

# Estimating labour supply elasticities in Thailand using personal income tax structures

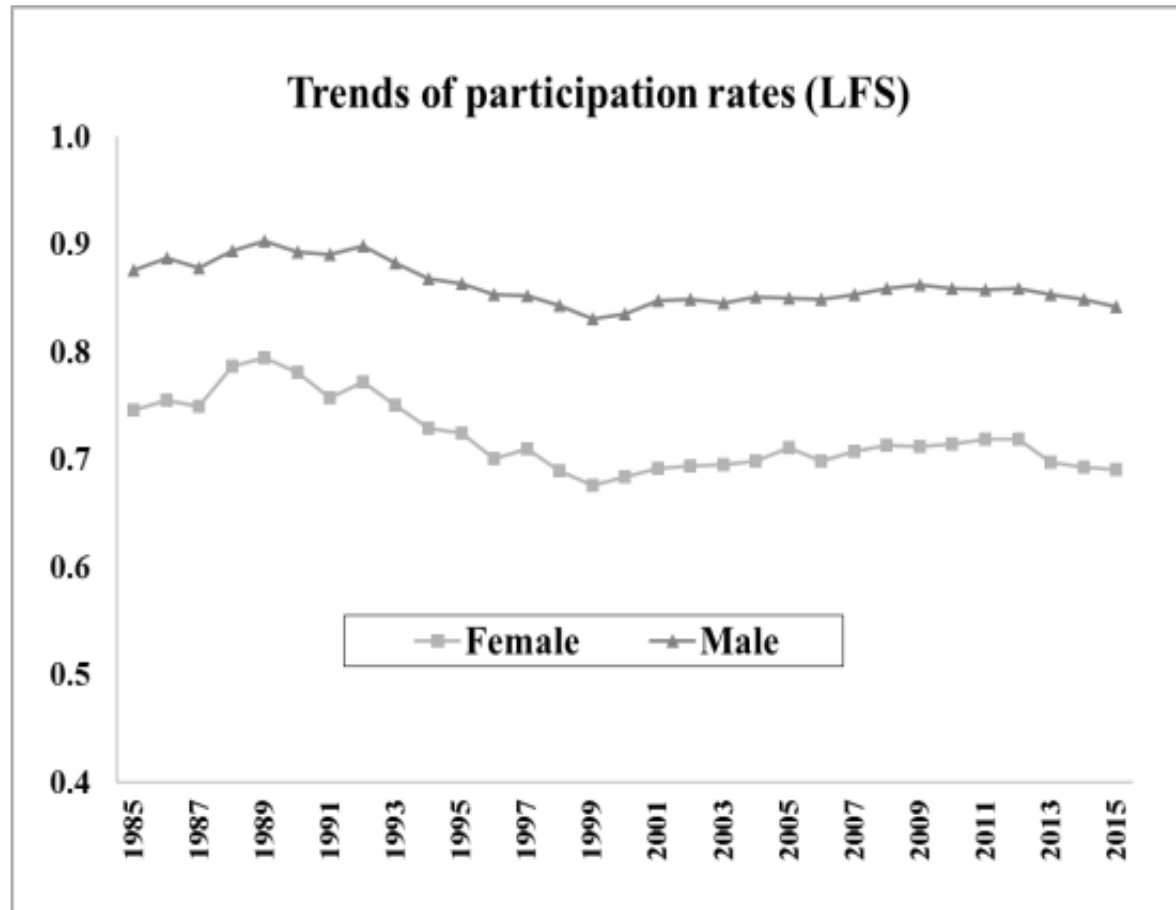
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Aug 2017

# Reduced-form estimation of (static) labour supply elasticities for Thailand

- Stylised facts of labour supply patterns in Thailand
- Conceptual model of static labour supply decisions
- Identification strategies: grouping estimators (Blundell, Duncan and Meghir, 1998)
- Main datasets (SES) and personal income tax structures
- Marshallian and Hicksian labour supply elasticities

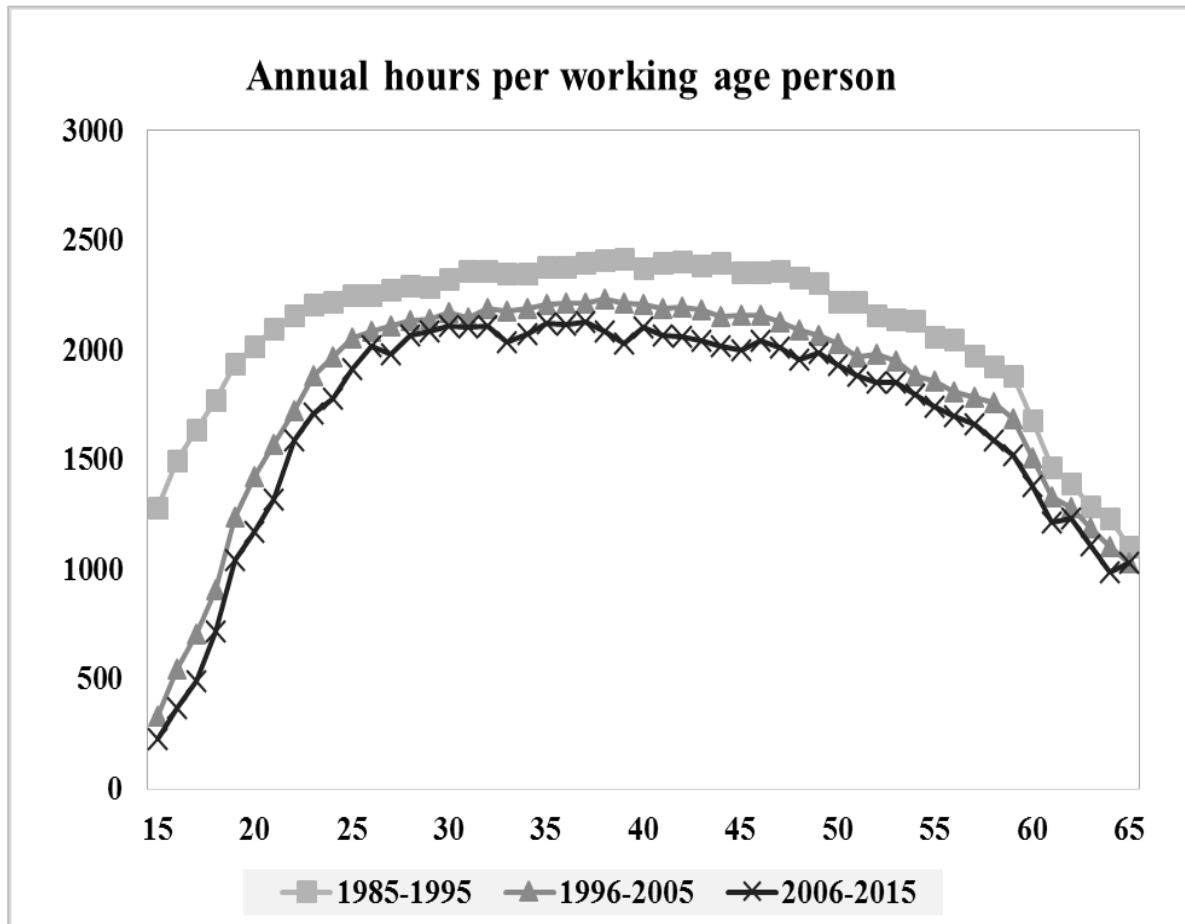
# **Stylised facts on labour supply in Thailand**

## 1. High and constant at extensive margin



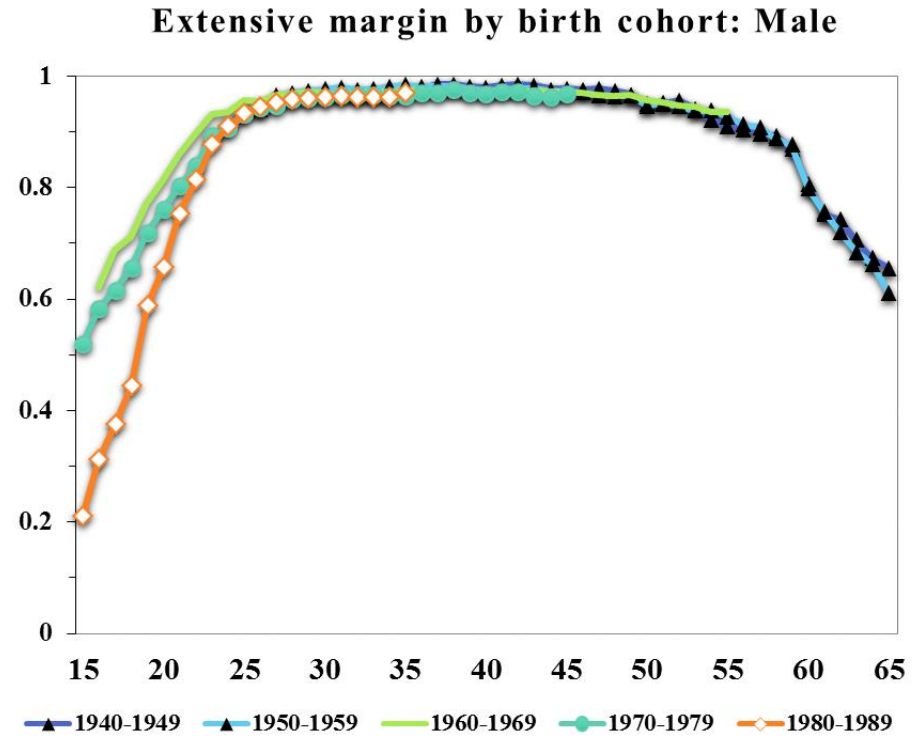
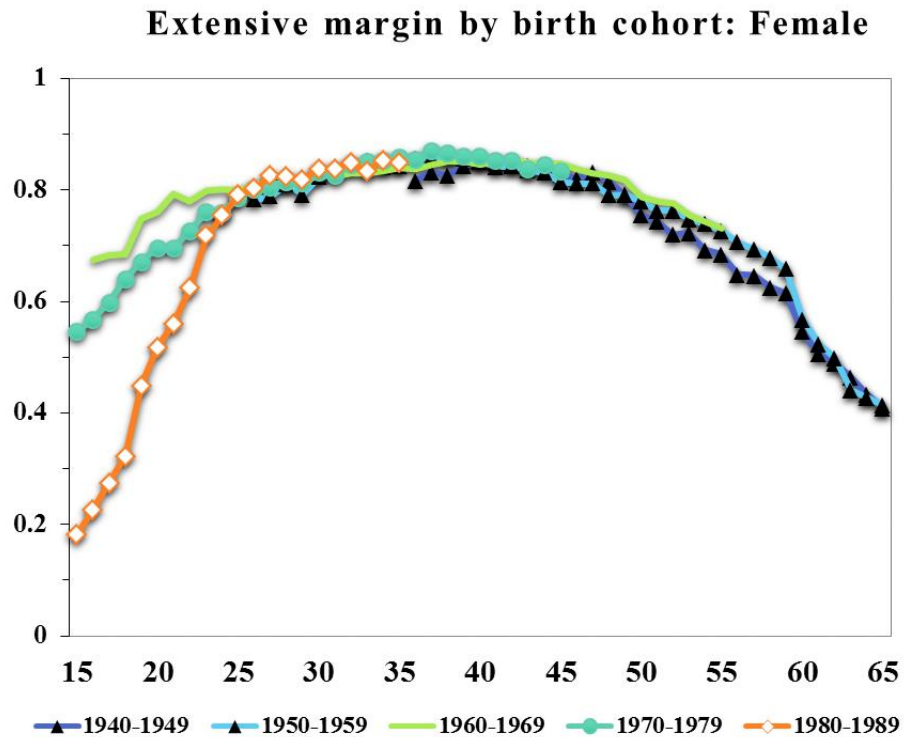
*Source: Thailand Labour Force Survey (1985-2015)*

## 2. Inverted U-shape of intensive margin (static)



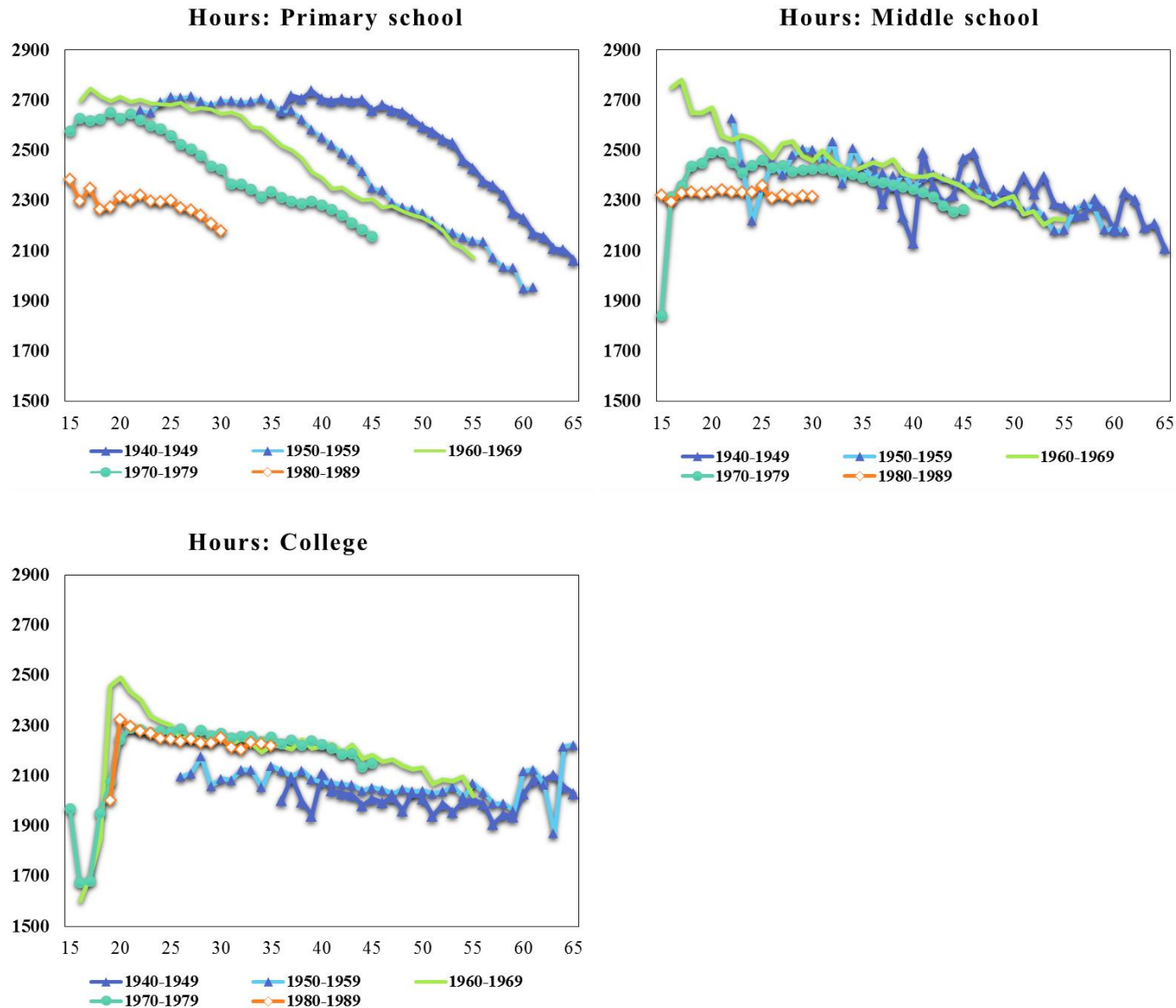
*Source: Thailand Labour Force Survey (1985-2015)*

### 3. Inverted U-shape of *life-cycle* extensive margin



Source: Thailand Labour Force Survey (1985-2015)

## 4. Life-cycle pattern varies by education



Source: Thailand Labour Force Survey (1985-2015)

## Some literature

- Self-selection correction (Heckman 1974)
- Account for unearned income (Blundell and MaCurdy 1999, Domeji and Floden 2006; Blundell et al 2007; Meghir and Phillips 2010)
- Static labour supply with taxation (Hausman 1981, 1985; Blundell, Duncan and Meghir 1998)
- Life-cycle labour supply with taxation (MaCurdy 1981; Keane 2011; Keane and Wasi, 2016)
- Thailand case (Schultz 1990; Aemkulwat 2012; Paweenwat and McNown 2017)



**A standard static, within-period labour supply (intensive margin)**  
(Blundell and MaCurdy, 1999)

$$H_t = H(W_t, Y_t, X_t)$$

where

$H_t$ : Hours worked

$W_t$ : Labour income

$Y_t$ : Unearned, non labour income

$X_t$ : Individual characteristics

**Static labour supply elasticities:**

**Uncompensated Marshallian:**  $E_U = \frac{\partial \ln(H_t)}{\partial \ln(W_t)}$

**Unearned:**  $E_Y = \frac{\partial \ln(H_t)}{\partial \ln(Y_t)}$

**Compensated Hicksian:**  $E_C = E_U - \frac{W_t H_t}{Y_t} \frac{\partial \ln(H_t)}{\partial \ln(W_t)}$

# Empirical strategies (I)

## Identifications

(Blundell, Duncan and Meghir, 1998; Meghir and Phillips, 2010)

- Group-estimation by **education x birth cohort**
- Sources of income: **earned** and **unearned income** (non durable consumption-based)
- Correct for **self-selection** into wage-earning activities
- Correct for **endogenous preference** for effort, job types, labour income and non-labour income
- Exposure to **reforms of personal income tax** as exogenous change of net labour income

## Empirical strategies (II)

### Estimating Equations

$$H_{it} = G_g + T_t + K_{it} + \beta \ln(w_{it}) + \beta Y_{it} + \widehat{v_{it}^w} + \widehat{v_{it}^Y} + \widehat{\lambda_{it}^P} + \widehat{v_{it}^S} + \mu_{it}$$

$$(\text{Aux 1}) \quad P_{it} = G_g + T_t + G_g T_t + K_{it} + \dot{K}_{it} + \varepsilon_{it}^P$$

$$(\text{Aux 2}) \quad \log(w_{it}) = G_g + T_t + G_g T_t + K_{it} + v_{it}^w + \widehat{\lambda_{it}^P}$$

$$(\text{Aux 3}) \quad Y_{it} = G_g + T_t + G_g T_t + K_{it} + v_{it}^Y$$

$$(\text{Aux 4}) \quad S_{it} = G_g + T_t + G_g T_t + K_{it} + v_{it}^S$$

where

**H** (hours), **G** (groups of birth x education), **T** (time), **K** (individual background), **K'** (excluded variables), **Y** (unearned), **w** (wage income), **S** (tax change exposure)

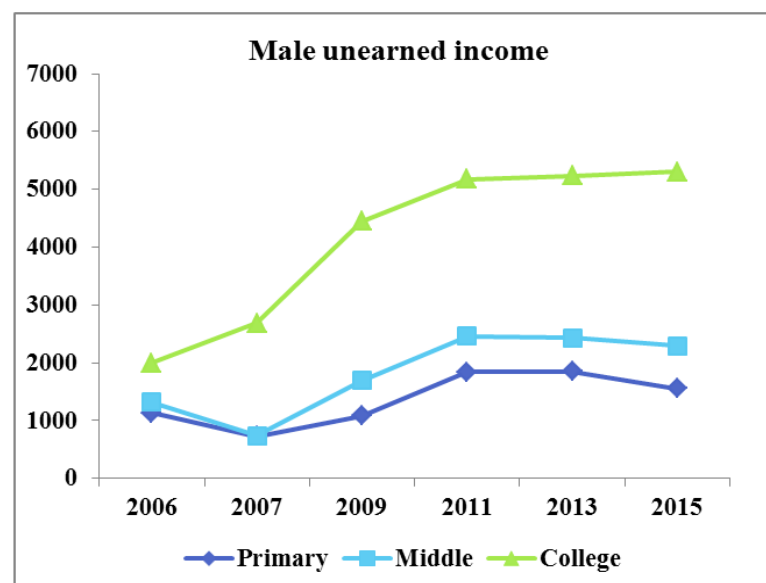
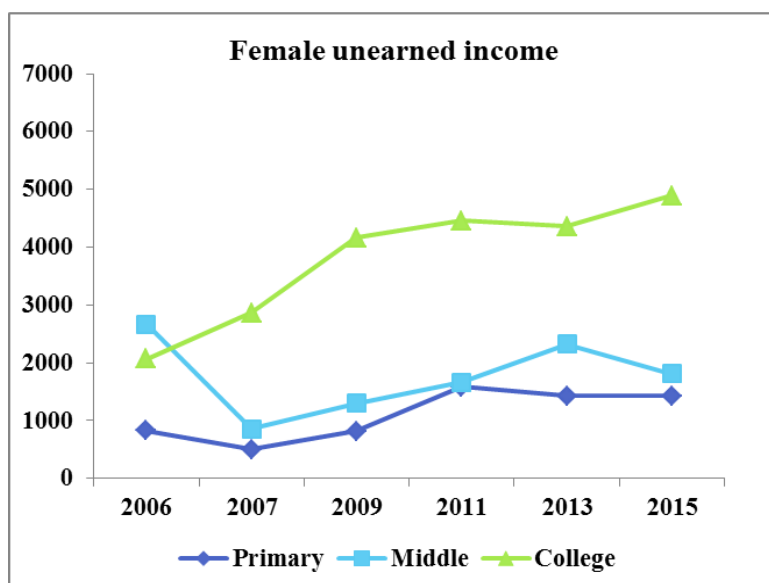
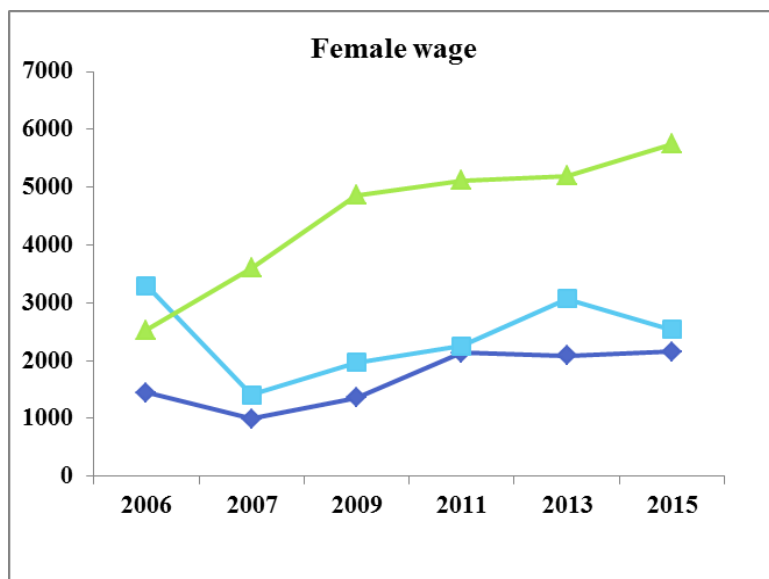
## Thailand Socio-economic Surveys (SES)

**Waves:** 2006, 2007, 2009, 2011, 2013 and 2015 (6)

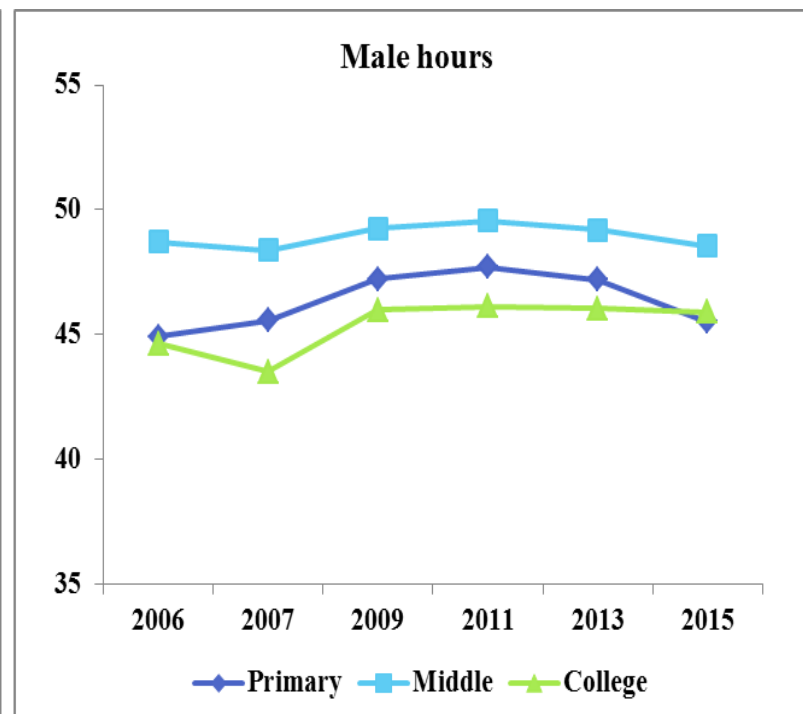
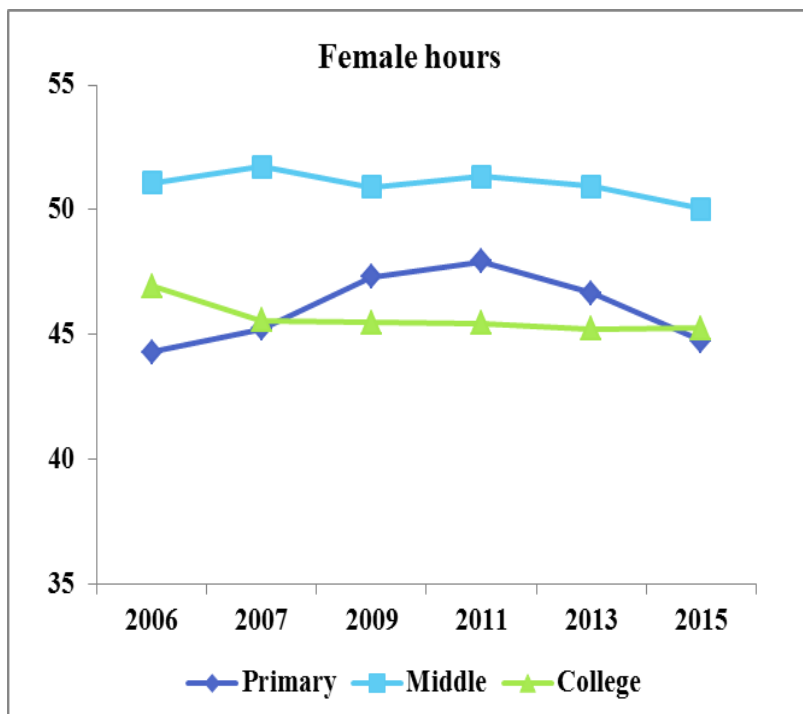
**Observations:** only wage-earners (40 % of working age sample)

**Key variables:** own earning (weekly rate), own hours worked, household expenditure (consumption), education, gender, children

**Grouping:** 10-year birth cohort (4: 1950s, 1960s, 1970s, 1980s), education (3: primary, middle, college) (Total group = 12)



Source: SES (2006-2015)



*Source: SES (2006-2015)*

# Thailand Personal Income Tax Code

## Structure of PIT in Thailand

- Gross income – {expenses; allowances; exemptions}
- Minimum income level eligible for tax exemption
- Progressive tax rates and brackets
- Applied Finance Ministry's tax formula (Ananapibut, 2012)

## Issue on tax compliance

- Large informal labour
- Our sample is wage earners, subjected to social security registration

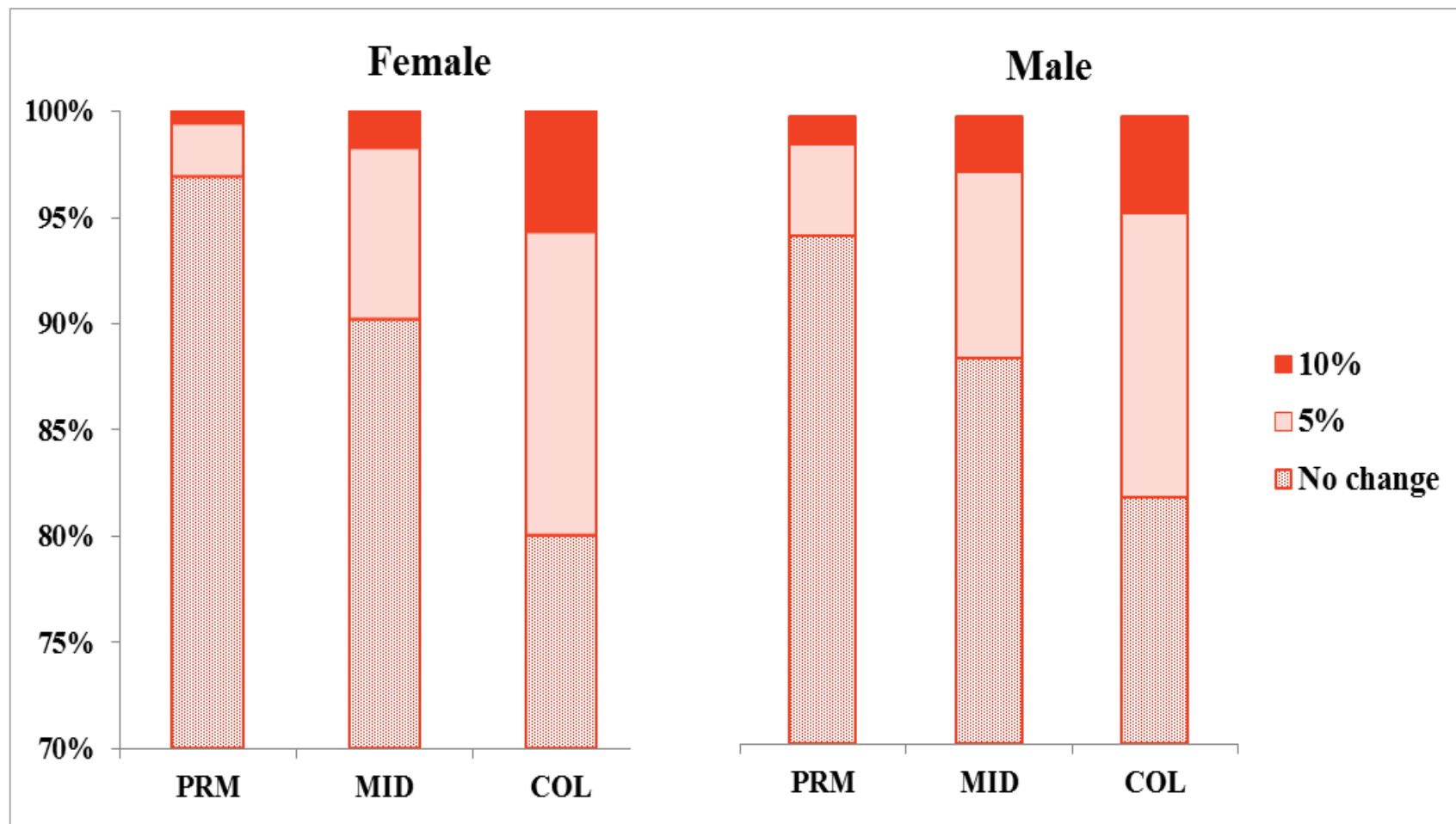
## PIT reforms during the periods

- Lower minimum level
- Changes tax brackets and marginal tax rates for each edu group

<b>Bottom</b>	<b>Top</b>	<b>2004-2007</b>	<b>2008-2012</b>	<b>2013-2016</b>
0	50000	0	0	0
50001	60000	0	0	0
60001	80000	0	0	0
80001	90000	0	0	0
90001	100000	0	0	0
100001	150000	10	0	0
150,001	200,000	10	10	5
200,001	220,000	10	10	5
220,001	250,000	10	10	5
250,001	270,000	10	10	5
270,001	300,000	10	10	5
300,001	350,000	10	10	10
350,001	400,000	10	10	10
400,001	450,000	10	10	10
450,001	500,000	10	10	10
500,001	550,000	20	20	15
550,001	600,000	20	20	15
600,001	750,000	20	20	15
750,001	800,000	20	20	20
800,001	1,000,000	20	20	20
1,000,001	1,100,000	30	30	25
1,100,001	2,000,000	30	30	25
2,000,001	4,000,000	30	30	30
4,000,001	Higher	37	37	35



# Share of exposure to PIT reform: by gender and education



Source: SES (2006-2015), Record 13.

# Estimated labour supply elasticities

	Compensated		Uncompensated		Unearned income	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<b>Female</b>	<b>0.234</b>	(0.247)	<b>0.243</b>	(0.265)	<b>-0.041</b>	(0.248)
Observations = 68,158						
<b>Male</b>	<b>0.194</b>	(0.148)	<b>0.201</b>	(0.188)	<b>-0.037</b>	(0.174)
Observations = 81,528						

Notes:

All estimates are converted from the raw coefficients from the regressions.

All are with p-value below 0.10.

# Heterogeneous elasticities: age of youngest child

	Compensated Wage		Uncompensated Wage		Unearned income	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<b>Female</b> (n == 68158)						
No children	<b>0.196</b>	0.207	<b>0.203</b>	0.222	<b>-0.038</b>	0.234
Youngest child 0-2	<b>0.321</b>	0.339	<b>0.259</b>	0.283	<b>-0.066</b>	0.402
Youngest child 3-5	<b>0.321</b>	0.339	<b>0.332</b>	0.362	<b>-0.077</b>	0.470
Youngest child 6-12	<b>0.298</b>	0.314	<b>0.309</b>	0.336	<b>-0.068</b>	0.415
Youngest child 12+	<b>0.252</b>	0.266	<b>0.261</b>	0.285	<b>-0.042</b>	0.255
<b>Male</b> (n = 81528)						
No children	<b>0.196</b>	0.150	<b>0.203</b>	0.190	<b>-0.039</b>	0.185
Youngest child 0-2	<b>0.235</b>	0.179	<b>0.282</b>	0.264	<b>-0.077</b>	0.364
Youngest child 3-5	<b>0.235</b>	0.179	<b>0.243</b>	0.228	<b>-0.051</b>	0.239
Youngest child 6-12	<b>0.246</b>	0.188	<b>0.254</b>	0.238	<b>-0.053</b>	0.248
Youngest child 12+	<b>0.207</b>	0.158	<b>0.214</b>	0.200	<b>-0.038</b>	0.181

## In sum

- Thailand: Group-estimation specification and PIT reforms
- Estimate consistent value of static LS elasticities
- Aligned with previous findings using US or UK-based data
- Negative income effect on hours of work
- Overall inelastic response, with male more inelastic
- Wage earners with young children are more elastic (both substitution effect and income effect)
- Female with children aged 3-5 have highest elasticities