The 3rd quarter of each survey year (1985-2016)
- ◆ **The main variables used in the estimation**
  - » Natural log of real hourly wage (in Thai currency, Baht)
  - » Years of education: No education (=0) to Bachelor level (=16)
  - » Degree: Primary, Lower Secondary, Upper Secondary, Bachelor
  - » Age (19-65) in the year 1985-2016

# Sample Set

- ◆ **Full-time workers in private sector, government, and state-owned enterprise**
- ◆ **Two sample sets:**
  - » Sub-sample set - Individuals reporting their parental educations
    - 44,824 observations
  - » Whole sample set - Individuals constructed as synthetic cohorts
    - 372,744 individuals sampled from 32 years of survey
    - 16 year-of-birth cohorts (born in 1951 to 1966)
    - 512 cohort-year observations (=16\*32)

## ◆ The Fundamental Equation of Human Capital Theory

- » Mincerian regression - find relation between the wage and year of education (Mincer, 1974)

$$\ln w_{it} = \gamma + \beta_1 S_{it} + \beta_2 X_{it} + \beta_3 X_{it}^2 + u_{it}$$

where  $\ln w_{it}$  is a natural log of hourly wage rate of individual  $i$  at time  $t$ ,  $S_{it}$  and  $X_{it}$  represent years of education and age

# Methodology (cont'd)

## ◆ The Sheepskin Effects Equation (Cross-sectional regression)

» The discontinuous spline function (Hungerford and Solon, 1987)

$$\begin{aligned}\ln w_{it} = & \gamma + \beta_1 S_{it} + \beta_2 X_{it} + \beta_3 X_{it}^2 + \beta_4 D6_{it} \\ & + \beta_5 [(S_{it} - 6) * D6_{it}] + \beta_6 D9_{it} + \beta_7 [(S_{it} - 9) * D9_{it}] \\ & + \beta_8 D12_{it} + \beta_9 [(S_{it} - 12) * D12_{it}] + \beta_{10} D16_{it} + \alpha_i + u_{it}\end{aligned}$$

where  $D6_{it}$ ,  $D9_{it}$ ,  $D12_{it}$ ,  $D16_{it}$  are dummy variables for individual  $i$  at time  $t$ , who completed 6, 9, 12, 16 years of education, respectively



# Methodology (cont'd)

- ◆  $\alpha_i$  captures unobserved individual heterogeneity, (i.e. ability, motivation) that may be correlated with years of education.
- ◆ **Two solutions**
  - 1) Schady (2003) uses parental education as another control variable to partially control for ability bias.
  - 2) Warunsiri and McNown (2010) use the pseudo-panel approach (Deaton, 1985) to deal with unobserved heterogeneity.
    - Define a set of  $C$  ( $c=1, \dots, C$ ) cohorts based on year-of-birth
    - Then, averaging over cohort members to obtain average equation.

# Methodology (cont'd)

## ◆ The Sheepskin Effects Equation (Pseudo-Panel Regression)

$$\begin{aligned}\overline{\ln w_{ct}} = & \gamma + \beta_1 \overline{S_{ct}} + \beta_2 \overline{X_{ct}} + \beta_3 \overline{X_{ct}^2} + \beta_4 \overline{D6_{ct}} + \beta_5 [(\overline{S_{ct}} - 6) * \overline{D6_{ct}}] \\ & + \beta_6 \overline{D9_{ct}} + \beta_7 [(\overline{S_{ct}} - 9) * \overline{D9_{ct}}] + \beta_8 \overline{D12_{ct}} + \beta_9 [(\overline{S_{ct}} - 12) * \overline{D12_{ct}}] \\ & + \beta_{10} \overline{D16_{ct}} + \overline{\alpha_c} + \overline{u_{ct}}\end{aligned}$$

where  $\overline{\ln w_{ct}}$  is mean of  $\ln w$  over sample obs. in cohort  $c$  at time  $t$ ,  
 $\overline{S_{ct}}$  is mean of years of education for those in the cohort  $c$  at time  $t$ ,  
 $\overline{D6_{ct}}$  is proportion of cohort that received at least 6 years of education.

# Sheepskin Effects in Sub-sample

VARIABLES	OLS	OLS w/ Parental Education
Primary(D6)	0.222*** (0.0169)	0.229*** (0.0169)
Lower Secondary(D9)	-0.0116 (0.0230)	-0.00911 (0.0229)
Upper Secondary(D12)	0.330*** (0.0941)	0.335*** (0.0938)
Bachelor(D16)	0.0900*** (0.00948)	0.0868*** (0.00945)

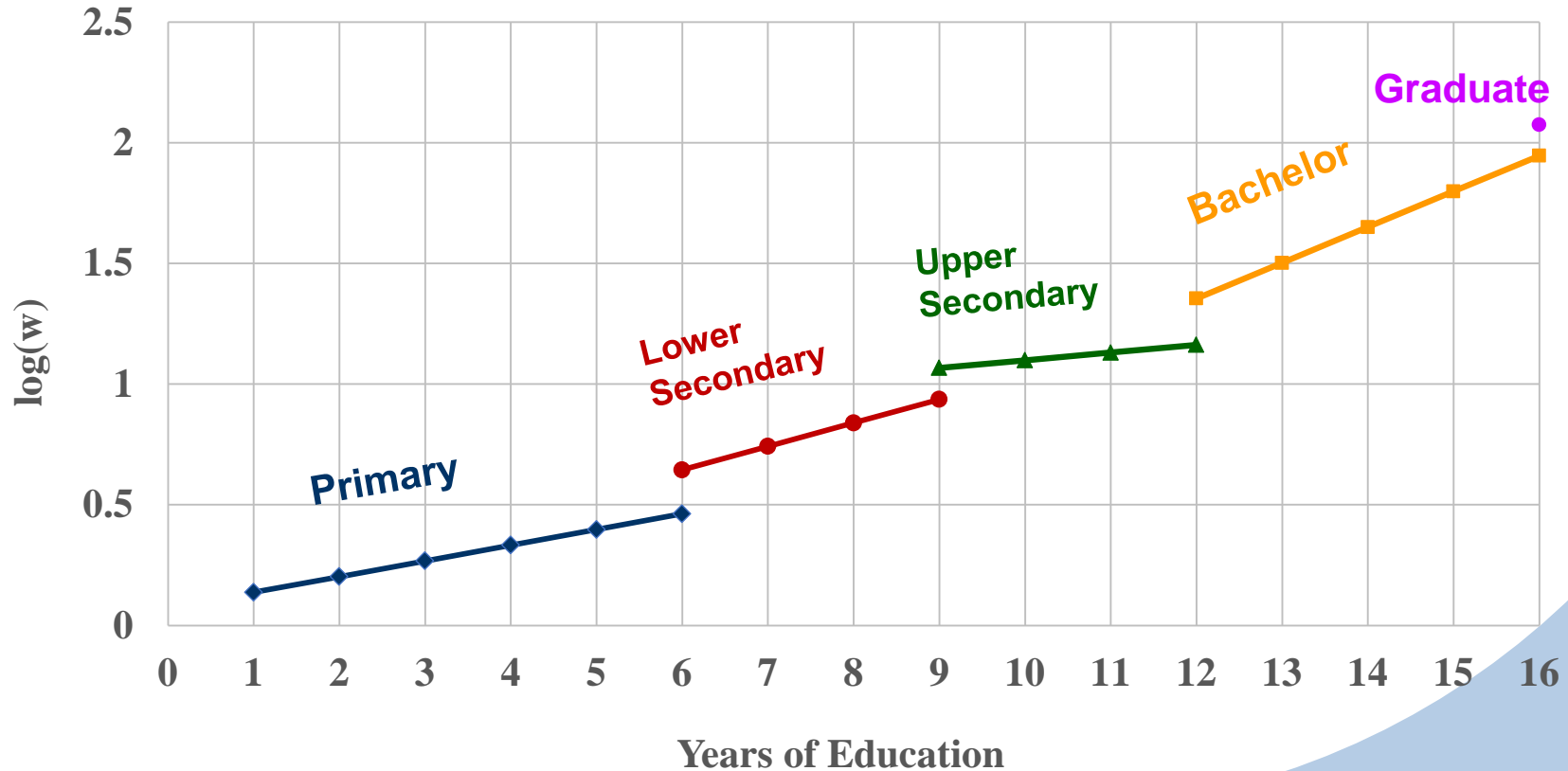
# The Rate of Returns to Education

The rate of returns to education	OLS	OLS w/ Parental Education
The first 5 years of primary	0.0482	0.0436
The 6 <sup>th</sup> year of education	0.2702	0.2726
The first 2 years of lower secondary	0.1011	0.0978
The 9 <sup>th</sup> year of education	0.0895	0.0886
The first 2 years of upper secondary	-0.0009	-0.0052
The 12 <sup>th</sup> year of education	0.3291	0.3298
The first 3 years of bachelor	0.1641	0.1598
The 16 <sup>th</sup> year of education	0.2541	0.2466

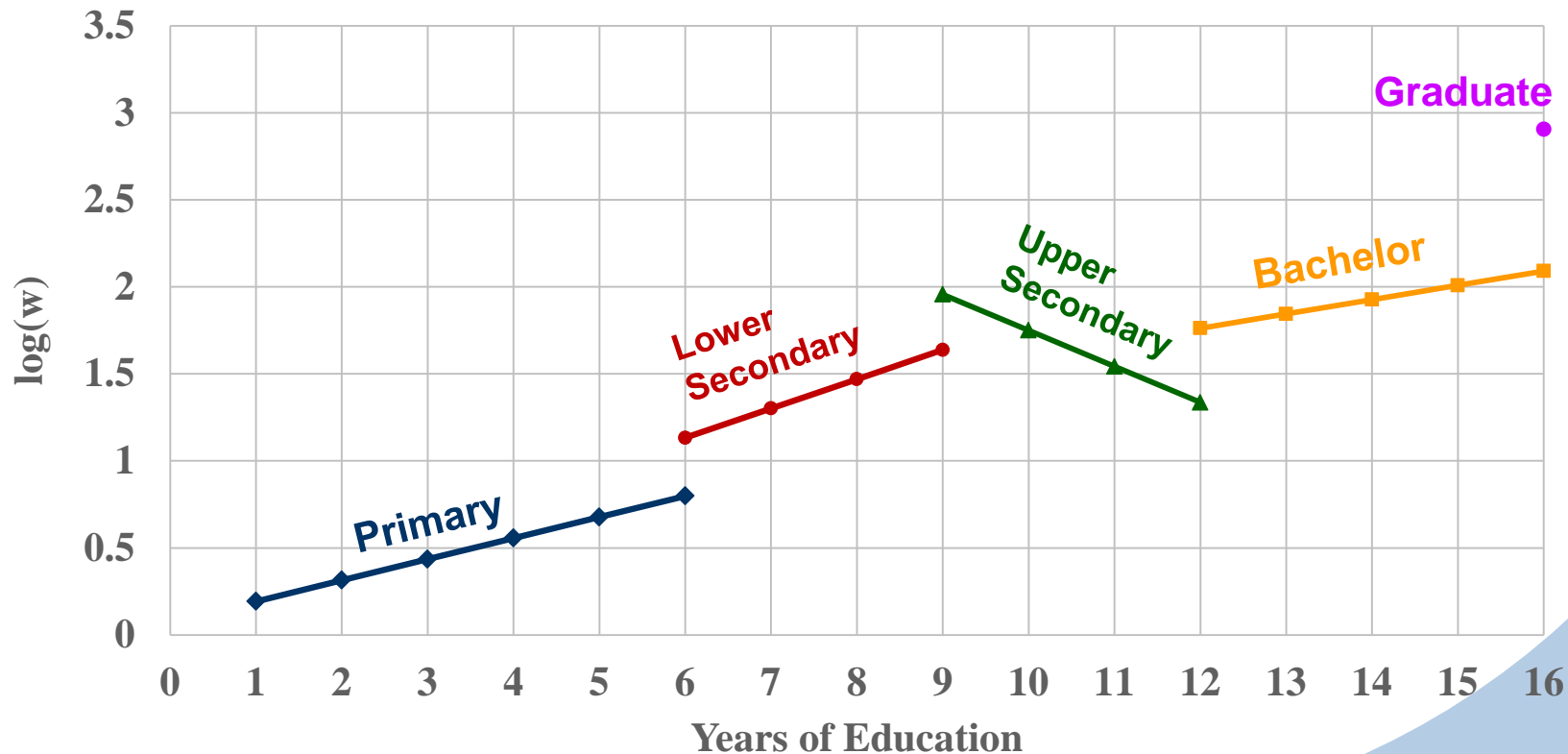
# Sheepskin Effects in Whole Sample

VARIABLES	(1) OLS	(2) OLS w/ Sheepskin	(3) Pseudo	(4) Pseudo w/ Sheepskin
Year of schooling(S)	0.135*** (0.000175)	0.0651*** (0.00145)	0.147*** (0.00793)	0.121** (0.0505)
Primary(D6)		0.182*** (0.00524)		0.335*** (0.124)
Lower_Secondary(D9)		0.130*** (0.00921)		0.319 (0.318)
Upper_Secondary(D12)		0.192*** (0.0464)		0.427 (0.909)
Bachelor(D16)		0.128*** (0.00391)		0.815*** (0.133)
D6*(S-6)		0.0323*** (0.00246)		0.0471 (0.0370)
D9*(S-9)		-0.0655*** (0.0156)		-0.375 (0.278)
D12*(S-12)		0.116*** (0.0155)		0.289 (0.280)

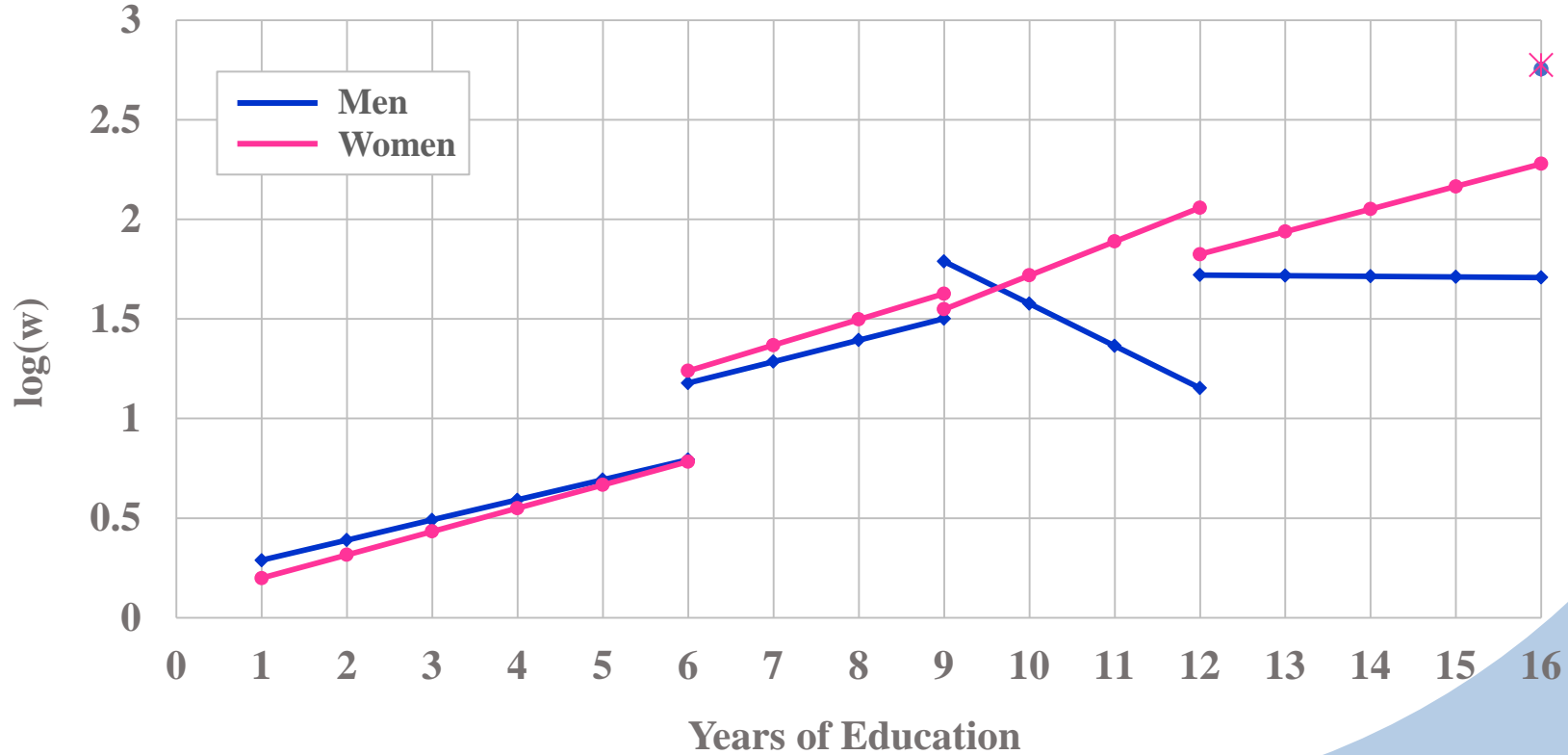
# Results from OLS Regression



# Results from Pseudo-Panel Regression



# Men VS Women





# Key Takeaways

- ◆ **This study addresses “ability bias” by using**
  - (1) parental education as a control variable**
  - (2) pseudo-panel approach**
- ◆ **OLS estimations give downward-biased results**
- ◆ **There exist the sheepskin effects in Thailand, especially for the primary degree and the bachelor degree**

# Thank You

