Behavioural Stability: Accounting for Proximal and Distal Constructs in the Theory of Trying

Presented by

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Present at

Puey Ungphakorn Institute for Economic Research

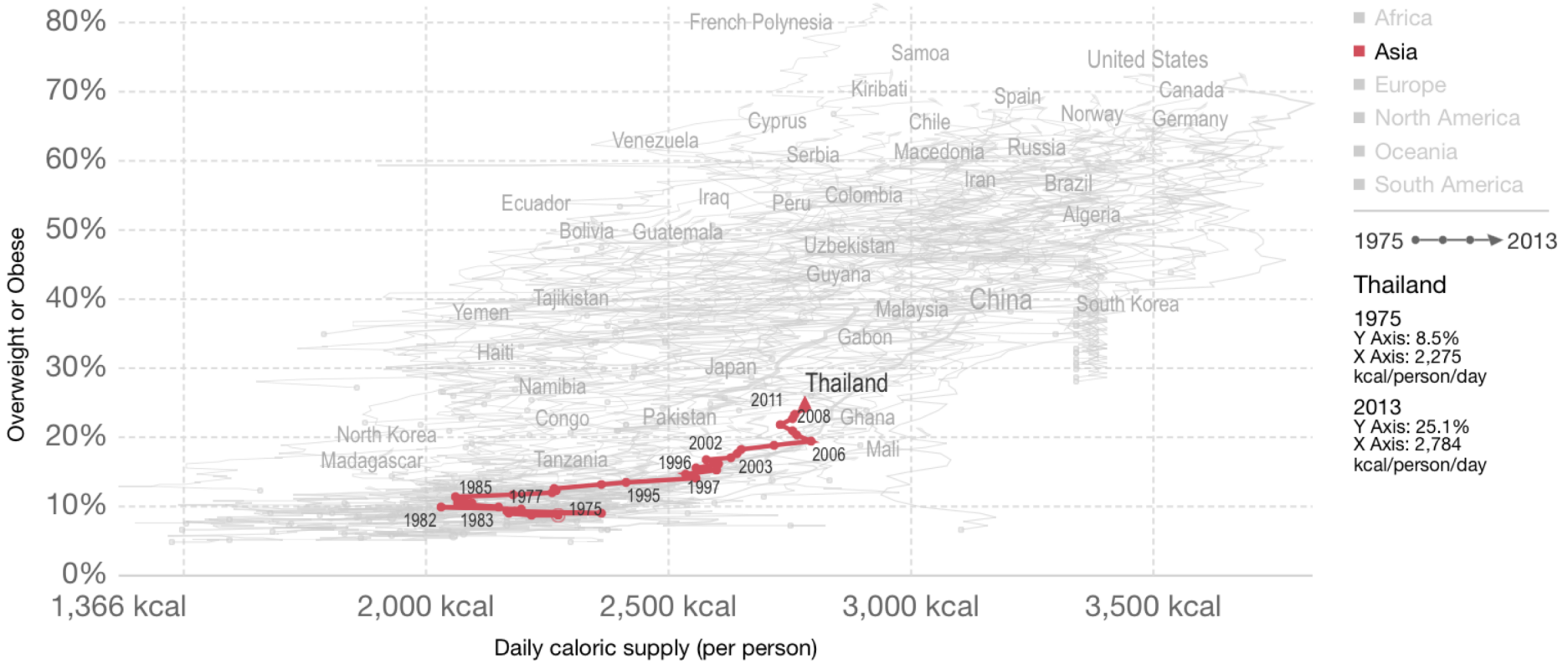
18 October 2018

Outline

- Background
- Objective and Research Questions
- Methodology
  - Conceptual Framework
  - Data Collection and Questionnaire
- Summary results
- Q&A

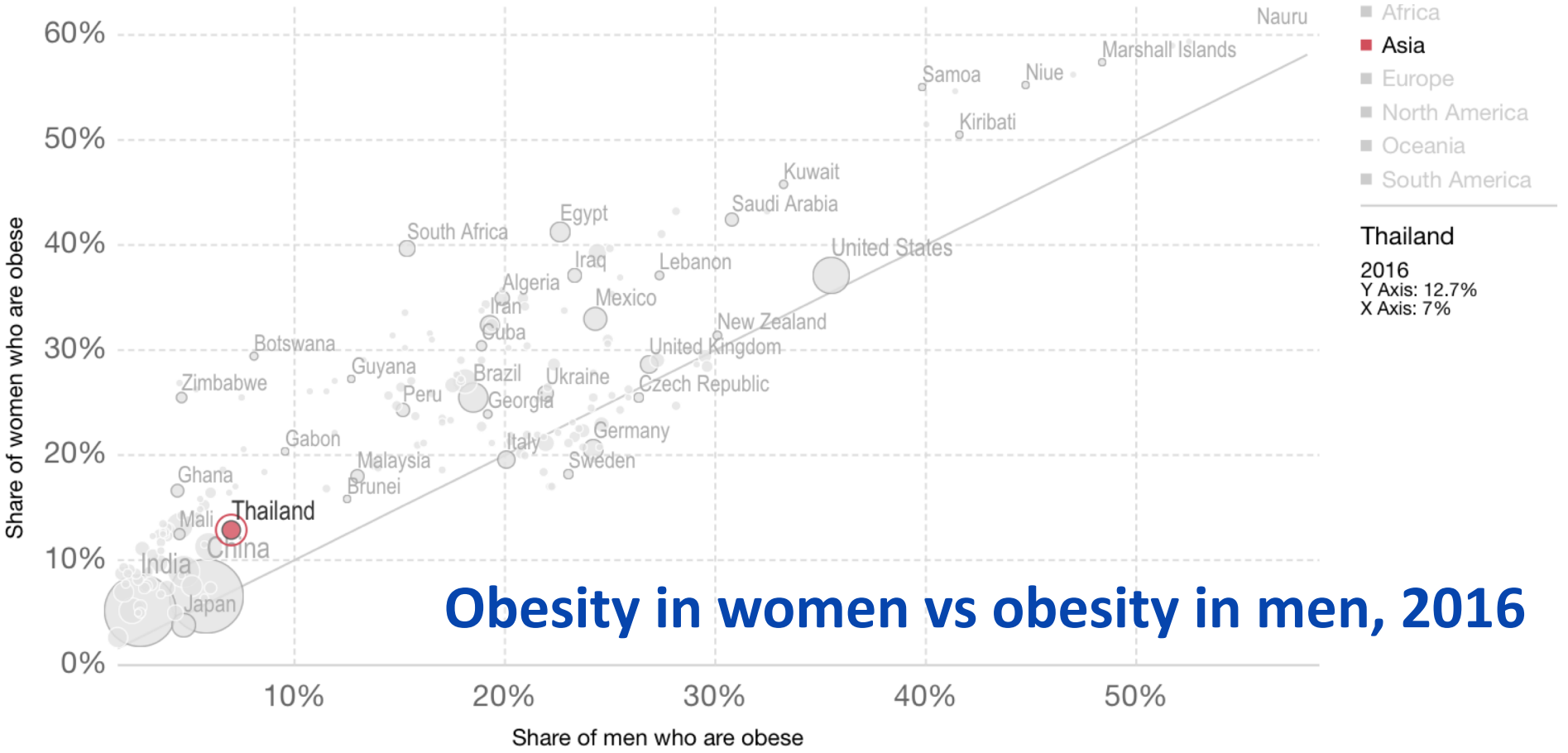
Background (1/5)

Share of adult men overweight or obese vs. daily supply of calories, 1975 to 2013



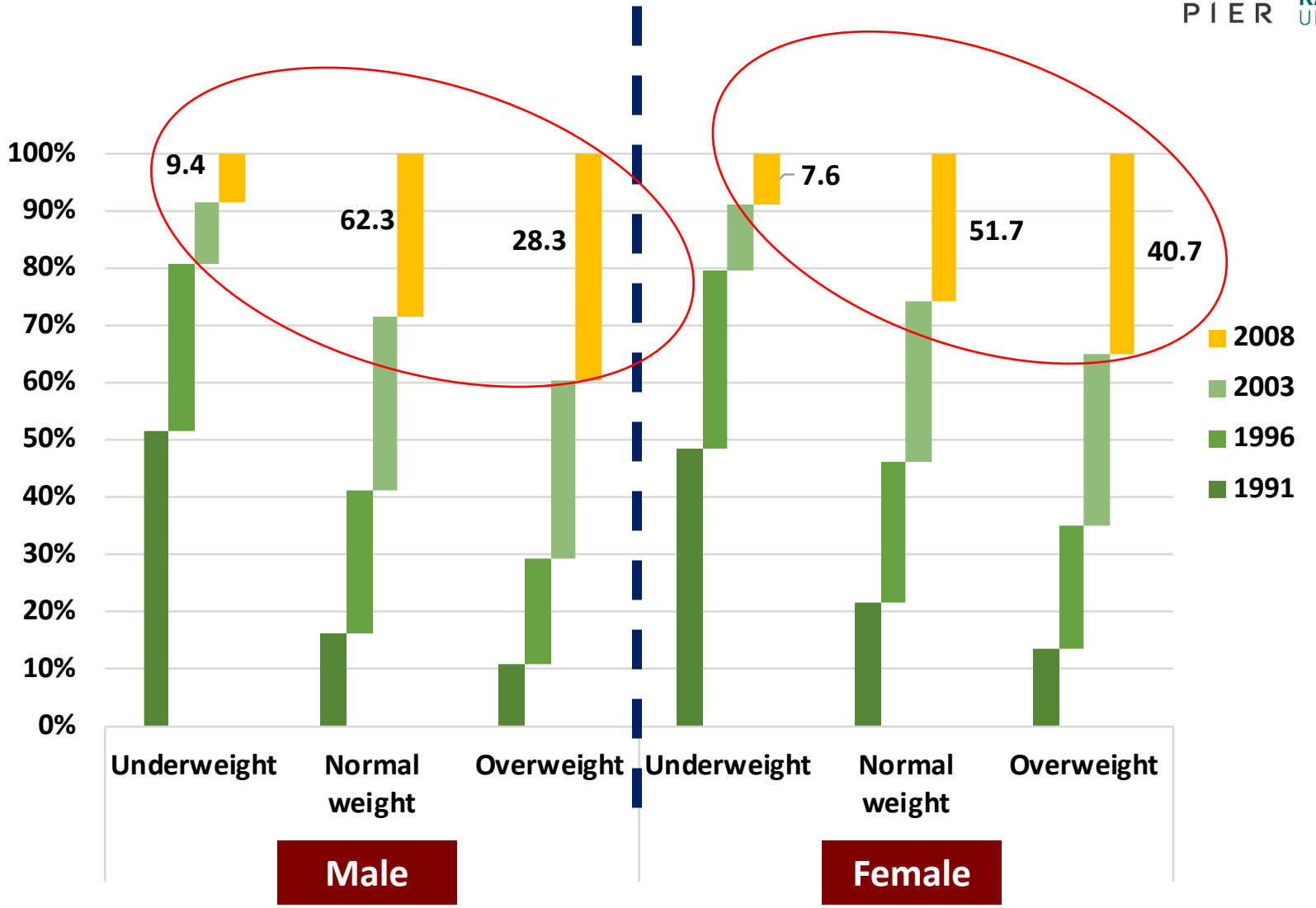
Source: https://ourworldindata.org/obesity

Background (2/5)



Source: https://ourworldindata.org/obesity

Background (3/5)



The prevalence proportion of underweight, normal weight and overweight in Thailand (1991 - 2008)

Source: Thummarungsi (2014)

Background (4/5)

Obesity cost

฿12,142 million

(0.13% of GDP)

Direct cost: Health expenditure

฿5,584 million

(2.2% of total health expenditure)

Indirect cost

฿6,558 million

Productivity loss

- Premature death = ฿5,864 million
- Care givers = ฿ 694 million

Source: WHO Non-Communicable Diseases Country Profiles, 2011
http://wops.moph.go.th/ops/thp/thp/user_files/file/issue%203_58.pdf

Background (5/5)

In an integrated weight-management approach, a part of the treatment could aim to support individuals in their efforts toward health behaviors changes by achieving a better psychological well-being.

Provencher et al., 2008

Personalised Nutrition

It's Time to Get Personal

Objective and Research Questions

Objective

To examine the factors determining WTP for Personalised Nutrition Programme (PNP)

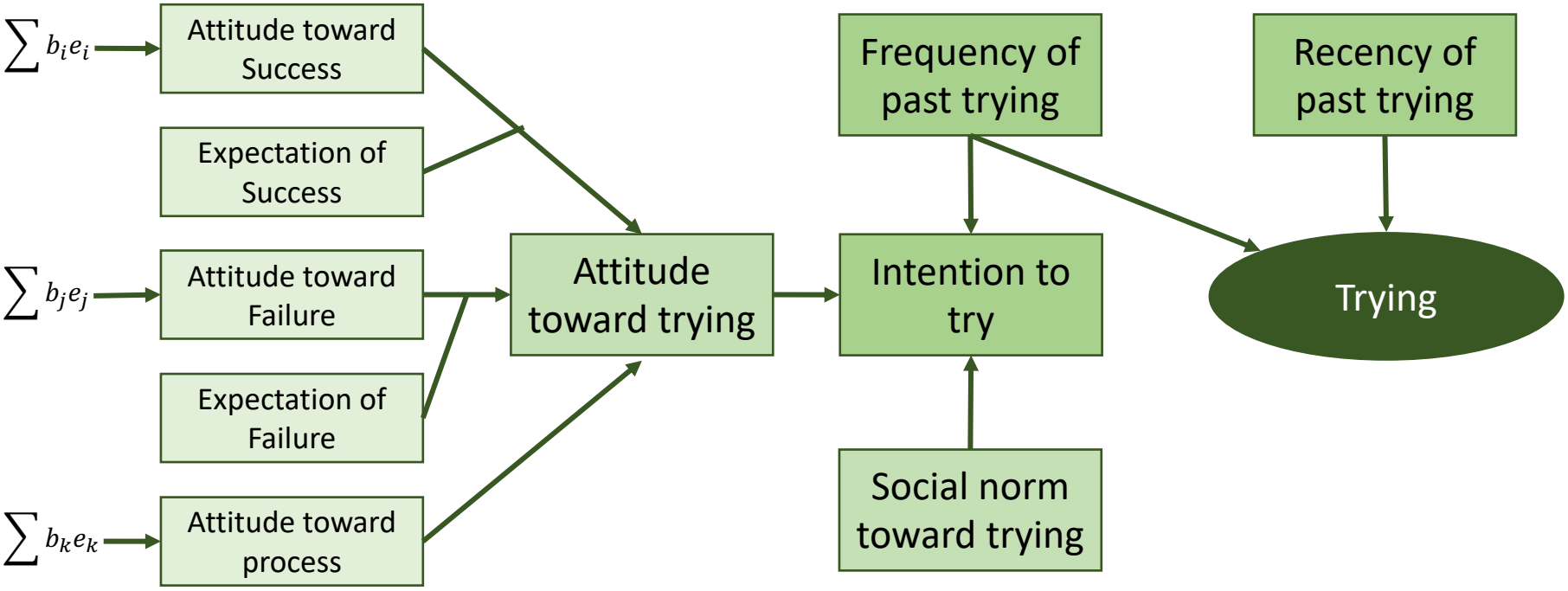
Research Questions:

1. What econometric models can be used to analyse cross-sectional data collected employing a combination of expectancy value and contingent valuation models?
2. How well can attitudes, social norms, socio-demographic and economic characteristics predict intention to try and WTP for a PN programme?
3. How much are Thai citizens willing to pay for a PN programme helping them to achieve their weight goals?
4. Are purchasing intentions and WTP for a PN programme stable over time?

Methodology (1/6)

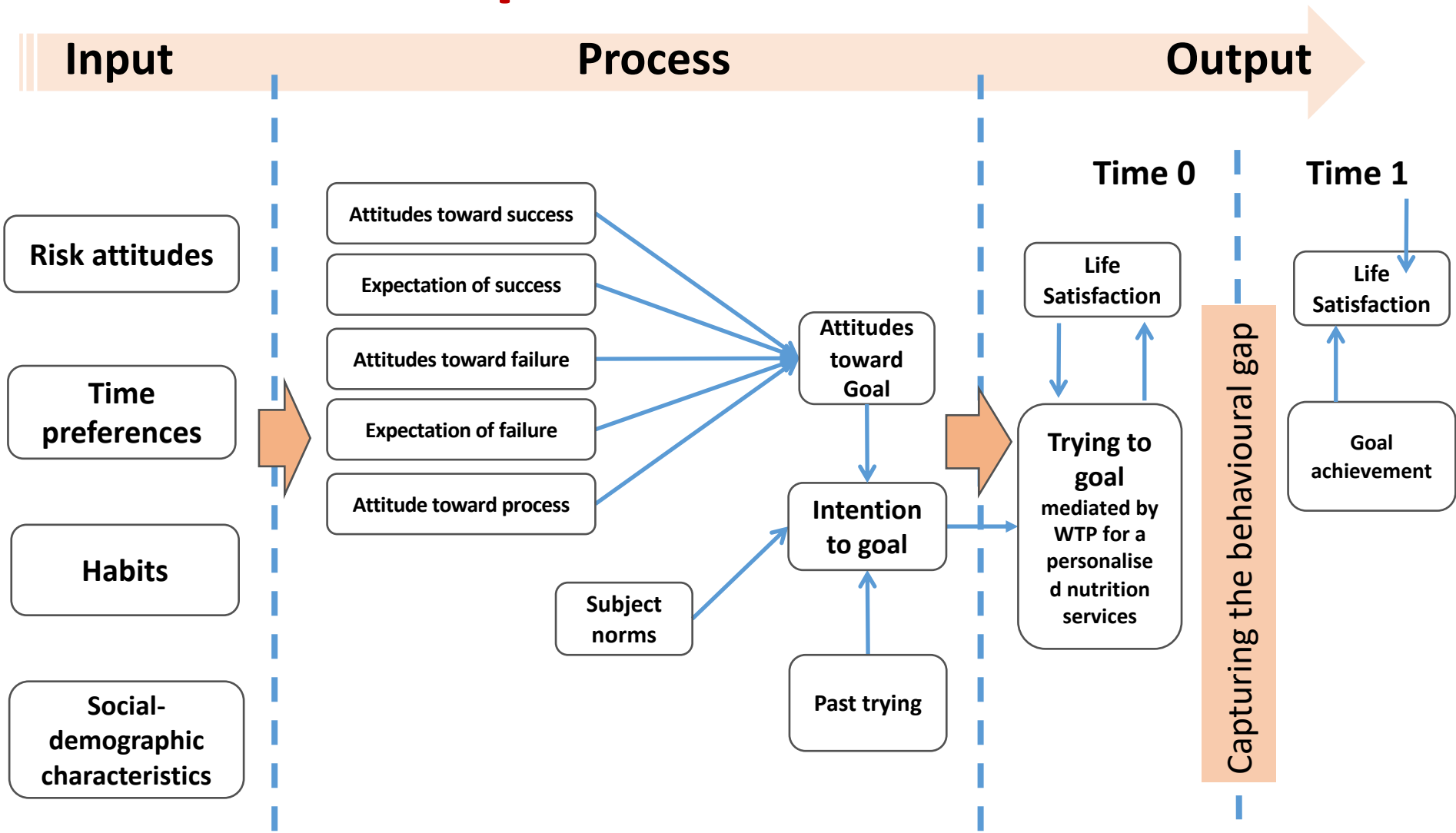
Theoretical frameworks and measurement

Bagozzi, R. P. & Warshaw, P. R. (1990). Trying to Consume.
Journal of Consumer Research, **17**, 127-140.



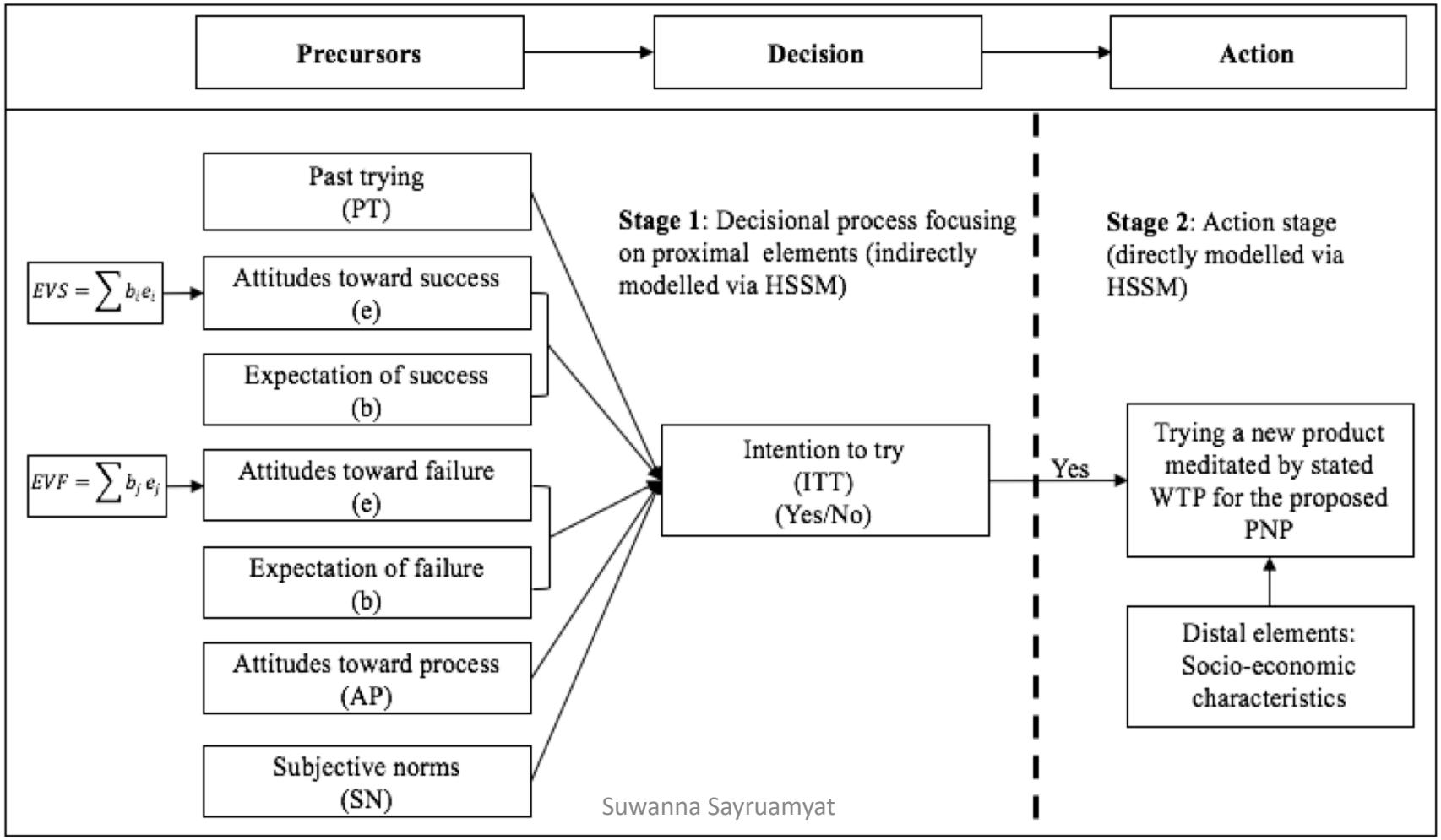
Methodology (2/6)

Conceptual Framework



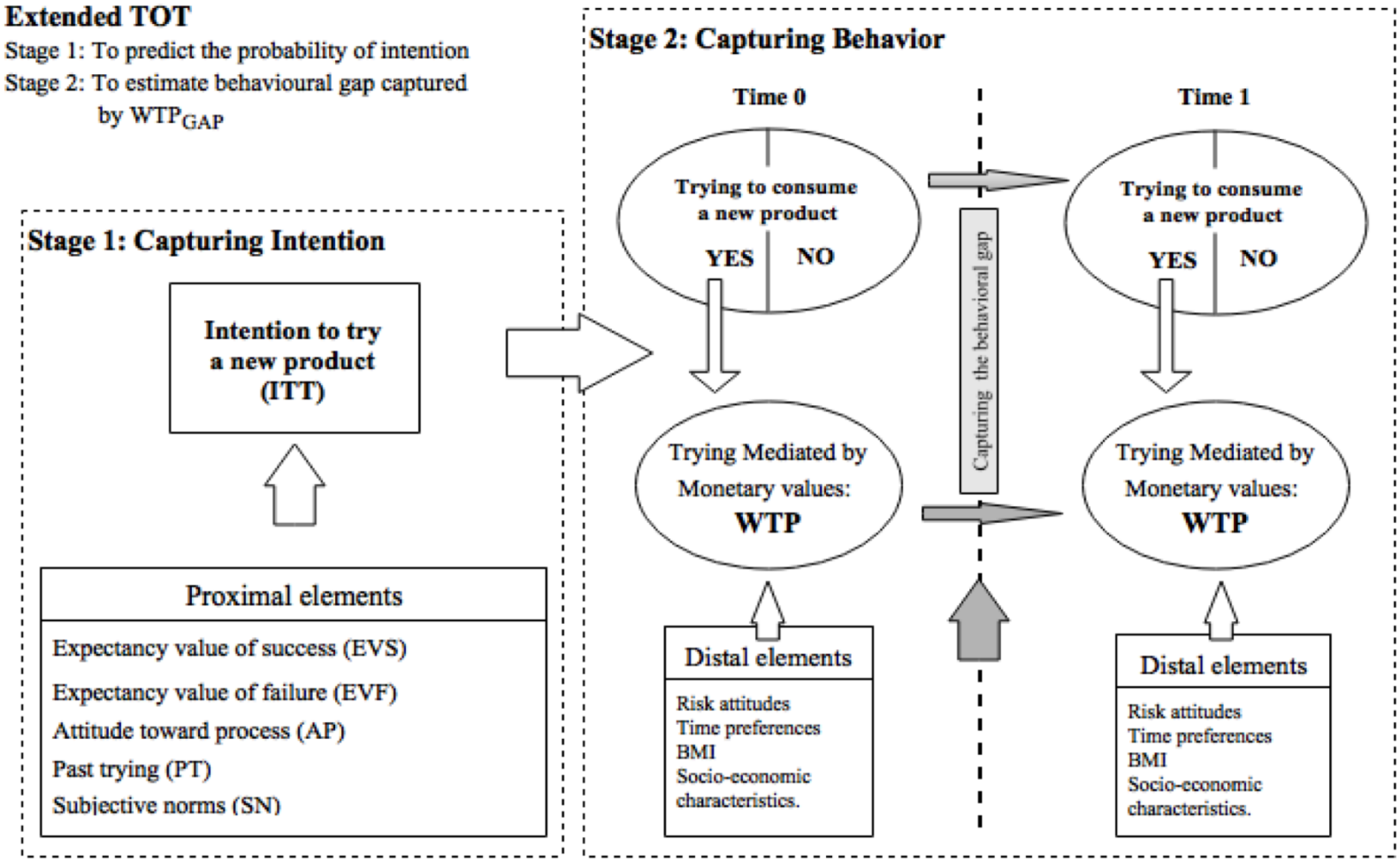
Methodology (3/6)

Stage 1: Exploring the impact of proximal and distal elements of TOT on consumer behaviour by Heckman sample selection model, Tobit model and Interval regression model



Methodology (4/6)

Stage 2–Capturing behaviour gap by Heckman selection model



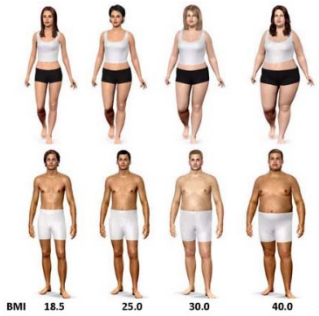
Methodology (5/6)

Data Collection and Questionnaire

- Data collection
  - Primary data
  - Two rounds of survey (in 2015 and in 2016)
  - Face to face interviewing
  - Follow-up: 6-month period
- Participants
  - 508 respondents who worked in Bangkok
  - were recruited in Bangkok advertising the study in several small businesses and governmental offices.
  - Concerned about weight and willing to set weight goal in 6 months later
- Questionnaire
  - The theory of trying
  - WTP for Personalised Nutrition Programme elicited by payment card format via contingent valuation survey
  - Risk attitudes
  - Time preference
  - Socio-economics

Methodology (6/6)

Personalised Nutrition Programme



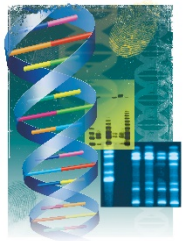
ผู้ที่มีความตั้งใจจะลดน้ำหนัก/รักษาระดับน้ำหนักให้คงเดิม/เพิ่มน้ำหนัก

มองหาคำแนะนำเพื่อบรรลุเป้าหมาย

พบแพทย์/ผู้เชี่ยวชาญ

ขั้นตอนที่ 1

ข้อมูลการวินิจฉัยเบื้องต้น



ตรวจโภชนพันธุศาสตร์ Nutrigenomic test (Genetic blood test)

ขั้นตอนที่ 2

ปรึกษาพูดคุยผลตรวจ Nutrigenomic test กับแพทย์ผู้เชี่ยวชาญ

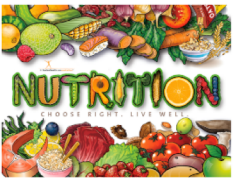
คำแนะนำในการควบคุมน้ำหนักเพื่อลดผลกระทบของภาวะโรคอ้วนและโรคต่างๆที่เกี่ยวข้อง

ขั้นตอนที่ 3

นักโภชนาการ/ผู้เชี่ยวชาญ

คำแนะนำเกี่ยวกับการควบคุมอาหาร

รายการอาหารแนะนำ



เทคนิคการเลือกเครื่องปรุง วัตถุดิบ และอาหารที่เหมาะสม

ปฏิบัติตามแผนโภชนาการ และเฝ้าติดตามผลด้วยตัวเอง

ขั้นตอนที่ 4

แพทย์

นักโภชนาการ/

ติดตามและประเมินผล พร้อมทั้งปรับแผนโภชนาการเดือนละ 2 ครั้ง

ผลลัพธ์ในเวลา 6 เดือน/ 1 ปี

บรรลุเป้าหมายน้ำหนักเป้าหมาย และลดความเสี่ยงของโรคอันมีสาเหตุเนื่องจากภาวะโรคอ้วน

Summary Results (1/9)

Participants

First survey

- 597 participants (89% of participants was willing to participate in the second survey)
- 60.8% of participants was female
- 64.7% of participants earned a gross monthly income between THB 10,000 and THB 30,000
- BMI:
  - Normal weight: 46.4%
  - Overweight: 29.1%
  - Obese: 17.25%
- Weight goals
  - Losing weight: 68.6%
  - Gaining weight: 10.0%
  - Maintaining weight: 21.2%

Follow-up survey

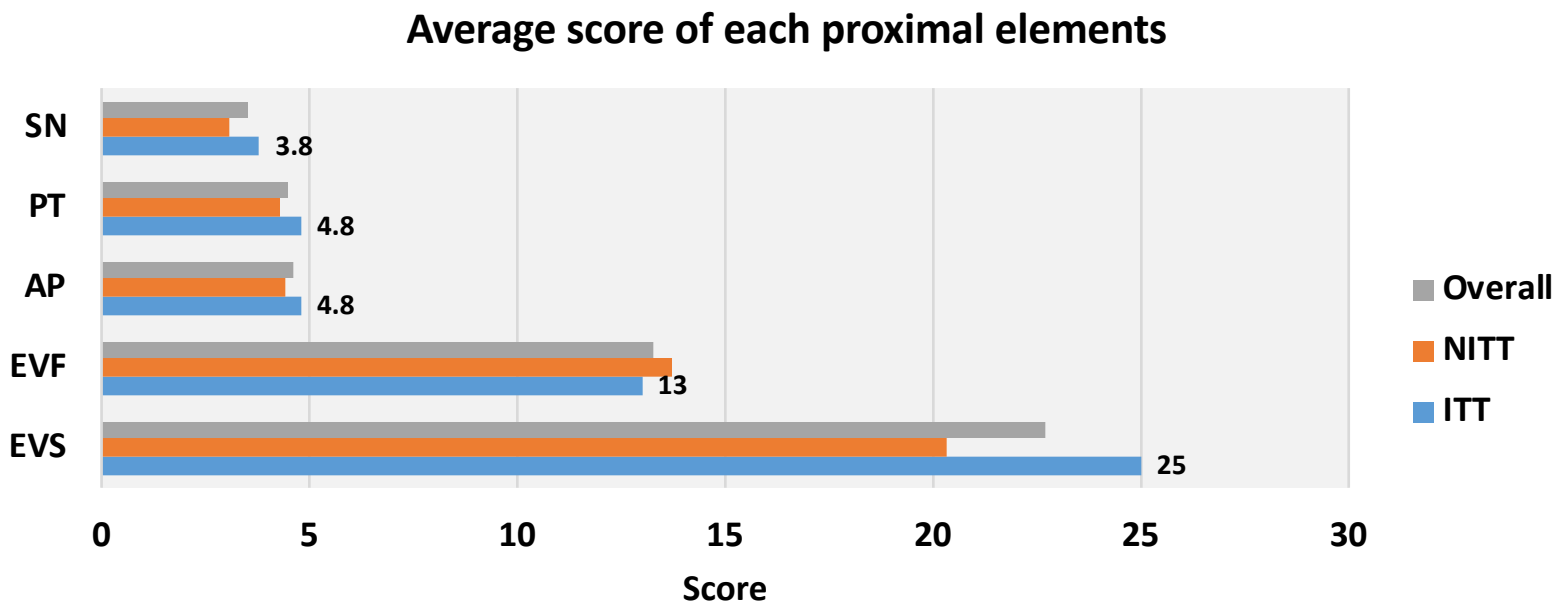
- 508 participants (85% of first survey)

Summary Results (2/9)

Summary statistics of proximal elements for intenders, non-intenders and total sample

Variables	ITT n = 260	NITT n=248	Total sample n = 508	t-test
EVS	25.0 (7.19)	20.3 (6.76)	22.7 (7.36)	-5.09[a]
EVF	13.0 (5.62)	13.7 (4.99)	13.3 (5.33)	0.027
AP	4.8 (.91)	4.4 (.82)	4.6 (.89)	-3.86[a]
PT	4.8 (1.08)	4.3 (1.01)	4.5 (1.07)	-4.36[a]
SN	3.8 (1.19)	3.1 (1.39)	3.5 (1.33)	-3.64[a]

Note: Standard deviations are in parenthesis. [a] Significant level at 1%, [b] Significant level at 5%, [c] Significant level at 10%.



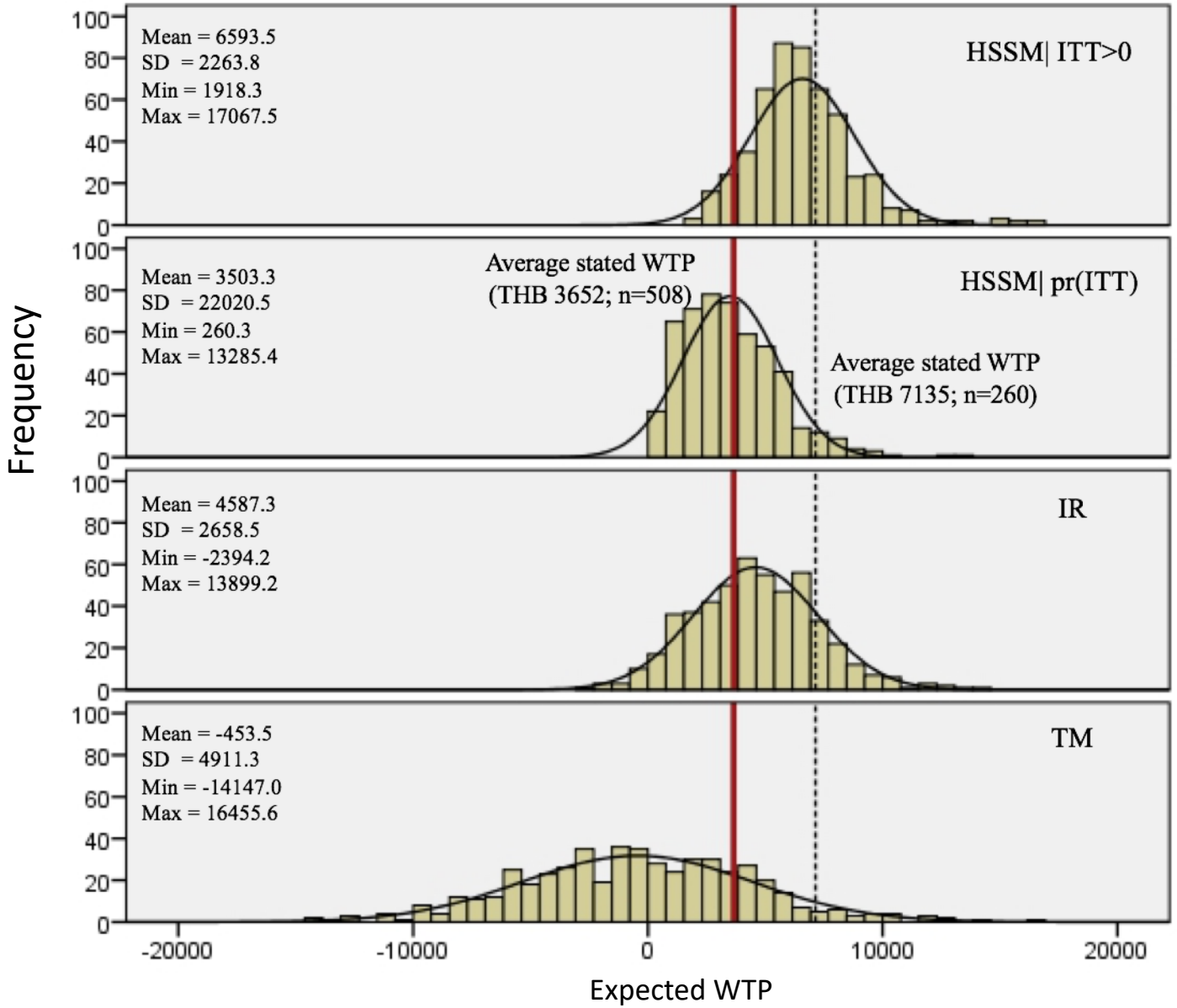
Summary Results (3/9)

Impact of proximal and distal elements of TOT on WTP for PNP: comparing results obtained with HSS, TOB and IR models.

	Two-stage model	One-stage models		One-stage models when replacing the missing value of WTP for PNP with zero	
Elements	HSS	TOB	IR	TOB	IR
Model's constants	7239.3[a] (2782.5)	3051.5 (4102.0)	5266.0 (3417.9)	-17526.2[a] (5293.9)	-18865.9[a] (5766.8)
Proximal[A]					
1st stage's constant	-2.84[a] (.414)	-	-	-	-
EVS	.043[a] (.009)	100.9 (65.6)	76.3 (56.1)	273.8[a] (71.3)	3.1.2[a] (75.1)
EVF	-.003 (.011)	-65.1 (58.8)	-51.5 (48.2)	-40.9 (75.4)	-29.3 (81.8)
AP	.153[b] (.076)	594.7 (441.6)	522.1 (378.5)	1136.8[c] (580.8)	1210.5[c] (622.7)
PT	.159[a] (.045)	-170.6 (274.0)	-121.9 (230.5)	824.2[b] (333.8)	1010.4[a] (362.4)
SN	.150[b] (.060)	309.5 (304.5)	261.3 (247.5)	1194.0[a] (393.3)	1342.0[a] (436.6)
Distal[B]					
FEMALE	669.6 (557.8)	749.6 (604.2)	684.0 (487.9)	-555.9 (812.9)	-812.9 (893.3)
AGE	-76.2[b] (34.8)	-113.2[a] (41.05)	-84.3[b] (33.5)	-204.1[a] (50.3)	-219.4[a] (55.1)
INCOME	1057.1[a] (181.7)	1234.7[a] (188.5)	978.2[a] (155.9)	1163.2[a] (300.8)	1102.2[a] (319.1)
EDU	110.2 (146.9)	-19.6 (169.3)	15.4 (136.1)	217.9 (236.8)	247.9 (263.7)
EMP_{GOV}	-2571.0[a] (815.9)	-2962.0[a] (875.8)	-2442.0[a] (709.2)	-3166.7[a] (115.3)	-3077.8[b] (1247.8)
EMP_{PRI}	-1854.8[b] (732.8)	-1928.7[b] (759.8)	-1658.1[a] (631.6)	-1942.9[b] (1058.3)	-1895.7 (631.6)
λ	-2058.4[a] (575.3)	-	-	-	-
ρ	-.434[a] (.104)	-	-	-	-
σ	4742.5[a] (297.8)	4797.9[a] (287.6)	3788.0[a] (241.8)	7926.3[a] (403.9)	8664.1[a] (403.2)
Observations	508	260	260	508	508
Censored obs.	248	27	27	275	275
Uncensored obs.	260	233	233	233	233
LL	-2863.7	-2335.8	-408.1	-2582.9	-736.2
Statistics	Wald(6) = 64.94	F(11, 249) = 8.17	Wald(11) = 91.4	F(11, 497) = 12.4	Wald(11) = 151.7

Note: Standard errors are in parentheses. [A] Proximal predictors in stage 1 of two-stage models; [B] Distal predictors in stage 2 of two-stage models. LL=the log pseudo likelihood and Wald = Wald chi2 test. [a] $p < .01$, [b] $p < .05$, [c] $p < .1$.

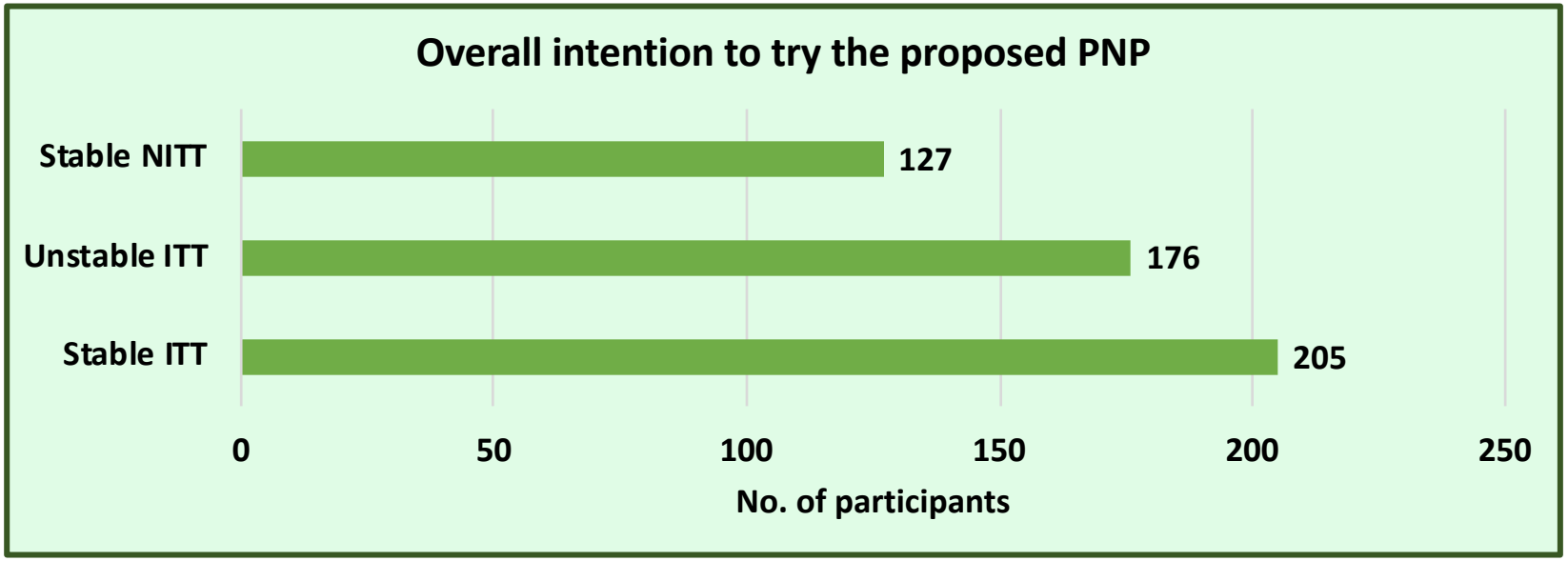
Summary Results (4/9)



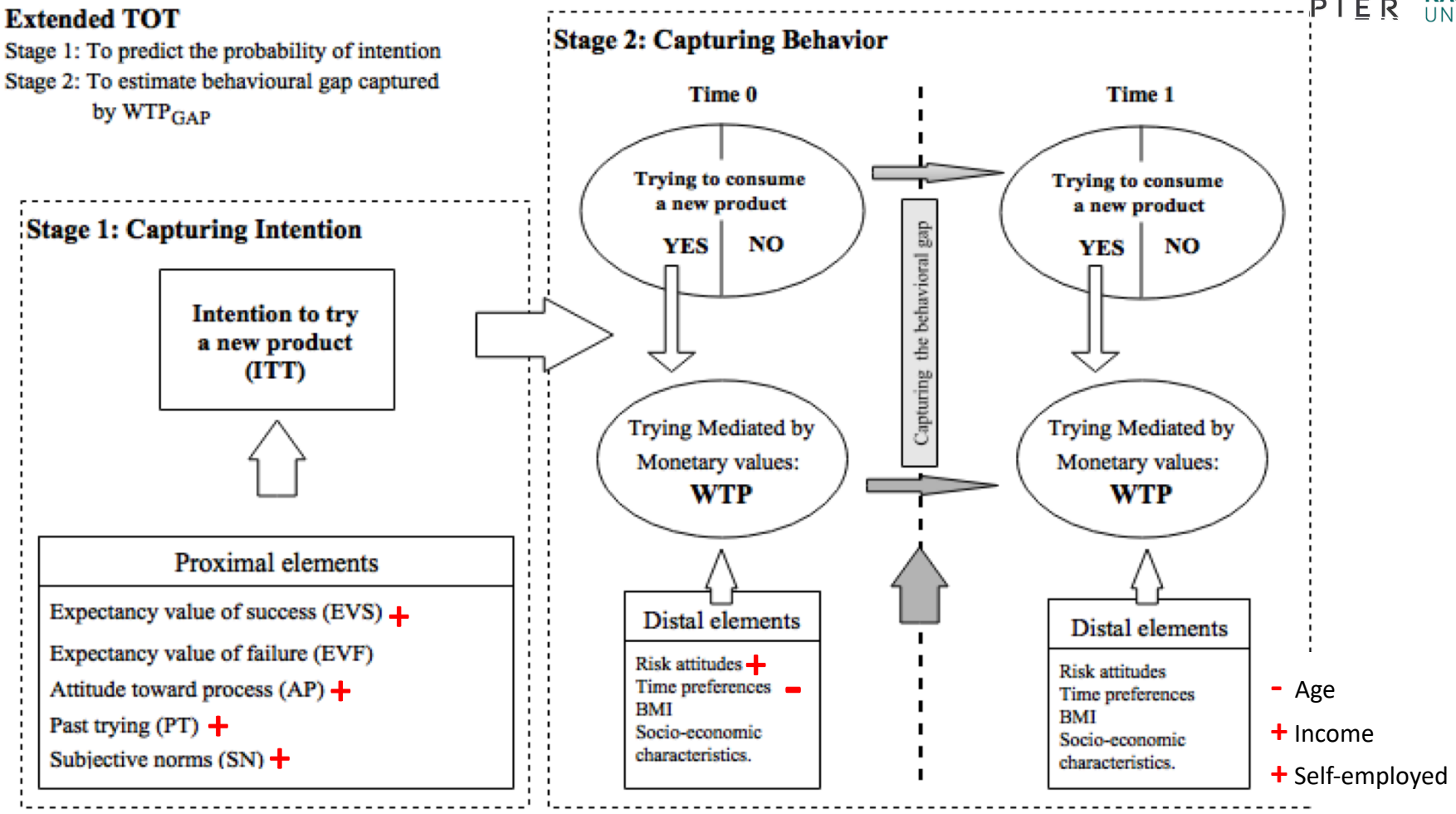
Summary Results (5/9)

Matrix of Intention Stability

		Time 0		
		Non-intended	Intended	Total
Time 1	Non-intended	127	121	**248**
	Intended	55	205	**260**
	Total	**182**	**326**	**508**



Summary Results (6/9)



- The first stage of Heckman selection model is consistent with the findings of Bagozzi and Warshaw (1990).
- The more people are risk-averse, the more they pay for PNP.
- The more people are impatient, the less they pay for PNP.
- The more people are stable ITT, the more likely they pay for PNP.

Summary Results (7/9)

Table 3.2 Marginal effects of proximal and distal elements of TOT on WTP for PNP

	Model 1: Prediction at time 0 << eq.7 >>		Model 2: Prediction at time 1 << eq.7 >>		Model 3: Average between time 0 and time1 << eq.9 >>		Model 4: Difference between time 0 and time1 << eq.11 >>	
Dependent variable	WTP_{T_0}		WTP_{T_1}		WTP_{MID}		ΔWTP	
Proximal variables	WTP|ITT>0	WTP| p(ITT)	WTP|ITT>0	WTP| p(ITT)	WTP|ITT>0	WTP| p(ITT)	WTP|ITT>0	WTP| p(ITT)
EVS	15.3***	79.3***	53.5***	129.5***	15.8***	72.2***	31.0	15.5
EVF	-2.0	-10.4	-6.3	-15.4	6.5	29.5	-55.2*	-27.7*
AP	164.9***	851.6***	173.6*	419.7*	114.9***	522.7***	257.4	129.3
PT	26.35	136.0	164.5***	397.6***	48.1*	218.9*	35.5	17.8
SN	125.1***	645.8***	188.7***	456.1***	85.2***	387.7***	136.9	68.7
Distal variables	Beta / WTP|ITT>0	WTP| p(ITT)	Beta / WTP|ITT>0	WTP| p(ITT)	Beta / WTP|ITT>0	WTP| p(ITT)	Beta / WTP|ITT>0	WTP| p(ITT)
RISK	11.6	7.4	22.6**	11.5***	15.3**	11.8**	17.4	12.9
TIME	.37	.23	- 4.1	-2.1	.132	.102	-5.0**	-3.7**
FEMALE	232.9	149.2	620.6	315.8	459.2	355.8	-436.8	-324.6
AGE	-84.5**	-54.1**	-68.0**	-34.6**	-51.9***	-40.2***	-21.7	-16.1
INCOME	486.2***	311.5***	1096.5***	558.0***	604.4***	468.3***	1179.3***	876.4***
EDU	-189.9	-121.6	86.3	43.9	-54.5	-42.2	227.4	169.0
BMI	5.12	3.2	-5.9	-3.0	-7.5	-5.8	163.0	121.2
EMP_{GOV}	-843.0	-540.1	-2552.7***	-1299.1***	-1217.4**	-943.2**	-1964.4*	-1459.8*
EMP_{PRI}	-711.6	-456.0	-1771.4**	-901.5**	-920.4**	-713.1**	-1497.9	-1113.3
ITT_{STABLE}	-	-	-	-	3872.1***	3000.0***	2080.0**	1545.7**
Constant	13040.3***		6440.6*		8906.8***		-5018.9	
Rho (x^2)	- .232* (2.96)		- .439*** (10.68)		-.314** (4.35)		-.850*** (23.11)	
sigma	5010.6***		4674.0***		3151.0***		8725.7	
lambda	-1166.6		-1933.2		-989.9		-7421.1	
Log pseudo likelihood	-3537.2		-2862.9		-3860.2		-4200.1	
Wald chi2	14.9*		73.9***		208.1***		56.1***	
Censored obs.	182		248		127		127	
Uncensored obs.	326		260		381		381	

Note: Total number of observations is 508. Marginal effects for categorical variables represent the discrete change from the base group. *** $p<.01$, ** $p<.05$, * $p<.1$. (Exchange rate: 53 THB equal 1 GBP on 31st December 2015).

Summary Results (8/9)

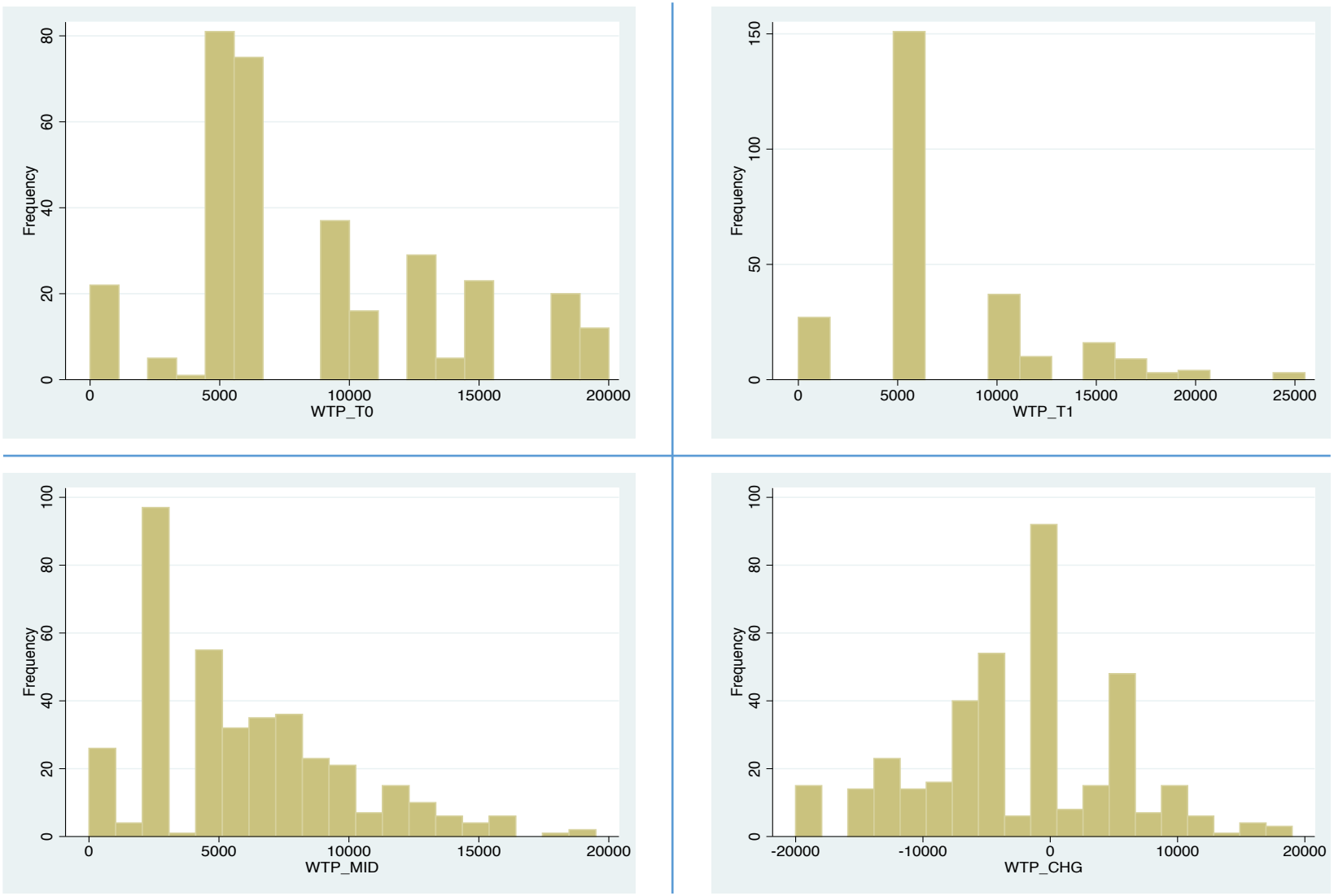
Table 3.4 Probability of intention and means of expected WTP for PNP

	Model 1: Prediction at time 0	Model 2: Prediction at time 1	Model 3: Average between Time 0 and time1	Model 4: Difference between Time 0 and time1 (T_1-T_0)
Probability of intention	.640	.508	.774	.743
WTP | ITT>0	8377.2	6626.3	6046.2	-2459.7
WTP | p(ITT)	5409.4	3511.2	4786.3	-1776.8
WTP*	9066.2	8195.5	6426.4	756.7

Note: *Expected WTP for PNP was predicted by linear prediction for ITT group. (Exchange rate: 53 THB equal 1 GBP on 31st December 2015).

Summary Results (9/9)

Distribution of WTP for PNP



References

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Q&A