NON-COGNITIVE SKILLS AND LABOR MARKET OUTCOMES: EVIDENCES FROM THAILAND

Ponlapat Rattana-ananta

A Dissertation Submitted in Partial
Fulfillment of the Requirements for the Degree of
Doctor of Philosophy (Economics)
School of Development Economics
National Institute of Development Administration
2014

NON-COGNITIVE SKILLS AND LABOR MARKET OUTCOMES: EVIDENCES FROM THAILAND

Ponlapat Rattana-ananta

School of Development Economics

Associate Professor _____ Major Advisor

(Pungpond Rukumnuaykit, Ph.D.)

Assistant Professor _____ Co-Advisor

(Amornrat Apinunmahakul, Ph.D.)

The Examining Committee Approved This Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy (Economics).

Associate Professor _____ Committee Chairperson

(Yongyuth Chalamwong, Ph.D.)

Associate Professor _____ Committee

(Pungpond Rukumnuaykit, Ph.D.)

Assistant Professor _____ Committee

(Amornrat Apinunmahakul, Ph.D.)

Lecturer _____ Committee

(Tongyai Iyavarakul, Ph.D.)

Assistant Professor _____ Dean

(Nada Chunsom, D.B.A.)

August, 2014

ABSTRACT

Title of Dissertation	Non-Cognitive Skills and Labor Market Outcomes: Evidences from Thailand
Author	Ponlapat Rattana-ananta
Degree	Doctor of Philosophy (Economics)
Year	2014

This study consists of both theoretical and empirical parts. In the theoretical part, the definitions of non-cognitive skills and similar proposed concepts are revealed as individual psychological characteristics that signal the skills or abilities to provide individual or improve group "effort," and these characteristics can be observed through one's personality, traits, behaviours, habits, and attitudes. A review of existing effort-inclusive economic models and psychological theories of motivation confirmed that effort involves both pre-determined and situational factors. Based on Atkinson's theory of achievement motivation and Bandura's theory of self-efficacy, an economic concept of individual motivation and effort was developed. The level of an individual's effort depends on the strength of his or her motivation and both effort and motivation are determined by *motive*, the existing characters of the individual required to approach or avoid certain behaviours; *self-efficacy*, the belief that a person can perform required actions; *outcome expectation*, the belief that actions will lead to desired outcomes; and *incentive value*, the attractiveness of the foreseen outcomes.

In the empirical part of the present study, earning differences in the Thai labour market due to a worker's psychological character of generalized *self-efficacy* were investigated. *Self-efficacy* is defined as a person's belief about his or her ability to organize and execute courses of action necessary to achieve a goal. Based on the Thai Mental Health Survey, the influence of self-efficacy on individual earnings was estimated and compared to that of traditional human capital. The analysis of four different model specifications confirmed the endogenous nature of self-efficacy. The

impact of self-efficacy on individual earnings was statistically significant in the full sample and in almost all sub-samples. Its impact on earnings was independent from other demographic variables and unrelated to year of schooling or work experience. The contribution of self-efficacy to the earnings of males was slightly higher than that of females. The relative values of self-efficacy compared with year of schooling and work experience were higher in the private sector than in the government sector, and they were different across occupations.

This study also makes brief policy recommendations to improve self-efficacy and introduces new paradigms of human development, namely human capability and the technology of skill formation.

ACKNOWLEDGEMENTS

This dissertation would never have been accomplished without the assistance and guidance of several individuals to whom I wish to acknowledge and thank.

First and foremost, my utmost gratitude to Assoc. Prof. Dr. Pungpond Rukumnuaykit, my major advisor, I greatly appreciate her countless support and effective guidance throughout my entire process of doctorate. She always provides me with so many good opportunities to learn and grow professionally and intellectually in an academic career. This dissertation owes much to her. I also wish to extend my heartfelt thanks and appreciation to all of the committee members, Assoc. Prof. Dr. Yongyuth Chalamwong from TDRI, Asst. Prof. Dr. Amornrat Apinunmahakul and Dr. Tongyai Iyavarakul for their brilliant and thought-provoking comments and suggestions.

I am deeply indebted to Dr. Apichai Mongkol from the Ministry of Public Health for his incredibly helpful assistance on Thai Mental Health Indicator. I also sincerely thank you to the National Statistics Office for allowing me to have access to Thai Mental Survey.

My profound gratitude also goes out to Asst. Prof. Dr. Wuttithep Indhapanya for the wonderful lessons which supplied me an idea for dissertation topic. Not to mention the fellow Ph.D. students at the School of Development Economics, their shared experiences and encouragements always provide me good motivation.

Lastly, but most important, I owe the greatest debt of gratitude to my wife, my parents and the rest of my family for their unending love and support. I appreciate everything they have done for me.

Ponlapat Rattana-ananta

July, 2013

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

Abbreviations	Equivalence
AFQT	The Armed Forces Qualification Test
ARAs	Achievement-Related Attitudes
C-A	The Need for *Challenge* or *Affiliation*
CPC	Chicago Child-Parent Centre Program
DHS	De Nederlandsche Bank Household Survey
FFM	The Five-Factor Model
FFPI	The Five-Factor Personality Inventory
GED	The General Educational Development
GSE	Generalized Self-Efficacy
GZTS	The Guilford-Zimmerman Temperament Survey
HSB	High School and Beyond
I-E	Internal-External Attitude
IQ	Intelligence Quotient
ISCO	The International Standard Classification of Occupations
ISIC	The International Standard Industrial Classification of All Economic Activities
IV	Instrumental Variable Technique
LOC	Locus of Control
MBTI	The Myers-Briggs Type Indicator
MHS	Thai Mental Health Survey
MTMM	Multitrait-Multimethod Technique
NCDS	The National Children Development Study
NELS	The National Educational Longitudinal Study
NLS	The National Longitudinal Survey
NLS72	The National Longitudinal Study of the Class of 1972
NLSY	The National Longitudinal Survey for Youth

NLSYW	The National Longitudinal Survey for Young Women
NSO	The National Statistic Office of Thailand
OLS	Ordinary Least Square Technique
OSCE	Objective Structured Clinical Examination
PIAT	The Peabody Individual Achievement Test
PSID	The Panel Study of Income Dynamics
SES	Socio-Economic Status
SES 2009	The Socio-Economic Survey 2009
TMHI	Thai Mental Health Indicator
TMHI-15	15-Questioned version of Thai Mental Health Indicator
TMHI-55	55-Questioned version of Thai Mental Health Indicator
UK	The United Kingdom
US	The United States of America

CHAPTER 1

INTRODUCTION

"As is intuitively obvious and commonsensical, much more than smarts is required for success in life" (Heckman, 2008: 296).

James J. Heckman
2000 Economic Nobel Laureate

1.1 Development of the Problem

In the traditional thought of labour economics, it is believed that wage differences are determined by individual cognitive skills or how smart you are. The differences are explained by the human capital theory. People accumulate their skills through formal education in schooling and through the individual's work experiences. These skills increase the workers' productivity and hence their wages. Wage differences are described mathematically by a wage equation introduced in 1958 (Mincer, 1974) as follows:

$$\ln W_{S,E} = \ln W_0 + rS + aE + bE^2 + error, \text{ for } r > 0,\ a > 0 \text{ and } b < 0, \qquad (1.1)$$

where W_0 is the wage rate when an individual receives no schooling, while $W_{S,E}$ is the wage rate received after S years of schooling and E years of work experience and error is an unexplained component. Whereas an estimation technique of ordinary least squares or OLS is the most commonly applied, the year of schooling was sometimes substituted by the levels of formal education as dummy variables and the year of work experience was seldom substituted by the age of workers. Later the year of job tenure was also included if available (Goldsmith, Veum and Darity, 1997, 2000a, 2000b;

Nyhus and Pons, 2005; Mueller and Plug, 2006; Semykina and Linz, 2007; Linz and Semykina, 2008, 2009; Fortin, 2008; and Heineck and Anger, 2010).

Further studies of wage differences have focused on other concretely definable and measurable socio-economic factors in order to examine their outcomes. By including the worker's gender, race, and marital status, discrimination can be verified as for example in the studies done by Murnane, Willett and Levy (1995), Rossetti and Tanda (2000), Jarrell and Stanley (2004), Lazear and Oyer (2004b), Neuman and Oaxaca (2004), Lallemand, Plasman and Rycx (2005), Ransom and Oaxaca (2005), Hettler (2007), and Verhoogen, Burks and Carpenter (2007).

Murnane, Willett and Levy (1995), Rossetti and Tanda (2000) and Currie and Thomas (2001) incorporated the worker's parental background, such as the parents' job and occupation, education, income and socio-economic status, and scores on cognitive abilities to illustrate intergenerational mobility. By including the worker's cognitive abilities, namely analytic skills such as mathematic scores, as mentioned by Murnane, Willett and Levy (1995), for example, language skills such as speaking, reading, and writing scores, e.g. in Gonzalez (2000) and Carnevale, Fry and Lowell (2001) or both, e.g. in Currie and Thomas (2001), the returns to these cognitive abilities can be valued.

Hettler (2007) incorporated the worker's union membership to prove how strongly collective bargaining can have an effect on return. By including job and occupation characteristics, skill premiums can be valued, for example, as can be seen in Lallemand, Plasman and Rycx (2005), Ransom and Oaxaca (2005), and Hettler (2007). By including the firm's geographical locations, as for example in Rossetti and Tanda (2000), Lazear and Oyer (2004a, 2004b), Neuman and Oaxaca (2004), Lallemand, Plasman and Rycx (2005), and Hettler (2007), labour market segregation and geographical advantages are demonstrated.

Rossetti and Tanda (2000), Jarrell and Stanley (2004), Lazear and Oyer (2004a), Neuman and Oaxaca (2004), Lallemand, Plasman and Rycx (2005), and Hettler (2007) incorporated firm and labour market characteristics, such as firm-sizes, sectors, and industries to prove whether these variables influenced wages. Lastly, Verhoogen, Burks and Carpenter (2007) incorporated unemployment rate and the

average market wage to show the extent to which market pressure influences the firm's wage and how strictly the firm filled in higher vacancies from within.

However, some studies on wage differences and other labour market outcomes have shifted their focus to the unorthodox factor of unobservable characteristics of workers. Since the 1970s, a number of studies have highlighted the importance of personal psychological characters, such as behaviour, personality, and attitude. These characters, collectively called non-cognitive skills, have been being questioned concerning whether they have impacts on both economic and social outcomes. Furthermore, if they do have impacts, can they be improved or invested and how?

1.2 Significance of the Problem

One of the most prominent economists that has concentrated on this issue is 2000 Nobel Laureate James Heckman. His scope of non-cognitive skills includes motivation, socio-emotional regulation, time preference, personality factors, and the ability to work with others (Heckman, 2000: 4; Cunha and Heckman, 2007: 32; Heckman, 2008: 296). The studies by himself and those with his colleagues show that, not only labour market outcomes, but also other social outcomes are associated with non-cognitive skills. As shown in Appendix A, Heckman, Stixrud and Urzua (2006) confirm that both cognitive and non-cognitive skills do co-determine economic and social outcomes, for example, wages, probabilities of college graduation, and probabilities of employment, as well as the probabilities of wrongdoings such as involvement in illegal activities, being imprisoned, and teenage pregnancy. As quoted previously, more than "smarts" is required for success in life.

In the case of Thailand, however, studies on the outcomes of non-cognitive skills in the Thai labour market are very rare. Almost all of them are case studies of work performance and academic achievement carried out by psychologists. The following are some of the most recent examples. Veerawan Sukin (2008) investigated how personality and working situation related to the teaching performance of engineering lecturers at twelve leading Thai universities. Manat Boonprakob and Pannee Boonprakob (2007) explored the post-retirement working behaviour of retirees from Srinakharinwirot University. Mohan (2007) examined the influence of

personality and the perceived work situation on the job well-being of the teachers at international schools in Bangkok. Pranot Kaochim (2006) studied the relationship between learning behaviour and academic achievement of the students in the faculty of humanities at Srinakharinwirot University.

So far there has not been any study that has investigated the effects of non-cognitive factors on the labour market outcome for the overall Thai labour market. In order to formulate national human development policies, such as in the studies carried out by Heckman (2000) and Carneiro and Heckman (2003), it is important to understand the extent to which the various outcomes in the Thai labour market, such as earnings, occupational choices, and gender discrimination, are influenced by these non-cognitive skills.

1.3 Scope, Aims, and Objectives

This study consists of both theoretical and empirical parts. In the theoretical part, this study aims to develop an economic concept from psychologists' theories of motivation to explain the relationship between personal psychological characters, motivation and effort, and economic outcomes in the labour market. The specific objectives of this part include: (1) describing how psychologists' psychological characteristics are related to the term "effort" in economists' principal-agent problems; and (2) formulating a single economic model of individual motivation and effort.

In the empirical section of this study, the aim is to investigate the extent to which personal psychological characteristics contribute to individual earnings in the Thai labour market. According to a Thai Mental Health Survey (MHS), this study has chosen generalized *self-efficacy* as the psychological characteristics. The specific objectives of this part include: (1) estimating the impact of self-efficacy on individual annual earnings; (2) comparing the impact of self-efficacy on individual annual earnings with that of traditional human capital, i.e. year of schooling and work experience; and (3) estimating and comparing the impact of self-efficacy on individual annual earnings in the sub-samples of genders, employment sectors, and occupations.

1.4 Organization of the Study

This study is organized into seven chapters. Chapter 1 is the introduction. Chapter 2 reveals the past literature and concepts. Chapter 3 presents the sequential development of the theoretical concept. Chapter 4 reveals the methodology of the empirical study. Chapter 5 presents the results of the empirical study. Chapter 6 provides the conclusion and policy recommendations regarding self-efficacy improvement. Lastly, Chapter 7 reveals the new paradigms of human development for further studies.

CHAPTER 2

REVIEW OF THE LITERATURE AND CONCEPTS

2.1 Definition of Non-Cognitive Skills and Similar Proposed Concepts

Heckman (2000) introduced and distinguished "non-cognitive skills" from cognitive ones. This study argues that measures of cognitive abilities such as achievement and I.Q. (intelligence quotient) tests reveal only academic cleverness. These measures completely exclude "social skills, self-discipline and a variety of non-cognitive skills" and "social adaptability and motivation" (Heckman, 2000: 4), which are socially and economically valuable. Later on, a broader scope of non-cognitive skills included "perseverance, motivation, time preference, risk aversion, self-esteem, self-control, preference for leisure" (Cunha and Heckman, 2007: 32), and "motivation, sociability (the ability to work with others), the ability to focus on tasks, self-regulation, self esteem, time preference" (Heckman, 2008: 296).

Before Heckman's introduction, two similar concepts were previously raised. First, Filer (1981) proposed a concept of general human capital where the individual's stock of human capital comprises two types of skills, cognitive skills and "affective skills." Cognitive skills, which are referred to as intellectual knowledge, are the ability to communicate and solve mathematic problems. Affective skills, which are referred to as an individual's affective characteristics, are personality traits such as drive, extraversion, and human relation skills (Filer, 1981: 371). Employers view these characteristics as valuable because they influence productivity, and hence affective skills do pay off in the labour market.

Secondly, Goldsmith, Veum and Darity (1997) made use of the concept of "psychological capital." Psychological capital may include "a person's perception of self, attitude toward work, ethical orientation, and general outlook on life" (Goldsmith et al., 1997: 815). Personality psychologists believe that this capital contributes to an individual's productivity and wage in the same way as human capital. However, due

to its unmeasurable nature, most economists usually treat psychological capital as unobservable.

Similarly, Bowles, Gintis and Osborne (2001a, 2001b) proposed the concept of "incentive-enhancing preferences." Because labour effort is endogenous and is not contractible, incentive-enhancing preferences are referred to as the employee's preferences that "allow the employer to induce effort at lower cost" (Bowles et al., 2001a: 155). These employee preferences can be revealed through an individual's behaviours, personality characteristics, or any psychological traits that are observed by the employer as an effort, for example, the individual's rate of time preference and sense of personal efficacy (Bowles et al., 2001a: 156).

These similar concepts have one thing in common. They are the worker's psychological characteristics that signal his or her skills or abilities in providing individual "effort." These effort-signalling characteristics are not related to traditional human capital but still make workers heterogeneous. The individual's effort is as important as his or her cognitive skills or abilities, as they contribute to the worker's productivity. In the case of social skills or human relation skills, they indicate the ability to work with others and are useful skills in managing, coordinating, and motivating groups of people. As a result these skills improve the group's effort and the group's productivity. Once productivity rises, higher wages can be paid. Altogether, these psychological characteristics of the worker signal the skills or abilities needed to provide individual or improve group "effort."

2.2 Existing Effort-Inclusive Economic Models

Much of the literature has proposed separating the effects of effort from the effects of cognitive abilities or has proposed economic models with the inclusion of the effort variable along with traditional human capital variables.

First, Goldsmith et al. (2000a) annexed effort and motivation into the traditional human capital and proposed a theory of human efficiency. In this framework, "an individual's level of motivation, M_i, influences human efficiency, HE_i, both directly – by altering an individual's physical effort level – and indirectly –

by effecting a person's rate of mental proficiency, e_i, and thus their 'effective' human capital, e_i*HC_i" (Goldsmith et al., 2000a: 111) as

$$HE_i = HE_i(M_i, e_i*HC_i), \tag{2.1}$$

$$e_i = e_i(M_i), \text{ for } 0 \leq e_i \leq 1. \tag{2.2}$$

Let the jth firm work with capital K_j and pay the ith worker a real wage w_i, according to his or her marginal product MP_i. Then the ith worker is paid

$$w_i = MP_i(K_j, HE_i). \tag{2.3}$$

This proposal specifies that effort depends totally on exogenous motivation, as the worker's psychological characteristics and the level of effort are assumed to be pre-determined, stable, and remain unchanged throughout the worker's life.

At the same time, Bowles and Gintis (2001) and Bowles et al. (2001a) directly employed an employee's best-response function as

$$e = e(w, z), \tag{2.4}$$

where e is the level of effort chosen by employee when faced with wage rate w and z is exogenously defined as the expected present value of lifetime utility for a dismissed agent. This proposal contrasts with the first model. The level of effort is not totally pre-determined by a worker's psychological characteristics but is also influenced by his or her immediate conditions, i.e. the wage earned by the worker.

Borghans, Duckworth, Heckman and ter Weel (2008) proposed the manifestation of trait. True traits are not known. To gauge them, however, the measurement process itself is under the influence of the immediate conditions, as

$$M_l^n = h_l(f_l, f_{\sim l}, R_l^n, W_l^n), \text{ for } n = 1,\ldots,N_L \text{ and } l = 1,\ldots,L, \tag{2.5}$$

where f is a vector of latent traits, and where f_l is a particular trait in the list of L traits, so $f_{\sim l}$ represents the other components of f. M_l^n is the manifestation of trait l,

representing the latent trait f_l obtained in situation n. R_l^n is the reward or incentive for manifesting the trait in situation n, and W_l^n is the context of situation n that affects the measurement of trait l. This clearly indicates that the measurement process, $h_l(\cdot)$ is under the influence of situational incentive R_l^n and context W_l^n. The third highlights that the manifestation of the trait is subject to incentives and the context of the situation, and likewise the performance of the workers should be subject to these as well. Again this contrasts with the first model. The last two proposals assume that the worker's motivation and level of effort are influenced by both pre-determined psychological characteristics and the immediate conditions.

2.3 Atkinson's Theory of Achievement Motivation

According to Atkinson's theory of achievement motivation, which was discussed in Dunifon and Duncan (1998), the strength of motivation is influenced by both pre-determined and situational factors. Firstly, *motives* are the existing characteristics of an individual in approaching or avoiding certain behaviours (Dunifon and Duncan, 1998: 33), and these are pre-determined and continue from one situation to another (Atkinson, 1964: 242). The other two are situational factors. *Expectancy* is how strongly individuals believe in the situation they are confronting that their performances will lead to the goal. Lastly, *incentive* is how attractive the success appears to them in this particular situation (Atkinson, 1964: 241). Atkinson (1964: 242) described this relationship in a multiplicative form as

$$T_S = M_S \times P_S \times I_S, \tag{2.6}$$

where T_S is the strength of motivation to achieve (or tendency to approach success), M_S is *motives* for achieving success, P_S is the strength of *expectancy* (or probability of success), I_S is the *incentive value* of success, and S subscript refers to a specific situation.

2.4 *Motives*: Differences among Psychological Characteristics

Even though the workers' psychological characteristics mentioned in section 2.1 represent Atkinson's motives altogether, they are slightly different.

2.4.1 Personality and Trait

Personality is defined as "a dynamic and organized set of characteristics possessed by a person that uniquely influences his or her cognitions, motivations, and behaviours in various situations" (Ryckman, 2004 quoted in Wikipedia, 2010a). Personality theories also highlight the following:

> Critics of personality theory claim personality is 'plastic' across time, places, moods, and situations. Changes in personality may indeed result from diet (or lack of thereof), medical effects, significant events, or learning. However, most personality theories emphasize stability over fluctuation (Wikipedia, 2010a).

Based on trait theory, traits are defined as "habitual patterns of behaviour, thought, and emotion" (Kassin, 2003 quoted in Wikipedia, 2010b) and "traits are relatively stable over time, different among individuals and influence behaviour." The following are examples of personality types and traits which have been studied.

Locus of control (LOC), previously called the internal-external attitude, was defined by Julian Rotter as "an individual's perception of events as determined internally by own behavior vs. fate, luck or external circumstances" (Rotter, 1966). Those that believe themselves to be masters of their own lives are called *internal* and those that do not are *external*. Andrisani (1977) examined the influences of LOC over six different outcomes in the American labour market, such as occupational attainment, average hourly earnings, and annual earnings, while Goldsmith et al. (2000a, 2000b) focused on hourly wages. Groves (2005) investigated the effects of LOC on hourly wages earned by American women, while Semykina and Linz (2007) focused on the gender wage gap in Russia. Linz and Semykina (2008) investigated how LOC influences self-reported performances, monthly earnings, and expected

promotions among workers in two Russian cities, while Linz and Semykina (2009) focused on the same issues among workers from three countries of the former Soviet Union.

Self-esteem is defined by Morris Rosenberg as "a favorable or unfavorable attitude toward oneself" or simply "a sense of personal worth" (Rosenberg, 1965). Goldsmith et al. (1997) examined its effects on hourly wages, while Murnane, Willett, Braatz and Duhaldeborde (2001) investigated how self-esteem, evaluated in the late teenage years and early 20s, influenced adult wages ten years later.

The need for *challenge* or *affiliation* (C-A) refers to the personal characteristics in which those that reveal the need for *challenge* prefer to "get ahead," while those that reveal the need for *affiliation* prefer to "get along" (Linz and Semykina, 2009: 72). Dunifon and Duncan (1998) examined the influences of C-A over hourly earnings in the American labour market. Semykina and Linz (2007) investigated how these characteristics impact the gender wage gap in Russia, while Linz and Semykina (2009) focused on self-reported performances, monthly earnings, and expected promotions among workers in three countries of the former Soviet Union.

Type A behavior is related to impatience, hostility, a high level of competitiveness, and a constant feeling of time urgency. Those with *type A behavior* are always in a hurry and are trying to achieve more in less time. Semeijn, Boone, van der Velden and van Witteloostuijn (2005) examined the effects of *type A behavior* on monthly wages and the probability of a having job, having tenure, and obtaining an academic job.

Aggression and *withdrawal* are the personal characteristics in which those that reveal *aggression* always represent "anxious, aggressive, restless, outwardly expressed behaviour," while those that reveal *withdrawal* always represent "anxious, withdrawn inhibited behaviour" (Jackson, 2006: 191). Groves (2005) examined the effects of *aggression* and *withdrawal* on hourly wages earned by British women, while Jackson (2006) investigated how they influence occupational choices in the UK.

These psychological characteristics can be assessed through the use of a personality inventory, a set of questions designed to measure personality types. The Guilford-Zimmerman Temperament Survey (GZTS) offers measures of ten

personality types, for example, sociability, emotional stability, friendliness, thoughtfulness, and masculinity. Filer (1981) investigated how these characteristics influence the gender wage gap.

The Five-Factor Personality Inventory (FFPI) sorts individual personality into five dimensions; namely extraversion, agreeableness, conscientiousness, emotional stability, and autonomy (Nyhus and Pons, 2005: 371). Similarly, the Five-Factor Model (FFM), often called the Big Five, provides five basic personal characteristics; namely openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Heineck and Anger, 2010: 536). Nyhus and Pons (2005) examined the impacts of these five personality types on hourly wages, while Gelissen and de Graaf (2006) investigated how they influence incomes and occupational status transitions in the Netherlands. Mueller and Plug (2006) examined their effects on the gender wage gap in the US, while Heineck and Anger (2010) focused on male and female hourly wages in Germany.

The Myers-Briggs Type Indicator (MBTI) consists of the four personality dimensions of extraversion-introversion (E/I), sensing-intuition (S/N), think-feeling (T/F), and judgment-perception (J/P). Selecting four cross productions (SP, SJ, NT and NF) to describe learning styles, Borg and Stranahan (2002) examined their influences on student performances in a macro-economics class at the University of North Florida, USA.

Unlike individual personality, General Occupational Themes describe the suitable characteristics of occupations in six dimensions; namely realistic, investigative, artistic, social, enterprising, and conventional. Rosenbloom, Ash, Dupont, and Coder (2008) examined how these six dimensions limit American women in the career of information technology.

2.4.2 Behaviour and Habit

Behaviours are defined as “actions or reactions of an object or organism, usually in relation to the environment. Behaviour can be conscious or subconscious, overt or covert, and voluntary or involuntary” (Wikipedia, 2010c). Neill (2003) argues that traits and situations interact to influence behaviour as follows:

$$behaviour = personality \times interpretation\ of\ the\ situation \quad (2.7)$$

Habits are defined as “routines of behaviour that are repeated regularly and tend to occur subconsciously, without one’s directly thinking consciously about them” (Butler and Hope, 1995 quoted in Wikipedia, 2010d). Also habitual behaviour “often goes unnoticed in persons exhibiting it, because a person does not engage in self-analysis when undertaking routine tasks” (Wikipedia, 2010d). Wood and Neal (2007 quoted in Wikipedia, 2010d) defines habit formation as:

> The process by which a behaviour becomes habitual. As behaviours are repeated in a consistent context, there is an incremental increase in the link between the context and the action. This increases the automaticity of the behaviour in that context.

The following are examples of studies on behaviours and habits. Borg, Mason and Shapiro (1989) examined the impacts of the number of hours spent studying outside class on student performance in an economics class at the University of North Florida, USA. Dunifon, Duncan, and Brooks-Gunn (2001) investigated how the cleanliness of the houses can explain individual hourly earnings and also their children’s years of completed schooling and hourly earnings. Jacob (2002) examined the impacts of the number of hours spent on homework during a week and misbehaving incidences on the widening gap of college attendance between American men and women. Kuhn and Weinberger (2005) investigated how leadership skills, revealed by high-school experiences in participating in group activities and leadership roles, influenced hourly wages, annual earnings, and probabilities of obtaining managerial occupations in the US.

2.4.3 Attitude

Attitude is defined as “a hypothetical construct that represents an individual’s degree of like or dislike for an item. Attitudes are generally positive or negative views of a person, place, thing, or event” (Wikipedia, 2010e). Attitudes are:

> Judgments [which] develop on the ABC model (affect, behaviour and cognition). The *affective* response is an emotional response that expresses an individual's degree of preference for an entity. The *behavioural* intention is a verbal indication or typical behavioural tendency of an individual. The *cognitive* response is a cognitive evaluation of the entity that constitutes an individual's beliefs about the object. Most attitudes are the result of either direct experience or observational learning from the environment (Wikipedia, 2010e).

Attitude formation refers to the fact that "unlike personality, attitudes are expected to change as a function of experience" (Tesser, 1993 quoted in Wikipedia, 2010e). The following are examples of studies on attitudes.

Linz and Semykina (2008) examined the effects of work-related attitudes on self-reported performances, monthly earnings, and expected promotions among workers from two Russian cities. The questions on work-related attitudes were for example, "Working hard leads to high productivity," "Working hard leads to good job performance," "Hard work makes one a better person," "Wasting time is as bad as wasting money," "A good indication of a person's worth is how well his/her job is done," and "I am not willing to do more than my job description requires just to help the organization."

O'Connell and Sheikh (2008) grouped 17 questionnaire items of attitudes and behaviours as proxies of "achievement-related attitudes" (ARAs). This study investigated how ARAs influenced the incomes of an "at risk" group in the UK, those that grew up in a household where the father figure was absent or unemployed when they were sixteen. In the questionnaire, statements such as "I feel school is largely a waste of time," "I think homework is a bore," "I don't like school," and "Reading books (apart from schoolwork or homework)" presented the subjects' attitudes toward education, while statements such as "seeking good payment" presented materialistic-oriented attitudes and "seeking chances for promotion" presented prospect-oriented work attitudes.

2.5 *Incentive*: Variation in Labour Market Outcomes

Originally, Mincer's wage equation provided the estimation of wage differences due to traditional human capital only (Mincer, 1974). The worker's money wages, salaries, or earnings on a logarithmic scale were regressed by their years of schooling, work experience, and other factors of interest. For example, hourly wages or earnings were studied by Andrisani (1977), Goldsmith et al. (1997), Dunifon and Duncan (1998), Groves (2005), Kuhn and Weinberger (2005), and Nyhus and Pons (2005); monthly earnings by Semeijn et al. (2005); and annual earnings by Andrisani (1977) and Kuhn and Weinberger (2005).

In addition, some studies investigated more extensively other kinds of labour market outcomes. Some outcomes are still seen as tangible or completely related to the materials earned by workers, such as the gender wage gap of Filer (1981), Mueller and Plug (2006), and Semykina and Linz (2007); and the growth of hourly earnings and the growth of annual earnings of Andrisani (1977).

In contrast, some studies have focused on occupational attainment, either in term of the possibility of entering the labour market, such as the probability of having a job or tenure as noted by Semeijn et al. (2005) and occupational choices in the work of Jackson (2006); or the probability of obtaining a particular job or work class, for example, the probability of obtaining an academic job as seen by Semeijn et al. (2005) and women's career in information technology as studied by Rosenbloom et al. (2008). Other studies have focused on occupational advancement, either in terms of the progressive movement on the job ladder, such as the occupational status transitions of Gelissen and de Graaf (2006) or the probability of obtaining managerial jobs, for example, the probability of obtaining managerial occupations of Kuhn and Weinberger (2005). Even though these outcomes are still partially related to the materials earned from work, there are still intangible values attached to them.

Besides the labour market outcomes from economists' points of view, psychologists such as Albert Bandura, a professor of social science in psychology, suggest that "the range of [labour market] outcomes include such things as salary, security, social status, freedom to exercise initiative and use one's special abilities, variety in work assignments, chance to learn new competencies, opportunity for

advancement and leadership, congenial associates, and the social benefits of the particular line of work" (Bandura, 1997: 426). Maslow's familiar hierarchy of needs, which highlight human needs beyond materials, should elaborate Atkinson's notion of *incentive* (the *incentive value* of success in the theory of achievement motivation).

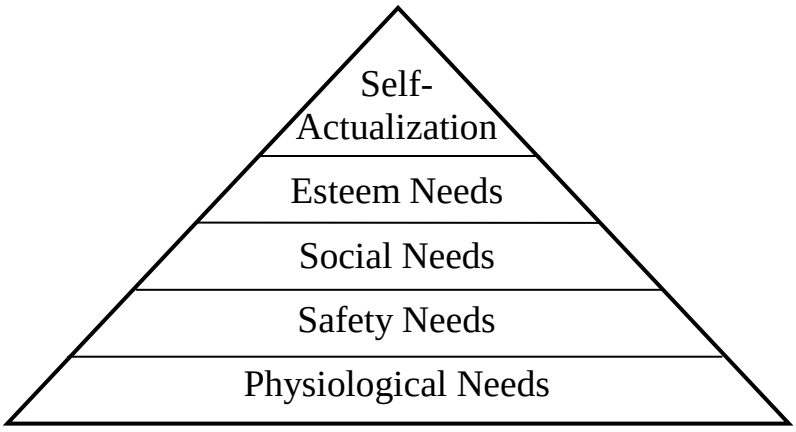


Figure 2.1 Maslow's Hierarchy of Needs
Source: Internet Center for Management and Business Administration, 2002.

From figure 2.1, it can be seen that physiological needs are fundamental requirements for human survival. If these requirements are not met, the human body cannot function. Physiological needs are for example breathing, food and water, clothing, shelter and sexual activity. Safety needs are the desire to be free from any threats, both physically and emotionally. Safety needs are in various forms, including physical safety against accidents and illness, employment and job security, and economic security. These first two may also be called "basic needs."

Social needs are the sense of belonging and acceptance. As humans need to love and be loved by others, social needs relate to interaction with others and involve emotionally-based relationships. Social needs are for example friendships, family, intimacy, and acceptance. Esteem needs are the desire to be recognized and respected. After being accepted, humans demand further levels of importance. Esteem needs fall into two classes. External motivation or lower esteem includes respect from others, the need for status, recognition, fame, prestige and attention. Internal motivation or higher esteem includes accomplishment, self-respect, the need for strength,

competence, mastery, and independence. These next two may also be called "psychological needs."

Maslow also defines these four levels of needs as deficiency needs. This means that human needs do not move up to higher levels until the needs at the present levels are met. Once all four are met, human needs reach self-actualization, the desire to become more and more what the individuals are capable of, according to the full potentials that they realize. This is also called "self-fulfilment needs." Learning and creating at a high level and opportunities for innovation and creativity are examples.

Linked to Atkinson's theory of achievement motivation, the strength of motivation depends on *incentive* or how workers value, according to hierarchy of needs, the outcomes rewarded by the labour market. For example, newly-graduated employees that are accumulating their wealth can gain possession of "basic needs" through working for money and spending that money on food and drink, clothes, housing, health and accidental insurances, etc. So their efforts are induced by money and in-kind incomes. In contrast, experienced employees, who are already wealthy and their basic needs are already fulfilled, would seek out "psychological needs" for which money cannot be exchanged. Hence their efforts are induced by career advancement and status in the workplace, such as managerial positions. This is supported by Frank (1984), as this study shows that some employees trade off some money for higher status in the workplace by accepting wages below their marginal products. This means that the utilities of these employees are not completely based on money and in-kind incomes, but also on their status in the work place.

2.6 *Expectancy*: Product of *Self-Efficacy* and *Outcome Expectation*

According to Bandura, whose works (Bandura, 1977, 1986) were mentioned in Dunifon and Duncan (1998), "expectations influence action focused almost exclusively on outcome expectations" (Bandura, 1997: 19), and "an outcome is the consequence of an act, not the act itself" (Bandura, 2002: 94). Figure 2.2 illustrates Bandura's explanation.

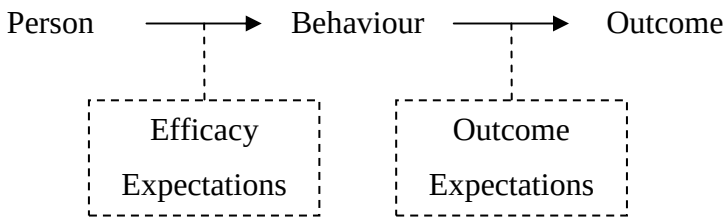


Figure 2.2 Diagrammatic Representation of the Difference between Efficacy Expectations and Outcome Expectations.

Source: Bandura, 1977: 193.

Therefore, the belief that performances will lead to the goal or *expectancy* (the strength of expectancy in Atkinson's theory of achievement motivation) is influenced by both the belief concerning whether one can perform required actions or perceived *self-efficacy,* and the belief as to whether the actions will lead to the desired outcomes or *outcome expectation*. Efficacy belief accounts for most of the variance in expected outcomes when outcome is determined by performance (Bandura, 1997: 24).

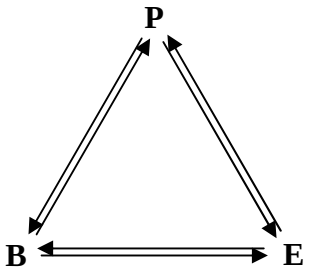
Bandura (1997: 49) classifies *self-efficacy* into three levels of generality of assessment:

> The most specific level measures perceived self-efficacy for a particular performance under a specific set of conditions. The intermediate level measures perceived self-efficacy for a class of performances within the same activity domain under a class of conditions sharing common properties. And finally, the most general and global level measures belief in personal efficacy without specifying the activities or the conditions under which they must be performed.

For *outcome expectation*, Bandura elaborates on the concept of *perceived control* of Ellen Skinner, a professor of human development and psychology. According to the glossary of psychological terms, perceived control is "the belief that one has the ability to make a difference in the course or the consequences of some

event or experience" (American Psychological Association, 2002). Skinner distinguishes three independent sets of beliefs; namely *control beliefs*, *means-ends beliefs* and *agency beliefs*. Bandura (1997: 27) states that "*agency beliefs* refer to whether one possesses or has access to the appropriate means [which] include effort, ability, luck, and unknown factors." *Agency beliefs* match up with Rotter's concept of *locus of control*, in which the *internal* believe in their own effort and ability while the *external* believe in external force such as luck and unknown factors. The slight difference is that Rotter's concept is "generalized expectancies" while Skinner's concept is "of some event or experience."

Therefore, both *self-efficacy* and *outcome expectation* may be viewed from two different perspectives, the broadest one and a specific one in particular situations. Variations in specific *self-efficacy* and situational *outcome expectation* can be described by triadic reciprocal causation from Bandura's Social Cognitive Theory, as can be seen in figure 2.3.



P: Internal personal factors;
B: Behaviour in forms of cognitive, affective and biological events;
E: External environment.

Figure 2.3 Triadic Reciprocal Causation
Source: Bandura, 1997: 6.

Bandura (1997: 5-6) states that "human agency operates within an interdependent causal structure involving triadic reciprocal causation." An individual's internal personal factors (P), emerging behaviour (B), and external environment (E) all interact and influence one another in both directions. Relative influences from one over another are varied by activities and circumstances and take time to produce influential affects. This means that in a particular situation, specific *self-efficacy* results from a comparison between the individual's own abilities and given particular requirements and the surrounding environment to produce the

required actions, while situational *outcome expectation* results from anticipation of whether the performing actions will lead to the desired outcomes, rewarded by the surrounding environment. As the conditions of these factors keep changing from one situation to another, specific *self-efficacy* and situational *outcome expectation* also change.

2.7 Bandura's Theory of Self-Efficacy

Introduced in 1977 by Albert Bandura, the originator of social learning theory, *self-efficacy* is defined as a person's belief about his or her ability to organize and execute the courses of action necessary to achieve a goal (Bandura, 1997). Self-efficacy has a significant impact on personal goals and accomplishments, as it determine how people feel, think, motivate themselves and behave. Self-efficacy directly influences the level of effort and persistence people demonstrate when facing obstacles. The stronger the perceived self-efficacy is, the more effort individuals make. Self-efficacy is also related to persistence, as Bandura (1977: 194) states that "those who persist in subjectively threatening activities that are in fact relatively safe will gain corrective experiences that reinforce their sense of efficacy."

2.7.1 Sources of Self-Efficacy

Self-efficacy is not an inborn trait. To recognise and realise their own ability, individuals must rely on information from self-knowledge. According to Bandura (1997: chapter 3), the following are four sources of information.

2.7.1.1 Enactive Mastery Experiences / Performance Accomplishments

This information is derived from an individual's own experiences of successes and failures. One's experiences form individual's expectations of his or her ability may be delivered in the upcoming situations, which may be similar or substantially different from past experiences. High expectations of one's own ability are developed through repeated success of a behaviour while low expectations result from failures.

2.7.1.2 Vicarious Experience / Social Modelling

This information is derived from the performances of others. By observing other performances of challenging or threatening activities without adverse consequences, individuals start to compare the similar attributes in the others and form expectations of their own ability. Without one's own experiences, individuals can calculate which activities are achievable and how much effort is needed. The more similar are the attributes, the higher are the expectations formed.

2.7.1.3 Verbal Persuasion / Social Persuasion

Individuals that are verbally persuaded that they are capable of achieving given activities are likely to mobilize greater effort and sustain it than those that doubt their own ability. However, verbal persuasion is considered as a weaker inducer of efficacy when one's own experiences of past failures dominate self-belief.

2.7.1.4 Physiological and Affective States / Emotional Arousals

An individual's expectations of his or her own ability can be distorted by negative emotional arousals such as stress or fear and the physiological state of fatigue, since they directly decrease performance and lead to other avoidance behaviours. The more sensitive is the person is to these arousals, the lower are the expectations that result. So by training or practicing to cope with stress and fear, individuals become less sensitive and can maintain their performances.

2.7.2 Mediating Processes

Self-efficacy produces effects through four mediating processes, all operating in concert rather than in isolation. Most causes of action begin with thought. In a cognitive process, self-efficacy influences how individuals interpret situations, anticipate scenarios, and visualize the futures they construct. Those with strong efficacy view the situations as realizable opportunities, while the weak may not or find it difficult. Self-efficacy enables individuals to generate possible outcomes and means to control. Those with strong efficacy regard ability as an acquirable skill, then seek knowledge and improve their competency. In contrast, the weak regard ability as an inherent gift, so they loss interest in skill development.

Visualized outcomes will not be realized unless actions are taken. In the motivational process, self-efficacy influences the self-regulation of motivation. Most

human motivation is cognitively generated, so-called cognitive motivation. Individuals motivate themselves and deliberately control their actions through the exercise of forethought. Those with strong efficacy form expectations what they can do, anticipate the likely outcomes from different options, choose a goal, and plan to achieve it or avoid undesired outcome.

On the course to achievement, individuals may encounter obstacles and adversaries that deteriorate their feeling. In the affective process, self-efficacy influences an individual's coping capability, which determines how much stress and depression he or she experiences. Those with strong coping efficacy do not conjure up disturbing thought patterns. In contrast, those that are coping deficient "cannot manage threats [and] experience high anxiety arousal" (Bandura, 1994). Coping efficacy also regulates avoidance behaviour as well as anxiety arousal. Moreover, "the stronger the sense of self-efficacy, the bolder people are in taking on taxing and threatening activities" (Bandura, 1994).

People are partly the products of their environments. By selecting their environments, people can have a hand in what they become. In the selective process, self-efficacy influences an individual's decision-making. Individuals tend to undertake activities and situations that they believe they are capable of handling and avoid those that exceed their coping capabilities. By the choices they make, individuals cultivate different competencies, interests, and social networks that determine their life courses.

2.7.3 Operative Functions

Self-efficacy influences an individual's behaviours and performance in many forms. Bandura (1997) categorises self-efficacy into six operative functions. In the cognitive function, self-efficacy predicts an interest in and positive attitudes toward mathematics, for example, while actual mathematical ability does not. Also, efficacy in mastering academic subjects predicts subsequent academic attainment. If students perform poorly it may result from lack of self-efficacy in making use of their skills rather than the lack of skills. Students with high efficacy are more persistent while those exhibiting low efficacy quit soon. Regarding the health function, self-efficacy directly influences health-promoting behaviours. First, individuals of low efficacy

view that they are incapable of changing their habits, like smoking and drinking, so they fail to initiate them. Then individuals of high efficacy are more self-motivated when they change them. Lastly, when the new habits are set, individuals of high efficacy are more self-regulated in maintaining them.

In clinical functions, anxiety and phobic dysfunctions are influenced by self-efficacy. Individuals avoid aversive situations and activities because they believe they are incapable of managing the risks. Depression results when anxiety exceeds an individual's coping efficacy. In a worse case, those that are coping deficient may end up with a sleeping and eating disorder, or alcohol and drug abuse. Regarding the athletic function, individuals of high efficacy are more self-motivated and self-regulated during their training sessions. As defined as a person's belief in relation to producing a given level of attainment, athletic performance is co-determined by both true capabilities and perceived self-efficacy. The strength of beliefs differentiates successful athletics from ordinary ones across a variety of sports.

Regarding the organizational function, self-efficacy influences the choices of work that an individual chooses. The higher the sense of self-efficacy, the wider is the range of career options that individuals seriously consider. Also, the greater their interest in them and the better they prepare themselves educationally for occupational pursuits, the greater is their success. Individuals exhibiting high efficacy are likely to perform occupational roles innovatively and direct their effort to improve the work situation. Lastly, collective efficacy is defined as "a group's shared belief in its joint capacities to organize and execute the courses of action required to produce given levels of attainments" (Bandura, 1997: 477). Collective efficacy determines the level of group performance, such as with athletic teams.

2.8 Self-Efficacy and Personal Performances

In the field of psychology and human resource development, there are a number of studies on the influences of either generalized or specific self-efficacy on personal performances. According to Judge, Jackson, Shaw, Scott and Rich (2007: 107), "self-efficacy has been studied in more than 10,000 investigations in the past 25 years" and "more than 800 articles on self-efficacy have been published in

organizational journals." For examples, Bouffard-Bouchard (1990) conducted an experiment to examine how self-efficacy influences cognitive performance, while Mone, Baker and Jeffries (1995) investigated how strong self-efficacy predicts personal goals and academic performance in college students; and Mavis (2001) studied the relationship between self-efficacy and clinical performance among second year medical students. Ayuppa and Kong (2010) investigated the relationship between task and outcome interdependence and self-efficacy in the work motivation of employees.

Furthermore, some studies have also revealed that self-efficacy is closely related to other personality types. For example, Judge, Erez, Bono, and Thoresen (2002) performed several analyses to estimate the relationship among four traits; namely self-esteem, neuroticism or emotional stability, locus of control (LOC), and generalized self-efficacy (GSE). The first analysis estimated the population correlations between GSE and self-esteem, emotional stability and LOC at 0.85, 0.62, and 0.56 respectively. In the second analysis, the estimated second-order factor loadings from the first sample were 0.93, -0.63, 0.82 and 0.77, and from the second sample they were 0.84, -0.74, 0.54 and 0.75, for self-esteem, neuroticism, LOC and GSE respectively. In the third analysis, the multitrait-multimethod (MTMM) technique indicated weak discriminant validity, "measures that should not be related, are not related in reality" (Trochim, 2006). In other words, these four traits are related.

This evidence proves the close relationship between self-efficacy and the other three. However, unlike the self-esteem investigated by Goldsmith et al. (1997) and Murnane et al. (2001); emotional stability (as a part of the Big Five) by Nyhus and Pons (2005), and the locus of control by Andrisani (1977), Semeijn et al. (2005), and Semykina and Linz (2007), the influences of self-efficacy over labour market outcomes have rarely been investigated.

As these three personality types are closely related to self-efficacy and contribute positively to wages and earnings, the first hypothesis to be tested in this study is:

Hypothesis 1. Holding other factors fixed, individuals with stronger self-efficacy earn more than those with weaker self-efficacy.

2.9 Self-Efficacy in Different Genders and Career Choices

In the field of educational and vocational psychology, the impacts of self-efficacy on career choice and development have been investigated since the 1980's. Hackett and Betz (1981 quoted in Hackett and Betz, 1995: 250) argue that "self-perceptions of ability are more predictive of career choice behaviour than commonly used objective ability measure." Bandura (1997: 429) also highlights that "success on the job rests partly on self-efficacy in dealing with the social realities of work situations." A number of skills needed to fulfil this function include "the ability to communicate well, to relate effectively to others, to plan and manage the demands of one's job, to exercise leadership, and to cope with stress effectively" (Bandura, 1997: 430).

The term *career self-efficacy* specifically relates to the wide variety of career-related tasks, decisions, behaviors and adjustment processes which determine career development (Hackett and Betz, 1995: 251). Initially the studies on career self-efficacy applied the theory to explain the career choice and development of women, but now the studies focus on both genders in order to describe gender disproportion in math-related careers, for example, or non-traditional occupations for women. As a moderator variable, the influence of career self-efficacy on, for example, perceived career options (Betz and Hackett, 1981), college majors (Hackett, 1985), and academic achievement and persistence (Lent, Brown and Larkin, 1984) has been specifically investigated.

2.9.1 Genders

Men and women are different in terms of the self-perception of their ability. Women's perceptions of their ability are shaped by socialization experiences, including family background, particularly parent's expectation, education system, mass media, and culture (Hackett and Betz, 1981 quoted in Bandura, 1997: 430). The cultural stereotype that girls are less skilled in mathematic ability than boys is always passed on by the parents (Eccles, 1989 quoted in Bandura, 1997: 430). The girls start losing their confidence in pursuing math-related careers; hence they are restricted

from traditionally male-dominated occupations (Betz and Hackett, 1981; Hackett, 1985). As a result the women generally earn less than men.

However, the contribution of self-efficacy to earnings is expected to be gender neutral. Unlike other psychological characters, such as the traits of aggression-withdrawal, men and women are rewarded or penalized differently. Osborne (2000) showed that men from high-status occupations are rewarded for being aggressive and penalized for being withdrawn, but women with the same status are penalized for being aggressive and rewarded for being withdrawn. The following hypotheses will be also tested in this study:

Hypothesis 2. Holding other factors fixed, men with stronger self-efficacy earn more than those with weaker self-efficacy.

Hypothesis 3. Holding other factors fixed, women with stronger self-efficacy earn more than those with weaker self-efficacy.

2.9.2 Career Choices

Self-efficacy has an influence on career choice and development as early as the student age since the ability gap begins then. Bandura (1997: 227) has pointed out that "knowledge and cognitive skill are likewise necessary but not sufficient to academic attainment" since "academic performances are products of cognitive capability implemented through motivational and other self-regulatory skill" (Bandura, 1997: 216). Independently from intelligence performance, the students with stronger self-efficacy resolve more math problems as they are quicker to discard fault strategies. Self-efficacy also predicts interest in math and the choice of a college major, but not math ability or prior math achievement.

Through the motivational process, self-efficacy influences personal short-term goals, and academic aspiration and persistence, which subsequently determine the range of long-term occupational opportunities. The more students progress in their education, particularly in advanced levels such as college, the more they are expected to become self-directing in their learning, in which the stronger that self-efficacy is, the more successful they are in regulating their own learning. As a result, those that display stronger self-efficacy should be found in the careers associate with a higher level of education and earn more than those that display weaker self-efficacy.

However, the contribution of self-efficacy to earnings is expected to be neutral across different career choices, such as employment sectors and occupations. Unlike other psychological characters, different sectors or occupations require different personality traits and reward them unequally. Jackson (2006) showed that men that display the character of withdrawal are less likely to enter managerial occupations, while men that display the character of aggression are less likely to enter higher technical occupations; however, none of them has any impact on entry into professional occupations. Rosenbloom et al. (2008) confirmed that the occupational personality of the *realistic dimension* is highly required in the information technology industry. Osborne (2000) also showed that men with high-status occupations are rewarded but men with low-status occupations are penalized for being aggressive. In contrast, women with high-status occupations are rewarded but women with low-status occupations are penalized for being withdrawn. The following hypotheses will be also tested in this study:

Hypothesis 4. In each employment sector, holding other factors fixed, individuals with stronger self-efficacy earn more than those with weaker self-efficacy.

Hypothesis 5. In each occupation, holding other factors fixed, individuals with stronger self-efficacy earn more than those with weaker self-efficacy.

2.10 Determinants of Affective States and Emotions

As previously explained, the sources of self-efficacy are mastery experiences, vicarious experience, verbal persuasion, and physiological and affective states. From an economist's point of view, the first three sources are exogenous factors, but affective state or emotion is not. As a simple explanation, affect refers to "the experience of feeling or emotion, [which] is a key part of the process of an organism's interaction with stimuli" (Wikipedia, 2012a) and emotions are defined as "feeling states with physiological, cognitive, and behavioral components" (Wikipedia, 2012b). Hence, an affective state or emotion is an endogenous factor.

Even though economic research on affective states or emotions is rare, research on happiness is more common. As a basic emotion, happiness refers to "a mental or emotional state of well-being characterized by positive or pleasant emotions

ranging from contentment to intense joy" (Wikipedia, 2012c). Therefore, the factors determining happiness should also influence affective states or emotions similarly.

According to Richard Easterlin, a professor of economics whose works predominantly focus on happiness, "in most people's lives everywhere the dominant concerns are making a living, family life, and health, and it is these concerns that ordinarily determine how happy people feel" (Easterlin, 2001: 466). The same paper also cited The Pattern of Human Concerns (Cantril, 1965: 162), which suggests that material circumstances, especially level of living, are of the most concern in people's lives at about three quarters, followed by family concerns such as happy family life and good relations at about half, personal or family health at about one third, and matters relating to one's work and to personal character at around one fifth. Besides total household income, Easterlin (2001) found that socio-economic circumstances, such as education and unemployment, which influence income, determine an individual's happiness. In addition, Easterlin (2003a, 2003b) found that disability and disable conditions, health conditions and ageing, and family structures such as marriage and children, also determine happiness.

CHAPTER 3

THEORETICAL CONCEPT

3.1 Economic Concept of Individual Motivation and Effort

An individual contributes an effort to producing a certain performance in an activity, at the end of which an individual expects to achieve *something* from that performance. Depending on the level or the strength of individual motivation, *T*, the level of effort, *E*, ranges between doing nothing (imply 0) and doing something tirelessly with full energy (imply 1), which can be provided by an individual. The individual effort function is defined as

$$E = e(T), \text{ for } 0 \leq E \leq 1. \tag{3.1}$$

Assuming that the stronger the motivation, the more intense the effort, equation (3.1) clearly constitutes an increasing or at least non-decreasing function as

$$dE/dT \geq 0. \tag{3.2}$$

In other words, the effort is a non-decreasing function of the motivation.

Three factors co-determine the strength of individual motivation. The first factor is the existing individual characteristic of approaching or avoiding certain behaviours or the *motive* to achieve success, *M*, which are pre-determined. The second factor is how strong individual believes or the perceived possibility that the performance, under confronting situation, will lead to *something* at the end of an activity or the strength of *expectancy*, *P*. The third factor is how an individual values *something* which he or she has been trying to achieve or the importance of the foreseen tangible and intangible rewards, **R**, which will be awarded at the end of an

activity or the *incentive value* of success, $I(\mathbf{R})$. The individual motivation function is defined as

$$T = t(M, P, I(\mathbf{R})). \tag{3.3}$$

The strength of *expectancy* is also co-determined by two factors. The first factor is how strongly an individual believes he or she can perform required actions or perceived *self-efficacy*, *SE*. The second factor is how strongly an individual believes the actions will lead to desired outcomes or *outcome expectation*, *OE*. The expectancy function is defined as

$$P = P(SE, OE). \tag{3.4}$$

Hence the strength of individual motivation and the level of effort become

$$T = t(M, P(SE, OE), I(\mathbf{R})), \tag{3.5}$$
$$E = e(t(M, P(SE, OE), I(\mathbf{R}))). \tag{3.6}$$

In reduced forms, the two functions become

$$T = T(M, SE, OE, I(\mathbf{R})), \tag{3.7}$$
$$E = E(M, SE, OE, I(\mathbf{R})). \tag{3.8}$$

Therefore the strength of an individual's motivation and level of effort is determined by four factors: *motive*, the existing individual characteristic to approach or avoid certain behaviours; *self-efficacy*, the belief whether he or she can perform the required actions; *outcome expectation*, the belief whether the actions will lead to desired outcomes; and *incentive value*, the attractiveness of the foreseen outcomes.

3.2 Long-Term vs. Short-Term Efforts

Strength of motivation and level of effort can be sorted into long-term and short-term, according to the individual's long-term goals vs. foreseeing immediate rewards and the generalized vs. situational concepts of psychological characteristics.

In the long term, the strength of motivation, T^L, and level of effort, E^L, respond to the individual's long-term goals, which fulfil desires, $\mathbf{R}^{Fulfilment}$, to become more of what the individual is capable of, according to his or her realized full potentials. Long-term motivation and effort are also determined by individual characteristics, M, the general perception of his or her ability to perform required actions, SE^G, and the general perception of the external environment in responding to these actions, OE^G. The function of long-term individual effort is defined as

$$E^L(T^L) = E^L(M, SE^G, OE^G, I^L(\mathbf{R}^{Fulfilment})). \tag{3.9}$$

In the short term or in a specific activity or in a particular situation, the strength of an individual's motivation, T_S, and the level of effort, E_S, respond to the foreseen immediate rewards, $\mathbf{R}_S$, which will be awarded at the end of an activity. Short-term motivation and effort are also determined by an individual's characteristics, M, how the individual currently perceives his or her ability to perform required immediate actions, SE_S, and how the individual currently perceives that the particular existing environment will respond to these immediate actions, OE_S. The function of short-term individual effort is defined as

$$E_S(T_S) = E_S(M, SE_S, OE_S, I_S(\mathbf{R}_S)). \tag{3.10}$$

3.3 Reward Preference

Assuming that those with the desired characteristics, such as diligence, perseverance, conscientiousness, or strong *motives*, are highly motivated, equation (3.7) constitutes an increasing or at least non-decreasing function as

$$\partial T/\partial M \geq 0. \tag{3.11}$$

Also assuming that those with strong *self-efficacy* or strong *outcome expectation* are highly motivated, equation (3.7) also constitutes an increasing or at least non-decreasing function as

$$\partial T/\partial SE \geq 0, \tag{3.12}$$
$$\partial T/\partial OE \geq 0. \tag{3.13}$$

Since the effort is a non-decreasing function of the motivation, equation (3.8) clearly constitutes an increasing or at least non-decreasing function as

$$\partial E/\partial M \geq 0, \tag{3.14}$$
$$\partial E/\partial SE \geq 0, \tag{3.15}$$
$$\partial E/\partial OE \geq 0. \tag{3.16}$$

In other words, the effort is a non-decreasing function of *motives*, *self-efficacy* and *outcome expectation*.

In the literature, *incentive value* matches with the psychological term *attitude* toward rewards. Increasing *incentive value* induces motivation and effort, in a fashion similar to the first three factors as

$$\partial T/\partial I \geq 0, \tag{3.17}$$
$$\partial E/\partial I \geq 0. \tag{3.18}$$

In other words, the motivation and effort are a non-decreasing function of *incentive value*. Even if the direct relationships with a particular reward, $\partial T/\partial R$ and $\partial E/\partial R$, are not known, it is clear that in order to increase *incentive value* the reward must be highly valued. Let $\partial I/\partial R_i \,|_{t=s}$ be marginal *incentive value* or marginal utility due to one unit increase of the *i*th reward, in situation or period *s*. Therefore

$$\partial I/\partial R_u \,|_{t=\tau} > \partial I/\partial R_v \,|_{t=\tau} \tag{3.19}$$

reveals that in situation or period τ, an individual prefers the uth to the vth reward; in other words, the marginal utility of the uth reward is higher than that of the vth reward. Consequently in situation or period τ, the uth reward induces higher additional effort than the vth reward as

$$\partial E/\partial R_u \,|_{t=\tau} \geq \partial E/\partial R_v \,|_{t=\tau}. \tag{3.20}$$

As time goes by, an individual may have been accumulating more of the uth reward, hence it becoming less desired according to the law of diminishing utility. An individual may value the uth reward in the next situation or later period ω, less than in the previous situation or the past period τ as

$$\partial I/\partial R_u \,|_{t=\omega} < \partial I/\partial R_u \,|_{t=\tau}. \tag{3.21}$$

In this situation or period ω, an individual now prefers the vth to the uth reward; in other words, the marginal utility of the vth reward is now higher than that of the uth reward as

$$\partial I/\partial R_v \,|_{t=\omega} > \partial I/\partial R_u \,|_{t=\omega}, \tag{3.22}$$

and also higher additional effort is resulted as

$$\partial E/\partial R_v \,|_{t=\omega} \geq \partial E/\partial R_u \,|_{t=\omega}. \tag{3.23}$$

Reward preference or *attitude* toward rewards keeps changing according to the function of individual experience, as explained by Maslow's hierarchy of needs.

To maximise work productivity in a particular situation or period, one possible option is to boost individual motivation and induce effort through awarding the reward that maximises *incentive value*. Let the *highest-valued reward*, R_h, be the reward which provides the highest marginal *incentive value* among other rewards, $R_{\sim h}$, and induces the highest additional effort in situation or period s as

$$\partial I/\partial R_h \,|_{t=s} \geq \partial I/\partial R_{\sim h} \,|_{t=s}, \tag{3.24}$$

$$\partial E/\partial R_h \,|_{t=s} \geq \partial E/\partial R_{\sim h} \,|_{t=s}. \tag{3.25}$$

3.4 Wage as a Labour Market Outcome

In the workplace where a worker contributes an effort to produce goods and services, the worker's marginal product, MP_i, is determined by the firm's existing capital goods, K, and both the worker's traditional human capital, HC_i, and level of effort, E_i. Assuming that the firm pays a real wage, W_i, according to worker's marginal product, wage received is defined as

$$W_i = MP_i(K, HC_i, E_i). \tag{3.26}$$

Assuming that the more intense the effort, the higher the marginal product and wage, equation (3.26) constitutes an increasing or at least non-decreasing function as

$$\partial MP_i/\partial E_i \geq 0, \tag{3.27}$$

$$\partial W_i/\partial E_i \geq 0. \tag{3.28}$$

In other words, wage is a non-decreasing function of the effort. Since the effort is a non-decreasing function of *motives*, *self-efficacy*, *outcome expectation* and *incentive value*, wage is also a non-decreasing function as

$$\partial W_i/\partial M_i \geq 0, \tag{3.29}$$

$$\partial W_i/\partial SE_i \geq 0, \tag{3.30}$$

$$\partial W_i/\partial OE_i \geq 0, \tag{3.31}$$

$$\partial W_i/\partial I_i \geq 0. \tag{3.32}$$

The above relationship (3.30) provides mathematical support for the proposed hypothesis: self-efficacy positively contributes to an individual's earnings.

CHAPTER 4

EMPIRICAL PROCEDURES

4.1 Data

This study uses data from Thai Mental Health Survey (MHS), which was conducted for the first time by the National Statistic Office of Thailand (NSO) in 2009. The data provide both basic socio-economic factors as well as useful psychological variables, since 15 questionnaire items from the Thai Mental Health Indicator (TMHI-15) were included in the routine Socio-Economic Survey (SES). TMHI-15 is a short version of a complete version of 55 items (TMHI-55), both of which were developed in 2007 by the Department of Mental Health, the Ministry of Public Health (Apichai Mongkol; Yongyuth Vongpiromsan; Tavee Tangseree; Watchanee Huttapanom; Praiwan Romsai and Worawan Chutha: 2009). From TMHI-15, this study identifies three items which reveal the psychological character of generalized *self-efficacy*.

4.2 Wage Equation and Sample

This study primarily follows Mincer's wage equation, with an estimation technique of ordinary least squares or OLS. Besides the traditional human capital in equation (1.1), the additional controlled variables include the demographic variables, geographical variables, and firm characteristics as described in section 1.1. Due to the lack of availability, the only controlled psychological character is generalized *self-efficacy*, while the influences of *motives*, *outcome expectation* and *incentive value* are included in the error term. They are unrelated theoretically. The impact of self-efficacy on earnings is investigated through comparison of an effort-inclusive model, in which the character is controlled, with a baseline model, in which the character is

omitted and its impact is embedded in an error. Hence the size of the impact and the model's explanatory power are estimated.

The baseline and effort-inclusive models are specified as

$$W = \boldsymbol{\beta}_H \mathbf{H}^W + \boldsymbol{\beta}_D \mathbf{D}^W + \boldsymbol{\beta}_G \mathbf{G}^W + \boldsymbol{\beta}_F \mathbf{F}^W + u, \quad (4.1)$$

$$W = \boldsymbol{\beta}_H \mathbf{H}^W + \boldsymbol{\beta}_D \mathbf{D}^W + \boldsymbol{\beta}_G \mathbf{G}^W + \boldsymbol{\beta}_F \mathbf{F}^W + \beta_E E + v, \quad (4.2)$$

where W is logarithmic annual earnings; $\mathbf{H}^W$, $\mathbf{D}^W$, $\mathbf{G}^W$, $\mathbf{F}^W$ are vectors of traditional human capital, demographic variables, geographical variables, and firm characteristics, while $\boldsymbol{\beta}$'s are corresponding coefficient vectors; E and β_E are a variable and a coefficient of self-efficacy; and u and v are error terms. This study expects a positive and statistically significant value of β_E.

Since this study hypothesises that self-efficacy positively contributes to individual earnings through intense effort and work productivity, the factors which may misrepresent the impact have been removed. An empirical analysis is limited to only earnings from wages and salaries of the non-disabled persons that continue working with only a single employer from the three sectors; namely, the government sector, state enterprise, and private sector, in the past 12 months without a second job. Hence the size of the main sample was reduced from the original 81,019 to 18,913 observations. In addition, the analysis with sub-samples of genders, employment sectors and occupations will show how self-efficacy is valued in each section.

4.3 Estimation of Self-Efficacy and Sample

Since the estimation technique of wage equation is OLS, self-efficacy must be assumed to be exogenous. However, the literature insists otherwise. Bandura (1997) states clearly that self-efficacy is not an inborn trait and highlights four sources of information on self-knowledge; namely, enactive mastery experiences, social modelling, verbal persuasion, and physiological and affective states. The OLS technique then would be inconsistent due to the omitted variables, in which self-efficacy is correlated to an error term. This study comes with several methods to

generate a proxy for self-efficacy. The first two techniques are preformed with the main sample of 18,913 observations.

Firstly (model a), self-efficacy is treated as an exogenous factor. An index of self-efficacy, E_{index}, was generated directly from three questionnaire items of TMHI-15 and substituted into equation (4.2) as

$$\hat{E} = E_{index}. \tag{4.3}$$

The three items are: “Do you accept hard-to-solve problems (when a problem occurs)?,” “Are you confident in controlling yourself in bad or serious situations?,” and “Are you confident in facing extremely bad situations in your life?,” all of which range from *No*, *A Little*, *Much* to *Very Much* and scores from 0 to 3. By applying equally-weighted linear combinations, the self-efficacy index, E_{index}, ranges between 0 and 9. Section 4.4.1 provides more explanation. However, the estimated impact of self-efficacy on earnings should not be accurate because this estimation of self-efficacy is not consistent with the literature, as previously explained.

Secondly (model b), equation (4.2) was estimated by an instrumental variable or IV technique for endogenous self-efficacy, since MHS provides information on self-knowledge, including an individual’s enactive mastery experiences, physiological states, and affective state. Nevertheless some constraints exist. This technique cannot adopt year of schooling, work experience or firm characteristics as the exclusion restriction in the mastery-experience element since all already appear in equation (4.2); or adopt disabled condition as the exclusion restriction in the physiological state element since the main sample was limited to only the non-disabled.

This study identifies five questionnaire items of TMHI-15 as the exclusion restriction in the affective state element. They are “Are you happy with your life?,” “Do you feel relaxed?,” “Do you feel bored with your daily life?,” “Do you feel disappointed with yourself?,” and “Are you depressed?,” all of which range from *No*, *A Little*, *Much* to *Very Much*. The first two items’ scores are from 0 to 3, while the other three scores are from 3 to 0. So an index of affective state, A_{index}, was generated directly from these items and adopted as the exclusion restriction for self-efficacy. By

applying equally-weighted linear combinations, the affective state index, A_{index}, ranges between 0 and 15. Section 4.4.1 provides more explanation.

In model b, the first-stage regression to estimate variable E in equation (4.2) can be revealed as

$$\hat{E} = \boldsymbol{\alpha}_H \mathbf{H}^W + \boldsymbol{\alpha}_D \mathbf{D}^W + \boldsymbol{\alpha}_G \mathbf{G}^W + \boldsymbol{\alpha}_F \mathbf{F}^W + \alpha_A A_{index}, \quad (4.4)$$

where $\hat{E}$ is expected self-efficacy; $\mathbf{H}^W$, $\mathbf{D}^W$, $\mathbf{G}^W$, $\mathbf{F}^W$ are the vectors of traditional human capital, demographic variables, geographical variables, and firm characteristics while $\boldsymbol{\alpha}$'s are the corresponding coefficient vectors; and α_A is a coefficient of the affective state index. The estimated impact of self-efficacy on earnings should be more accurate than the OLS since this estimation is consistent with the literature.

Alternatively, a better proxy for self-efficacy in equation (4.2) can be drawn from the original sample of 81,019 observations. Since the main sample has a limited number of items which can be adopted as the exclusion restriction, the original sample provides all of the available sources of self-efficacy according to the literature. From the original sample, the proxy of self-efficacy can be estimated from year of schooling, work experience, and firm characteristics (mastery-experience element), disabled condition (physiological state element) and affective state index (affective state element) independently from the wage estimation and then substituted into equation (4.2).

Thirdly (model c), a new set of variable E was generated with an OLS technique from the original sample. Similarly-controlled variables to equation (4.4) were organised into different sets and affective state was treated as an exogenous factor as

$$\hat{E} = \boldsymbol{\gamma}_D \mathbf{D}^E + \boldsymbol{\gamma}_G \mathbf{G}^E + \boldsymbol{\gamma}_M \mathbf{M}^E + \boldsymbol{\gamma}_P \mathbf{P}^E + \gamma_A A_{index}, \quad (4.5)$$

where $\hat{E}$ is expected self-efficacy; $\mathbf{D}^E$, $\mathbf{G}^E$, $\mathbf{M}^E$, $\mathbf{P}^E$ are the vectors of demographic variables, geographical variables, worker's mastery experiences, and physiological

states, while $\boldsymbol{\gamma}$'s are corresponding coefficient vectors; A_{index} and γ_A are the affective state index and its coefficient.

However, this predicted value of self-efficacy directly from the affective state index should not be accurate, because the affective state itself is also endogenous. As with exogenous self-efficacy in model a, the OLS technique would be inconsistent due to omitted variables, where affective state is correlated to an error term.

Fourthly (model d), another set of variable E was generated with the IV technique, in which equation (4.5) was the main regression and affective state was treated as an endogenous factor. Easterlin (2001, 2003a, 2003b) suggest that individual happiness, as a basic emotion, is determined by level of living or household economic conditions, family concerns, personal and family health, work concerns and personal characters. This study assumes that these factors also determine one's emotion or affective state. From the MHS, several items were identified as the exclusion restriction for the affective state and were categorised into three groups in this study. First, personal health was approximated only from ageing or birth cohort since disabled condition already appeared in equation (4.5). Secondly, household economic conditions were approximated from four items of current household economic status and six items of present household financial problems. Lastly, family concerns were approximated from three items of family structure and the health of family members. Section 4.4.9 provides more explanation.

In model d, the first-stage regression estimating variable A in equation (4.5) can be revealed as

$$\hat{A} = \boldsymbol{\delta}_D\mathbf{D}^E + \boldsymbol{\delta}_G\mathbf{G}^E + \boldsymbol{\delta}_M\mathbf{M}^E + \boldsymbol{\delta}_P\mathbf{P}^E + \boldsymbol{\delta}_V\mathbf{V}, \tag{4.6}$$

where $\hat{A}$ is the expected affective state; $\mathbf{D}^E$, $\mathbf{G}^E$, $\mathbf{M}^E$, $\mathbf{P}^E$ are the vectors of the demographic variables, geographical variables, worker's mastery experiences and physiological states, and $\mathbf{V}$ is the IV vector, while $\boldsymbol{\delta}$'s are corresponding coefficient vectors. The predicted value of self-efficacy from the endogenous affective state should provide the most accurate estimated impact of self-efficacy on earnings, since the estimation of self-efficacy and affective state was consistent with the literature. Figure 4.1 illustrates these four estimation techniques.

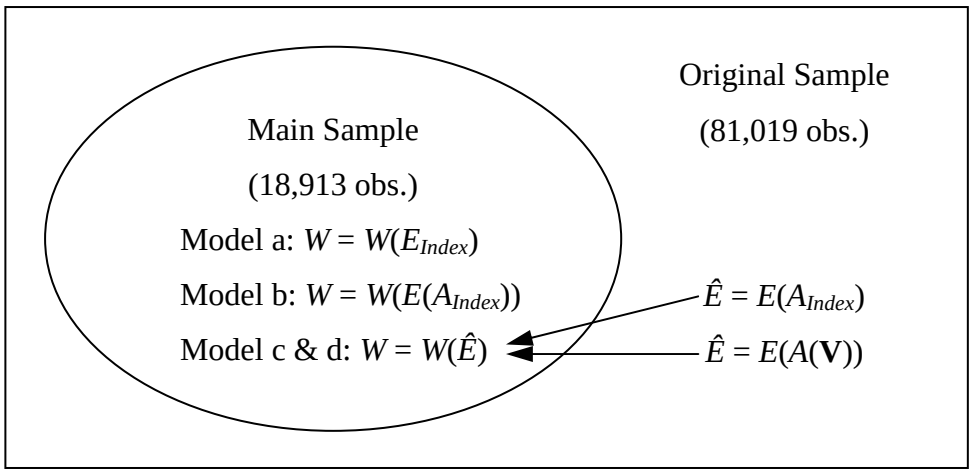


Figure 4.1 Estimation Techniques for the Proxy of Self-Efficacy

4.4 Variables

4.4.1 Affective State and Self-Efficacy Indices (*A* & *E*)

TMHI-55 provides four questionnaire items of the sub-domain "General well-being positive effect" and six items of the sub-domain "General well-being negative effect" under the "Mental State" domain, where individuals were to evaluate how well or unwell they were. TMHI-55 also provides five items of the sub-domain "Confidence in coping" under "Mental Capacity" domain, where individuals were to evaluate how strong they believed in their ability to handle unpleasant situations. All items ranged from *No, A Little*, *Much* to *Very Much* and scores were from 0 to 3, while negative affects had the same range but reversed scores. Table 4.1 provides the factor loading of related questionnaire items and Table 4.2 provides the descriptive statistics and reliability of the related domains from TMHI-55.

Table 4.1 Factor Loading of Related Questionnaire Items from TMHI-55

Questions	Factor Loadings			TMHI-15
	1	2	3	
Domain 1 Mental State				
Sub-domain 1.1 General well-being positive effect				
1. Are you happy with your life?	0.73			X
2. Do you feel relaxed?	0.83			X
3. Do you feel pleased?	0.79			
4. Do you feel your life is peaceful (peaceful mind)?	0.70			
Sub-domain 1.2 General well-being negative effect				
5. Do you feel bored with your daily life?		0.72		X
6. Do you feel disappointed with yourself?		0.74		X
7. Are you depressed?		0.71		X
8. Do you feel worried?		0.65		
9. Do you feel sad without reason?		0.68		
10. Do you feel annoyed easily without reason?		0.60		
Domain 2 Mental Capacity				
Sub-domain 2.3 Confidence in coping				
20. Do you think most problems can be solved?			0.52	
21. Do you accept hard-to-solve problems (when a problem occurs)?			0.68	X
22. Are you confident in controlling yourself in bad or serious situations?			0.76	X
23. Are you confident in facing extremely bad situations in your life?			0.76	X
24. You are good at resolving conflicts?			0.56	

Source: Apichai Mongkol et al., 2009: 113-117.

Note: 1) Observation = 3,184

2) Questions were translated from Thai by the author.

Factor analysis, a statistical method used to explain variability among a larger number of quantifiable *observed variables* in terms of a potentially smaller number of unobserved *construct variables* or underlying factors, provides factor loadings, coefficients that represent the relationship between *observed variables*, i.e. questionnaire items, and unobserved factors. The factor loadings in each column of Table 4.1 show how close the items were among themselves in the same sub-domain since they share an unobserved common factor.

Table 4.2 Descriptive Statistics and Reliability of Related Domains from TMHI-55

Domain / Sub-domain	Number of item	Average	S.D.	Potential range	Obtained range	Cronbach's Alpha
1 Mental State	13	42.81	5.20	13-52	17-52	0.84
1.1 General well-being positive effect	4	11.30	2.18	4-16	4-16	0.85
1.2 General well-being negative effect	6	20.70	2.99	6-24	6-24	0.83
1.3 Perceived ill-health and mental illness	3	10.81	1.83	3-12	3-12	0.82
2 Mental Capacity	15	43.72	5.44	15-60	23-60	0.83
2.1 Interpersonal relationships	3	9.39	1.47	3-12	2-12	0.76
2.2 Expectation achievement congruence	3	8.13	1.76	3-12	2-12	0.79
2.3 Confidence in coping	5	14.04	2.41	5-20	6-20	0.79
2.4 Adequate mental mastery	4	12.16	2.30	4-16	3-16	0.80

Source: Apichai Mongkol et al., 2009: 114-118.

Note: Observation = 3,184

In a short version of the TMHI-15, a number of questionnaire items in three sub-domains were reduced to two, three and three, as indicated in Table 4.1. According to Apichai Mongkol et al. (2009: 138), agreement study results in kappa statistics of 0.66 and p-value of less than 0.001, which confirm substantial agreement between TMHI-15 and -55. Therefore the remaining five items under the "Mental State" domain still indicate how well or unwell individuals are and also the remaining three items of the sub-domain "Confidence in coping" still indicate how strongly individuals believe in their ability to handle unpleasant situations, which is an indication of generalized *self-efficacy*.

Instead of treating each questionnaire item as a separated qualitative dummy variable, this study generated two psychological indices for affective state and self-

efficacy as linear variables for several benefits from two points of view. From a result interpretation viewpoint, first, it is a common practice in social science research that abstract psychological characters, such as self-efficacy and affective state, be treated as unobserved *construct variable*s, and approximated by a number of closely-related and quantifiable *observed variables*, i.e. questionnaire items of the TMHI.

For example, *locus of control* was quantified from four items in studies done by Andrisani (1977), Duncan and Morgan (1981), Goldsmith et al. (1997) and Cebi (2007), and from ten items in studies done by Semykina and Linz (2007) and Linz and Semykina (2008, 2009). The need for *challenge* or *affiliation* was quantified from four items in studies done by Semykina and Linz (2007) and Linz and Semykina (2009), while *self-esteem* was quantified from seven items in a study done by Murnane et al. (2001). The interpretation of every single item would be unusual and more complicated than interpretation of a character itself.

Secondly, to compare the impact of self-efficacy with the impacts of year of schooling and work experience, self-efficacy must be approximated as a linear variable. A dummy variable represents a character on an ordinal scale, such as very strong, strong, weak, and very weak self-efficacy, which provides limited information. According to the reviews, those with stronger self-efficacy perform better and are expected to earn more than those with weaker self-efficacy. In contrast, approximating a character on a cardinal scale or as a linear variable would provide more fruitful information, because additional earnings due to self-efficacy improvement can be quantified and compared with additional earnings due to other variables.

From an econometric viewpoint, first treating psychological characteristics as indices can prevent multicollinearity. Factor analysis performed in Apichai Mongkol et al. (2009), confirmed multicollinearity among the selected questionnaire items. In Table 4.1, the factor loadings indicate how close the items are related to the others in the same sub-domain. If these items are treated as separated independent variables, the result would report each coefficient as statistically insignificant.

Secondly, this study not only estimated the impact of self-efficacy but also generated a proxy of self-efficacy from other variables. When generating a proxy from the original sample, i.e. model c and d, it was possible to treat self-efficacy as a

qualitative dependent dummy variable. However, it would be very complicated to treat self-efficacy as a qualitative independent dummy variable in model b, in which equation (4.2) was estimated by the IV technique. It is also impossible to treat self-efficacy as a linear variable in one model but as a dummy variable in the others. Therefore, treating self-efficacy as a linear variable in all models was the most practical.

This study generated the indices from equally-weighted linear combinations of the related items, which is the same approach as in Apichai Mongkol et al. (2009), and assumes normal distribution. According to an interview with Dr. Apichai Mongkol, there is no standard rule for how questionnaire items should be weighted and also there is no justification why they should be weighted unequally. As can be seen from Table 4.2, the mental health scores are the results of equally-weighted linear combinations.

Therefore, the affective state index, generated from five items under the "Mental State" domain, ranged between 0 and 15; and the self-efficacy index, generated from three items of the sub-domain "Confidence in coping," ranged between 0 and 9. Appendix B presents the distributions and mean values for the self-efficacy index and female fractions of each variable, and also summarizes age, years of education, work experience, and the self-efficacy index of the main sample and sub-samples.

4.4.2 Dependent Variable - Annual Earnings (*W*)

This study adopted three different scopes for annual earnings as labour market outcomes of interest. The narrowest *Earn1* is a maximum value between wages or salaries (in cash) received in the previous month multiplied by 12 and wages or salaries (in cash) received in the past 12 months. *Earn2* is equivalent to *Earn1* plus overtime, bonus and others (in cash) received in the past 12 months. The broadest *Earn3* is equivalent to *Earn2* plus the total value of welfare received in the past 12 months. This paper mainly uses *Earn1* unless specified otherwise.

4.4.3 Traditional Human Capital (H^W)

This study converts the grade of completed schooling to the year of completed schooling; primary as six years; lower secondary or vocational as three more years, and upper secondary or vocational as three more years; post-secondary or equivalent as two more years; higher vocational or equivalent as three more years; bachelor, master and doctoral degrees as four, two and three more years respectively, unless specified otherwise. The first year starts from primary level grade 1. Work experience was calculated from the present age less six years of pre-schooling age and years of schooling. Those samples obtaining a negative value of work experience were discarded.

4.4.4 Demographic Variables (D^W & D^E)

The demographic variables for the wage estimation (equations 4.1, 4.2) and self-efficacy estimation (equations 4.4, 4.5, 4.6) were the same. Gender was assigned as a dummy variable where female is 1. Marital status was assigned as a dummy variable of four categories, one for never married, one for married, one for widowed, and one for once married but split-up which included being divorced, separated, and unknown marital status. Religion was assigned as a dummy variable for three categories, one for Buddhist, one for Muslim, and one for Christian. The reference groups were male, never married, and Buddhist.

4.4.5 Geographical Variables (G^W & G^E)

The geographic variables for wage estimation and self-efficacy estimation were also the same. Each location was assigned two sets of dummy variables, one for the area of residence and one for the country's region. The first category falls into urban (municipal areas) and rural (non-municipal areas). The second category falls into five regions, the central (25 provinces), the north (17 provinces), the northeast (19 provinces), the south (14 provinces), and Bangkok. The reference groups are urban and Bangkok.

4.4.6 Firm Characteristics (F^W)

MHS categorizes work status into 14 groups, seven for economically active and the other seven for economically inactive. Considering only wages and salaries, government employees, state enterprise employees, and private company employees were assigned as a dummy variable. Business or industry was categorized into 17 types, based on the International Standard Industrial Classification of All Economic Activities (ISIC: Revision 3). Occupation was also recorded as a three-digit code of ten major groups, based on the International Standard Classification of Occupations (ISCO-88). Based on the first two digits, occupation was reorganized into a two-digit code, reduced from 114 to 27 categories. This increased the numbers of observation in each occupational category while occupational variation was maintained. Both business/industry and occupation were assigned as dummy variables. Therefore the reference groups were the government sector, business/industry of "extra-territorial organization and bodies," and occupation of "armed forces."

4.4.7 Mastery Experiences (M^E)

The variables of mastery experience to estimate self-efficacy included all of the variables of traditional human capital and firm characteristics in the wage equation, with all 14 groups of work status, either economically active or inactive, and ten major groups of occupation.

4.4.8 Physiological States (P^E)

The physiological states used in this paper were individual disabled condition, which consisted of two sets of dummy variables. The first variable was whether one was non-disabled, disabled at birth or disabled later, while the other was whether one can both take care of him/herself and go out without assistance, one can only take care of him/herself without assistance, one can only go out without assistance, or one can neither take care of him/herself nor go out without assistance. The reference group was the non-disabled that could can both take care of themselves and go out.

4.4.9 Instrument Variables for Affective State (V)

4.4.9.1 Ageing or Birth Cohort

Birth cohort was a part of the demographic variables. Birth cohort was assigned as a dummy variable of nine sub-categories of a ten-year gap where the reference cohorts' current ages were 15-19 years.

4.4.9.2 Household Economic Conditions

Household economic conditions fell into current economic status and present financial problems. For economic status, this study chose four variables. First, household socio-economic status (SES) was categorized into 20 groups with the baseline of a farm operator that owned less than 2 *rai* (3,200 square meters) of land. The next two were the values of household physical properties and financial assets. Each was assigned a dummy variable of nine categories in which the baseline was less than or equal to 30,000 baht. Lastly, the average monthly total income per household was assigned as a dummy variable of eleven categories as some values were negative. The baseline was positive income and less than or equal to 10,000 baht.

The household debt problems were binary dummy variables responses to the six following situations; "Had many problems (over 3 months) paying house rent, water/electricity rates or school fees," "Could not borrow money for operating business or farm," "Could not borrow money for emergency payment," "Had debt at present," "Had borrowed or owed any bills from the formal sector (previous month)," and "Had borrowed or owed any bills from the informal sector (previous month)."

4.4.9.3 Family Concerns

Apart from marital status**,** family concerns mainly focused on family members, which included the number of children age less than 15 years old, the number of elderly greater than 60 years old, and the numbers of disabled persons living in the same house. Table 4.3 summarises the details of all of the variables.

Table 4.3 Summary of Vectors and Variables

Vectors/ Variables	Definition and Description
A_{Index}	Affective-state index: summation of 5 items of domain 1 "Mental State" from TMHI-15, range between 0 and 15
E_{Index}	Self-efficacy index: summation of 3 items of the sub-domain "Confidence in coping" from TMHI-15, range between 0 and 9
W	Natural log of annual earnings, classified into 3 different scopes
Wage Estimation: W is a dependent variable	
$\mathbf{H}^W$	Vector of traditional human capital 1) year of completed schooling: converted from a grade of completed schooling 2) year of work experience: present age less six years and years of schooling
$\mathbf{D}^W$	Vector of demographic variables 1) gender: male*, female 2) marital status: never married*, married, widowed, others 3) religion: Buddhist*, Muslim, Christian
$\mathbf{G}^W$	Vector of geographical variables 1) area of residence: municipal*, non-municipal 2) country's region: Bangkok*, Central, North, Northeast, South
$\mathbf{F}^W$	Vector of firm characteristics 1) employment sector: government*, state enterprise, private sector 2) business or industry: extra-territorial organization and bodies* and 13 other industries 3) occupation: armed forces* and 26 other two-digit-coded occupations
Efficacy Estimation: E_{Index} is a dependent variable	
$\mathbf{D}^E$	Vector of demographic variables 1) gender: male*, female 2) marital status: never married*, married, widowed, others 3) religion: Buddhist*, Muslim, Christian
$\mathbf{G}^E$	Vector of geographical variables 1) area of residence: municipal*, non-municipal 2) country's region: Bangkok*, Central, North, Northeast, South
$\mathbf{M}^E$	Vector of mastery experiences 1) years of completed schooling: converted from a grade of completed schooling

Table 4.3 (Continued)

Vectors/ Variables	Definition and Description
Efficacy Estimation (continued)	
$\mathbf{M}^E$	Vector of mastery experiences (continued) 2) years of work experience: present age less six years and years of schooling 3) work status: students* and 13 other groups 4) business or industry: extra-territorial organization and bodies* and 13 other industries 5) occupation: armed forces* and 9 other major groups
$\mathbf{P}^E$	Vector of physiological states 1) disability: non-disabled*, disabled at birth and disabled later 2) assistance needed: can both take care of themselves and go out without assistance*; can only take care of themselves without assistance; can only go out without assistance; can neither take care of themselves nor go out without assistance
V	Vector of instrument variables for affective state 1) ageing or birth cohort: 9 categories of a ten-year gap 2) current household economic status: a. 20 categories of household socio-economic status b. 8 categories of the value of household physical properties c. 8 categories of the value of household financial assets d. 11 categories of the average monthly total income per household 3) present household financial problems: positive responses to a. "Household had many problems (over 3 months) paying house rent, water/electricity rates or school fees" b. "Household could not borrow money for operating business or farm" c. "Household could not borrow money for emergency payment" d. "Household had debt at present" e. "(Previous month) Household had borrowed or owed any bills from the formal sector" f. "(Previous month) Household had borrowed or owed any bills from the informal sector" 4) family concerns: a. numbers of children aged less than 15 years old b. numbers of elderly aged greater than 60 years old c. numbers of disabled persons living in the same house

Note: * is a baseline category for the dummy variables.

CHAPTER 5

EMPIRICAL RESULTS

To interpret the results, two coefficients – years of schooling and work experience – approximate the proportional additional earnings due to one more year of schooling or work experience (Wooldridge, 2006: 707), while the coefficients of dummy demographic variables, geographical variables, and firm characteristics approximate the proportional additional earnings, differently from the reference groups (Wooldridge, 2006: 232). However, it is slightly complicated for generalized *self-efficacy*. The workers with the strongest self-efficacy should have replied to all of the questions 21, 22 and 23 in Table 4.1 with *Very Much* and scored 9, while those with the weakest self-efficacy should have replied to all of the same questions with *No* and scored 0 for the self-efficacy index. Hence, the coefficient of generalized *self-efficacy* approximates the proportional additional earnings due to self-efficacy improvement, one level out of nine.

5.1 Findings from the Main Sample

5.1.1 Preliminary Study

Table 5.1 shows that the worker's generalized *self-efficacy* is rewarded in the Thai labour market, no matter how this variable is generated. Appendix C details the main-sample generation of expected self-efficacy, or variable *E* for model c and d. Overall, the coefficients of self-efficacy remained statistically significant at 1%, even though demographic variables, geographical variables, and firm characteristics were controlled along with the traditional human capital. Between baseline model A04 and all inclusive models A04a-A04d, an inclusion of self-efficacy cannot improve the R^2, which was around 0.637-0.684. An inclusion of self-efficacy does not alter the impacts of the traditional human capital on earnings either, as the coefficient of years of schooling was around 0.064-0.069 and that of work experience was around 0.046-

0.048. This suggests that self-efficacy does not correlate with years of schooling or work experience and confirms that self-efficacy is rewarded independently from these two variables. However, self-efficacy may partially correlate with the additional controlled variables.

Table 5.1 Results of Preliminary Study

Model		**A04**	**A04a**	**A04b**[#]	**A04c**	**A04d**
Sample		Main	Main	Main	Main	Main
Dep. Var.		*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*
Efficacy			0.010 ***	0.108 ***	0.114 ***	0.135 ***
Schooling		0.069 ***	0.069 ***	0.066 ***	0.065 ***	0.064 ***
Experience		0.048 ***	0.048 ***	0.047 ***	0.046 ***	0.046 ***
Experience^2		-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
Female		-0.161 ***	-0.156 ***	-0.111 ***	-0.110 ***	-0.100 ***
Religion	Muslim	-0.116 ***	-0.116 ***	-0.118 ***	-0.128 ***	-0.130 ***
(Buddhist)	Christian	-0.035	-0.037	-0.058	-0.054	-0.056
Marital Status	Married	0.040 ***	0.040 ***	0.039 ***	0.038 ***	0.038 ***
(Single)	Widow	-0.058 ***	-0.059 ***	-0.062 ***	-0.058 ***	-0.057 ***
	Break Up	-0.017	-0.018	-0.027	-0.023	-0.023
Rural		-0.025 ***	-0.024 ***	-0.017 **	-0.021 ***	-0.021 ***
Region	Central	-0.273 ***	-0.275 ***	-0.294 ***	-0.296 ***	-0.300 ***
(Bangkok)	North	-0.437 ***	-0.441 ***	-0.480 ***	-0.472 ***	-0.479 ***
	Northeast	-0.411 ***	-0.418 ***	-0.485 ***	-0.471 ***	-0.483 ***
	South	-0.282 ***	-0.286 ***	-0.325 ***	-0.328 ***	-0.337 ***
Employ Sector	State Ent.	0.248 ***	0.247 ***	0.239 ***	0.249 ***	0.249 ***
(Government)	Private	-0.262 ***	-0.264 ***	-0.278 ***	-0.271 ***	-0.273 ***
Business /	Buss01	-0.410 *	-0.403 *	-0.345	-0.335	-0.325
Industry	Buss02	-0.315	-0.309	-0.250	-0.233	-0.221
(Buss17)	Buss03	-0.205	-0.199	-0.140	-0.113	-0.099
	Buss04	-0.239	-0.232	-0.173	-0.160	-0.149
	Buss05	-0.149	-0.143	-0.088	-0.075	-0.064
	Buss06	-0.231	-0.225	-0.175	-0.151	-0.139
	Buss07	-0.276	-0.269	-0.205	-0.192	-0.180
	Buss08	-0.382 *	-0.376 *	-0.311	-0.297	-0.284
	Buss09	-0.254	-0.248	-0.190	-0.176	-0.165
	Buss10	-0.094	-0.089	-0.044	-0.027	-0.019
	Buss11	-0.213	-0.207	-0.150	-0.134	-0.123
	Buss12	-0.384 *	-0.381 *	-0.344	-0.326	-0.319
	Buss13	-0.394 *	-0.389 *	-0.345	-0.328	-0.320
	Buss14	-0.402 *	-0.396 *	-0.341	-0.328	-0.318
	Buss15	-0.474 **	-0.468 **	-0.412 *	-0.387 *	-0.374 *
	Buss16	-0.505 **	-0.498 **	-0.437 *	-0.415 *	-0.402 *
Sub-	Occ11	-0.665 ***	-0.664 ***	-0.652 ***	-0.647 ***	-0.643 ***
Occupation	Occ12	0.453 ***	0.455 ***	0.473 ***	0.470 ***	0.473 ***
(Occ01)	Occ13	0.305 ***	0.305 ***	0.307 ***	0.318 ***	0.322 ***
	Occ21	0.261 ***	0.262 ***	0.272 ***	0.265 ***	0.265 ***
	Occ22	0.253 ***	0.253 ***	0.248 ***	0.254 ***	0.254 ***
	Occ23	0.151 ***	0.152 ***	0.163 ***	0.153 ***	0.153 ***
	Occ24	0.040	0.041	0.057	0.045	0.045

Table 5.1 (Continued)

Model		**A04**	**A04a**	**A04b**[#]	**A04c**	**A04d**
Sample		Main	Main	Main	Main	Main
Dep. Var.		*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*
Sub-	Occ31	-0.146 **	-0.143 **	-0.117 *	-0.132 **	-0.130 **
Occupation	Occ32	-0.220 ***	-0.217 ***	-0.195 ***	-0.209 ***	-0.207 ***
(Occ01)	Occ33	-0.365 ***	-0.363 ***	-0.342 ***	-0.351 ***	-0.349 ***
	Occ34	-0.091 *	-0.090	-0.073	-0.081	-0.079
	Occ41	-0.275 ***	-0.272 ***	-0.238 ***	-0.254 ***	-0.250 ***
	Occ42	-0.253 ***	-0.250 ***	-0.226 ***	-0.233 ***	-0.230 ***
	Occ51	-0.341 ***	-0.337 ***	-0.298 ***	-0.324 ***	-0.322 ***
	Occ52	-0.433 ***	-0.430 ***	-0.399 ***	-0.415 ***	-0.412 ***
	Occ61	-0.441 ***	-0.436 ***	-0.395 ***	-0.405 ***	-0.399 ***
	Occ71	-0.497 ***	-0.492 ***	-0.445 ***	-0.472 ***	-0.469 ***
	Occ72	-0.357 ***	-0.353 ***	-0.323 ***	-0.341 ***	-0.338 ***
	Occ73	-0.520 ***	-0.515 ***	-0.465 ***	-0.498 ***	-0.495 ***
	Occ74	-0.714 ***	-0.710 ***	-0.674 ***	-0.693 ***	-0.690 ***
	Occ81	-0.380 ***	-0.378 ***	-0.354 ***	-0.360 ***	-0.356 ***
	Occ82	-0.460 ***	-0.456 ***	-0.415 ***	-0.438 ***	-0.434 ***
	Occ83	-0.424 ***	-0.420 ***	-0.383 ***	-0.403 ***	-0.400 ***
	Occ91	-0.556 ***	-0.551 ***	-0.507 ***	-0.531 ***	-0.526 ***
	Occ92	-0.708 ***	-0.705 ***	-0.673 ***	-0.680 ***	-0.676 ***
	Occ93	-0.654 ***	-0.649 ***	-0.598 ***	-0.622 ***	-0.617 ***
Constant		11.322 ***	11.262 ***	10.688 ***	10.676 ***	10.560 ***
R^2		0.681	0.682	0.637	0.684	0.684
Adjusted R^2		0.680	0.681	0.636	0.683	0.683
RMSE		0.448	0.448	0.478	0.446	0.446
N		18,913	18,913	18,913	18,913	18,913

Note: *** p<0.01, ** p<0.05, * p<0.1; Sub-category in blanket is a baseline and codes for Business/Industry and Sub-Occupation can be found in Appendix B.

[#] IV's for self-efficacy include schooling, experience, experience squared, female, religion, marital status, rural, region, employ sector, business/industry, sub-occupation and affective state index.

Earn1 - salaries (in cash) received in the past 12 months

Between the baseline model and model A04a, in which the impact of exogenous self-efficacy on earnings was estimated, the coefficient of exogenous self-efficacy was estimated at 0.010, while the inclusion of self-efficacy barely made a change in the coefficients of the additional controlled variables. In model A04b, in which the impact of self-efficacy was estimated endogenously, the coefficient of endogenous self-efficacy rose to 0.108, while the coefficients of the additional

controlled variables changed considerably. This confirms the partial correlations between self-efficacy and these variables.

Moreover, when substituting the proxies of self-efficacy generated separately from the original sample, the results still support the endogeneity of self-efficacy. From model A04c in which expected self-efficacy was estimated from the exogenous affective state index, and model A04d, in which expected self-efficacy was estimated from the affective state endogenously, the coefficient of endogenous self-efficacy rose further to 0.114 and 0.135 respectively. The coefficients of the additional controlled variables in these two models were similar but slightly different from those estimated in model A04b.

Considering the additional controlled variables by groups, the inclusion of self-efficacy had diverse influences over the coefficients of these variables. An inclusion made no change in the coefficients of religion, marital status, area of residence (urban-rural), or employment sector, confirming that self-efficacy did not correlate with them. An inclusion improves the coefficients of female as they became less negative by 5-6 percentage points, underlining the underestimation of female earnings. An inclusion improved most of the coefficients of sub-occupation, as they became more positive or less negative, and were almost all statistically significant at 1%. Only the coefficients of sub-occupation of professionals barely changed. This also underlines the underestimation of earnings in the other major occupational groups and positive correlation between self-efficacy and occupations. All coefficients of business/industry also improved similarly but they were not statistically significant. An inclusion worsens all coefficients of region as they became more negative and all were statistically significant at 1%. This underlines the overestimation of earnings in non-Bangkok regions and negative correlation between self-efficacy and regions.

5.1.2 Different Scopes of Earnings

Table 5.2 still confirms the importance of a worker's generalized *self-efficacy* in the Thai labour market. When widening the scope of earnings, from the narrowest *Earn1*, salaries (in cash) received in past 12 months, to the broadest *Earn3*, salaries (in cash) plus overtime, bonus and others (in cash) plus total value of welfare received

in past 12 months, all of the coefficients of self-efficacy remained statistically significant at 1%, even though all of the variables were controlled. Between the baseline models AE1-AE3 and the inclusive models AE1d-AE3d, an inclusion of self-efficacy could not improve the R^2, which were still around 0.665-0.684. Interestingly, the coefficient of self-efficacy slightly increases from 0.135 to 0.148 and 0.152 as the scope of earnings widened but that of years of schooling was up and down at around 0.063-0.071 and that of work experience was around 0.044-0.048. The evidence highlights the importance of self-efficacy, as it brings about those extra earnings beyond in-cash salaries.

Table 5.2 Results of Different Scopes of Earnings

Model	AE1[#]	AE2	AE3	AE1d[#]	AE2d	AE3d
Sample	Main	Main	Main	Main	Main	Main
Dep. Var.	***Earn1***	***Earn2***	***Earn3***	***Earn1***	***Earn2***	***Earn3***
Efficacy				0.135 ***	0.148 ***	0.152 ***
Schooling	0.069 ***	0.071 ***	0.069 ***	0.064 ***	0.065 ***	0.063 ***
Experience	0.048 ***	0.047 ***	0.047 ***	0.046 ***	0.044 ***	0.044 ***
Experience^2	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
Female	-0.161 ***	-0.175 ***	-0.178 ***	-0.100 ***	-0.108 ***	-0.109 ***
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X	X	X	X	X	X
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	11.322 ***	11.354 ***	11.386 ***	10.560 ***	10.522 ***	10.527 ***
R^2	0.681	0.677	0.665	0.684	0.679	0.668
Adjusted R^2	0.680	0.676	0.664	0.683	0.678	0.667
RMSE	0.448	0.471	0.477	0.446	0.469	0.475
N	18,913	18,913	18,913	18,913	18,913	18,913

Note: *** p<0.01, ** p<0.05, * p<0.1; X - Variables in these groups are additionally controlled.

[#] Models AE1 and AE1d are the same as models A04 and A04d respectively.

Earn1 - salaries (in cash) received in the past 12 months

Earn2 - salaries (in cash) + overtime, bonus and others (in cash) received in the past 12 months

Earn3 - salaries (in cash) + overtime, bonus and others (in cash) + total value of welfare received in the past 12 months

5.2 Finding from the Sub-Samples

5.2.1 Gender Differences

Table 5.3 demonstrates the different impacts of the worker's generalized *self-efficacy* on earnings in separate gender sub-samples. When excluding self-efficacy, the baseline models ME1 and FE1 showed that the impacts of the traditional human capital on earnings were indifferent between males and females. The coefficients of years of schooling for the male and female sub-samples were 0.065 and 0.071, which was similar to the full-sampled coefficient of 0.069. The coefficients of work experience in the male and female sub-samples were 0.045 and 0.051, which was also similar to the full-sampled coefficient of 0.048. All gender coefficients were statistically significant at 1%. This means that education and work experience in the two gender sub-samples were equally valued to those in the full sample. Between the two proxies of the traditional human capital, year of schooling was slightly more important than work experience for both genders.

When including self-efficacy, the models ME1d and FE1d showed that the impacts of self-efficacy on earnings were slightly different between males and females. Similar to the full sample, an inclusion of self-efficacy did not alter the impacts of the traditional human capital on earnings in the sub-samples. The coefficients of both years of schooling and work experience in the inclusive models remained the same as those in the baseline models of the same sub-samples and were statistically significant at 1%. In the male sub-sample, the coefficient of self-efficacy was 0.140, which is slightly greater than 0.123 in the female sub-sample, while the full-sampled coefficient was 0.135. Both coefficients were statistically significant at 1%, which means that the male's self-efficacy was slightly higher in value than the female's.

Table 5.3 Results for Gender Differences

Model	AE1[#]	ME1	FE1	AE1d[#]	ME1d	FE1d
Sample	**Main**	**Male**	**Female**	**Main**	**Male**	**Female**
Dep. Var.	***Earn1***	***Earn1***	***Earn1***	***Earn1***	***Earn1***	***Earn1***
Efficacy				0.135 ***	0.140 ***	0.123 ***
Schooling	0.069 ***	0.065 ***	0.071 ***	0.064 ***	0.060 ***	0.066 ***
Experience	0.048 ***	0.045 ***	0.051 ***	0.046 ***	0.042 ***	0.049 ***
Experience^2	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
Female	-0.161 ***			-0.100 ***		
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X	X	X	X	X	X
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	11.322 ***	11.230 ***	11.408 ***	10.560 ***	10.430 ***	10.791 ***
R^2	0.681	0.665	0.705	0.684	0.668	0.707
Adjusted R^2	0.680	0.663	0.703	0.683	0.666	0.705
RMSE	0.448	0.436	0.450	0.446	0.434	0.449
N	18,913	9,543	9,370	18,913	9,543	9,370

Model	AE2d	ME2d	FE2d	AE3d	ME3d	FE3d
Sample	**Main**	**Male**	**Female**	**Main**	**Male**	**Female**
Dep. Var.	***Earn2***	***Earn2***	***Earn2***	***Earn3***	***Earn3***	***Earn3***
Efficacy	0.148 ***	0.154 ***	0.134 ***	0.152 ***	0.161 ***	0.137 ***
Schooling	0.065 ***	0.060 ***	0.069 ***	0.063 ***	0.059 ***	0.067 ***
Experience	0.044 ***	0.040 ***	0.047 ***	0.044 ***	0.039 ***	0.047 ***
Experience^2	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
Female	-0.108 ***			-0.109 ***		
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X	X	X	X	X	X
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	10.522 ***	10.331 ***	10.926 ***	10.527 ***	10.315 ***	10.937 ***
R^2	0.679	0.668	0.699	0.668	0.661	0.685
Adjusted R^2	0.678	0.666	0.697	0.667	0.659	0.683
RMSE	0.469	0.452	0.475	0.475	0.457	0.482
N	18,913	9,543	9,370	18,913	9,543	9,370

Note: *** p<0.01, ** p<0.05, * p<0.1; X - Variables in these groups are additionally controlled.

[#] Models AE1 and AE1d are the same as models A04 and A04d respectively.

Earn1 - salaries (in cash) received in the past 12 months

Earn2 - salaries (in cash) + overtime, bonus and others (in cash) received in the past 12 months

Earn3 - salaries (in cash) + overtime, bonus and others (in cash) + total value of welfare received in the past 12 months

When widening the scope of earnings from *Earn1* to *Earn3*, the results of both sub-samples were similar to the results of the full sample. The impacts of the traditional human capital on earnings remained the same. For the male and female sub-samples, the inclusive-model coefficients of years of schooling were around 0.059-0.060 (ME1d-ME3d) and 0.066-0.069 (FE1d-FE3d), similar to the excluded-model coefficients of 0.065 (ME1) and 0.071 (FE1); and the inclusive-model coefficients of work experience were around 0.039-0.042 (ME1d-ME3d) and 0.047-0.049 (FE1d-FE3d), similar to the excluded-model coefficients of 0.045 (ME1) and 0.051 (FE1). All were statistically significant at 1%.

Similarly, the impacts of self-efficacy on earnings in all sub-samples slightly increased as the scope of earnings widened. The coefficients of self-efficacy increased from 0.140 to 0.154 and 0.161 (ME1d-ME3d) in the male sub-sample, and from 0.123 to 0.134 and 0.137 (FE1d-FE3d) in the female sub-sample. All were statistically significant at 1%. The evidence again highlights the importance of self-efficacy, as it brings about those extra earnings beyond in-cash salaries.

5.2.2 Employment Sectors

Table 5.4 demonstrates the different impacts of the worker's characteristic of "self-efficacy" on earnings in separate employment sectors; namely the government sector, state enterprises, and the private sector. When excluding self-efficacy, the baseline models S4E1, S5E1 and S6E1 showed that the impacts of the traditional human capital on earnings varied from sector to sector. The coefficients of years of schooling in the sub-samples of the government sector and state enterprises were 0.095 and 0.106, which was considerably greater than the full-sampled coefficient of 0.069, while the same coefficient for the private sector sub-sample was the lowest at 0.057, and all were statistically significant at 1%. The coefficients of work experience in the sub-samples of the government sector and state enterprises were 0.053 and

0.097, which was slightly greater and considerably greater than the full-sampled coefficient of 0.048, while the same coefficient for the private sector sub-sample was the lowest at 0.036, and all were statistically significant at 1%. This means that education and work experience in the government sector and state enterprises were valued more highly than those in the private sector. Between the two proxies of the traditional human capital, years of schooling was more important than work experience in the government and private sector while they were equally important for state enterprises.

When included, the models S4E1d, S5E1d, and S6E1d showed that the impacts of self-efficacy on earnings also varied from sector to sector. Similar to the full sample, the inclusion of self-efficacy did not alter the impacts of the traditional human capital on earnings in the sub-samples. The coefficients of both years of schooling and work experience in the inclusive models remained the same as those in the baseline models of the same sub-samples and were statistically significant at 1%. The coefficients of self-efficacy in the sub-samples of the government sector and state enterprises were 0.108 and 0.110, which was considerably less than the full-sampled coefficient, while the same coefficient for the private sector was 0.125, which was slightly less than the full-sampled coefficient of 0.135. However, only two coefficients in the sub-samples of government and private sector were statistically significant at 1%. This means that self-efficacy was relatively more valuable, compared with years of schooling and work experience, in the private sector than in the government sector.

Table 5.4 Results for Employment Sectors

Government Sector						
Model	AE1[#]	S4E1	AE1d[#]	S4E1d	S4E2d	S4E3d
Sample	**Main**	**Govt**	**Main**	**Govt**	**Govt**	**Govt**
Dep. Var.	***Earn1***	***Earn1***	***Earn1***	***Earn1***	***Earn2***	***Earn3***
Efficacy			0.135 ***	0.108 ***	0.135 ***	0.130 ***
Schooling	0.069 ***	0.095 ***	0.064 ***	0.090 ***	0.089 ***	0.089 ***
Experience	0.048 ***	0.053 ***	0.046 ***	0.051 ***	0.047 ***	0.047 ***
Experience^2	-0.001 ***	0.000 ***	-0.001 ***	0.000 ***	0.000 ***	0.000 ***
Female	-0.161 ***	-0.106 ***	-0.100 ***	-0.058 ***	-0.070 ***	-0.079 ***
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X		X			
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	11.322 ***	10.548 ***	10.560 ***	9.942 ***	9.884 ***	9.923 ***
R^2	0.681	0.686	0.684	0.687	0.662	0.655
Adjusted R^2	0.680	0.682	0.683	0.684	0.659	0.651
RMSE	0.448	0.385	0.446	0.384	0.413	0.419
N	18,913	5,504	18,913	5,504	5,504	5,504

State Enterprises						
Model	AE1[#]	S5E1	AE1d[#]	S5E1d	S5E2d	S5E3d
Sample	**Main**	**State Ent**	**Main**	**State Ent**	**State Ent**	**State Ent**
Dep. Var.	***Earn1***	***Earn1***	***Earn1***	***Earn1***	***Earn2***	***Earn3***
Efficacy			0.135 ***	0.110	0.118	0.134
Schooling	0.069 ***	0.106 ***	0.064 ***	0.102 ***	0.108 ***	0.103 ***
Experience	0.048 ***	0.097 ***	0.046 ***	0.095 ***	0.091 ***	0.091 ***
Experience^2	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
Female	-0.161 ***	0.017	-0.100 ***	0.069	0.050	0.062
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X		X			
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	11.322 ***	9.806 ***	10.560 ***	9.288 ***	9.146 ***	9.079 ***
R^2	0.681	0.608	0.684	0.609	0.579	0.579
Adjusted R^2	0.680	0.570	0.683	0.570	0.537	0.537
RMSE	0.448	0.538	0.446	0.538	0.578	0.575
N	18,913	471	18,913	471	471	471

Table 5.4 (Continued)

Private Sector						
Model	AE1[#]	S6E1	AE1d[#]	S6E1d	S6E2d	S6E3d
Sample	**Main**	**Private**	**Main**	**Private**	**Private**	**Private**
Dep. Var.	***Earn1***	***Earn1***	***Earn1***	***Earn1***	***Earn2***	***Earn3***
Efficacy			0.135 ***	0.125 ***	0.132 ***	0.140 ***
Schooling	0.069 ***	0.057 ***	0.064 ***	0.052 ***	0.054 ***	0.052 ***
Experience	0.048 ***	0.036 ***	0.046 ***	0.034 ***	0.033 ***	0.032 ***
Experience^2	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
Female	-0.161 ***	-0.168 ***	-0.100 ***	-0.112 ***	-0.118 ***	-0.116 ***
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X		X			
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	11.322 ***	10.949 ***	10.560 ***	10.264 ***	10.247 ***	10.250 ***
R^2	0.681	0.581	0.684	0.584	0.592	0.581
Adjusted R^2	0.680	0.579	0.683	0.582	0.590	0.579
RMSE	0.448	0.439	0.446	0.438	0.459	0.465
N	18,913	12,938	18,913	12,938	12,938	12,938

Note: *** p<0.01, ** p<0.05, * p<0.1; X - Variables in these groups are additionally controlled.

[#] Models AE1 and AE1d are the same as models A04 and A04d respectively.

Earn1 - salaries (in cash) received in the past 12 months

Earn2 - salaries (in cash) + overtime, bonus and others (in cash) received in the past 12 months

Earn3 - salaries (in cash) + overtime, bonus and others (in cash) + total value of welfare received in the past 12 months

When widening the scope of earnings from *Earn1* to *Earn3*, the results of all sub-samples were similar to the results of the full sample. The impacts of the traditional human capital on earnings remained the same. For the sub-samples of the government sector, state enterprises, and the private sector, the inclusive-model coefficients of years of schooling were around 0.089-0.090 (S4E1d-S4E3d), 0.102-0.108 (S5E1d-S5E3d), and 0.052-0.054 (S6E1d-S6E3d) respectively, similar to the excluded-model coefficients of 0.095 (S4E1), 0.106 (S5E1), and 0.057 (S6E1); and the inclusive-model coefficients of work experience were around 0.047-0.051

(S4E1d-S4E3d), 0.091-0.095 (S5E1d-S5E3d), and 0.032-0.034 (S6E1d-S6E3d) respectively, similar to the excluded-model coefficients of 0.053 (S4E1), 0.097 (S5E1), and 0.036 (S6E1). All were statistically significant at 1%.

Similarly the impacts of self-efficacy on earnings in all sub-samples slightly increased as the scope of earnings widened. The coefficients of self-efficacy increased from 0.108 to 0.135 and 0.130 (S4E1d-S4E3d) in the sub-sample of the government sector; from 0.110 to 0.118 and 0.134 (S5E1d-S5E3d) in the sub-sample of state enterprises; and from 0.125 to 0.132 and 0.140 (S6E1d-S6E3d) in the sub-sample of the private sector. However, only the coefficients in the sub-samples of the government and private sector were statistically significant at 1%. The evidence again highlights the importance of self-efficacy as it brings about those extra earnings beyond in-cash salaries

5.2.3 Occupational Differences

Table 5.5 demonstrates the different impacts of the worker's generalized *self-efficacy* on earnings in ten separate occupational sub-samples. When excluding self-efficacy, the baseline models O0E1-O9E1 showed that the impacts of the traditional human capital on earnings varied from occupation to occupation. The coefficients of years of schooling in the first five occupational sub-samples; namely armed forces, legislators, professionals, technicians-associate professionals and clerks, were 0.117, 0.126, 0.136, 0.101, and 0.090, which was remarkably greater than the full-sampled coefficient, while in the last five; namely service workers, skilled agricultural workers, craft workers, plant operators, and elementary occupations, they were 0.058, 0.047, 0.041, 0.054, and 0.025, which was considerably less than the full-sampled coefficient of 0.069, and all were statistically significant at 1%. The coefficients of work experience for the two occupational sub-samples of legislators and professionals were 0.060 and 0.055, which was greater than the full-sampled coefficient, while in the other eights; namely armed forces, technicians-associate professionals, clerks, service workers, skilled agricultural workers, craft workers, plant operators, and elementary occupations, they were 0.037, 0.044, 0.041, 0.035, 0.037, 0.039, 0.028, and 0.026, which was less than the full-sampled coefficient of 0.048. Nine of them

were statistically significant at 1%, while the armed forces' coefficient was statistically significant at 5%.

Table 5.5 Results for Occupational Differences

Excluded-Models						
Model	A04	O0E1	O1E1	O2E1	O3E1	O4E1
Sample	**Main**	**Occ0**	**Occ1**	**Occ2**	**Occ3**	**Occ4**
Dep. Var.	*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*
Efficacy						
Schooling	0.069 ***	0.117 ***	0.126 ***	0.136 ***	0.101 ***	0.090 ***
Experience	0.048 ***	0.037 **	0.060 ***	0.055 ***	0.044 ***	0.041 ***
Experience^2	-0.001 ***	0.000	-0.001 ***	0.000 ***	0.000 ***	0.000 ***
Female	-0.161 ***	-0.151	-0.110 **	0.002	-0.166 ***	-0.110 ***
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X	X	X	X	X	X
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	11.322 ***	10.355 ***	9.096 ***	10.729 ***	10.164 ***	10.072 ***
R^2	0.681	0.756	0.657	0.639	0.497	0.512
Adjusted R^2	0.680	0.702	0.642	0.633	0.486	0.505
RMSE	0.448	0.313	0.546	0.338	0.452	0.397
N	18,913	73	796	2,751	1,785	2,045

Model	A04	O5E1	O6E1	O7E1	O8E1	O9E1
Sample	**Main**	**Occ5**	**Occ6**	**Occ7**	**Occ8**	**Occ9**
Dep. Var.	*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*
Efficacy						
Schooling	0.069 ***	0.058 ***	0.047 ***	0.041 ***	0.054 ***	0.025 ***
Experience	0.048 ***	0.035 ***	0.037 ***	0.039 ***	0.028 ***	0.026 ***
Experience^2	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	0.000 ***	0.000 ***
Female	-0.161 ***	-0.175 ***	-0.174 ***	-0.354 ***	-0.100 ***	-0.178 ***
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X	X	X	X	X	X
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	11.322 ***	10.688 ***	10.661 ***	11.466 ***	11.016 ***	11.017 ***
R^2	0.681	0.488	0.307	0.484	0.308	0.341
Adjusted R^2	0.680	0.481	0.255	0.477	0.299	0.335
RMSE	0.448	0.461	0.415	0.459	0.384	0.430
N	18,913	2,387	370	2,793	2,558	3,355

Table 5.5 (Continued)

Inclusive-Models						
Model	A04d	O0E1d	O1E1d	O2E1d	O3E1d	O4E1d
Sample	**Main**	**Occ0**	**Occ1**	**Occ2**	**Occ3**	**Occ4**
Dep. Var.	*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*
Efficacy	0.135 ***	0.345 *	0.193 **	0.148 ***	0.150 ***	0.107 ***
Schooling	0.064 ***	0.106 ***	0.119 ***	0.130 ***	0.095 ***	0.087 ***
Experience	0.046 ***	0.032 *	0.056 ***	0.052 ***	0.042 ***	0.039 ***
Experience^2	-0.001 ***	0.000	-0.001 ***	0.000 ***	0.000 ***	0.000 ***
Female	-0.100 ***	-0.002	-0.026	0.066 ***	-0.100 ***	-0.062 **
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X	X	X	X	X	X
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	10.560 ***	8.406 ***	8.199 ***	10.027 ***	9.334 ***	9.575 ***
R^2	0.684	0.771	0.659	0.643	0.500	0.515
Adjusted R^2	0.683	0.716	0.645	0.638	0.490	0.507
RMSE	0.446	0.305	0.544	0.336	0.451	0.396
N	18,913	73	796	2,751	1,785	2,045

Model	A04d	O5E1d	O6E1d	O7E1d	O8E1d	O9E1d
Sample	**Main**	**Occ5**	**Occ6**	**Occ7**	**Occ8**	**Occ9**
Dep. Var.	*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*	*Earn1*
Efficacy	0.135 ***	0.089 ***	0.200 **	0.134 ***	0.081 ***	0.120 ***
Schooling	0.064 ***	0.055 ***	0.038 ***	0.036 ***	0.051 ***	0.020 ***
Experience	0.046 ***	0.033 ***	0.032 ***	0.037 ***	0.027 ***	0.024 ***
Experience^2	-0.001 ***	0.000 ***	0.000 ***	-0.001 ***	0.000 ***	0.000 ***
Female	-0.100 ***	-0.135 ***	-0.076	-0.296 ***	-0.063 ***	-0.124 ***
Religion	X	X	X	X	X	X
Marital Status	X	X	X	X	X	X
Rural	X	X	X	X	X	X
Region	X	X	X	X	X	X
Employ Sec	X	X	X	X	X	X
Bus/Indus	X	X	X	X	X	X
Sub-Occup	X	X	X	X	X	X
Constant	10.560 ***	10.261 ***	9.765 ***	10.824 ***	10.628 ***	10.458 ***
R^2	0.684	0.489	0.320	0.487	0.311	0.346
Adjusted R^2	0.683	0.482	0.266	0.481	0.301	0.340
RMSE	0.446	0.460	0.411	0.457	0.383	0.429
N	18,913	2,387	370	2,793	2,558	3,355

Note: *** p<0.01, ** p<0.05, * p<0.1; X - Variables in these groups are additionally controlled; Codes for Occupation are in Appendix B.

[#] Models AE1 and AE1d are the same as models A04 and A04d respectively.

Earn1 - salaries (in cash) received in the past 12 months

Earn2 - salaries (in cash) + overtime, bonus and others (in cash) received in the past 12 months

Earn3 - salaries (in cash) + overtime, bonus and others (in cash) + total value of welfare received in the past 12 months

When included, the models O0E1d-O9E1d showed that the impacts of self-efficacy on earnings also varied from occupation to occupation. Similar to the full sample, the inclusion of self-efficacy did not alter the impacts of the traditional human capital on earnings in the sub-samples. The coefficients of both years of schooling and work experience in the inclusive models remained the same as those in the baseline models of the same sub-samples and were statistically significant at 1%. Only the armed forces' work experience coefficient was statistically significant at 10%. The coefficients of self-efficacy in the five occupational sub-samples; namely armed forces, legislators, professionals, technicians-associate professionals, and skilled agricultural workers, were 0.345, 0.193, 0.148, 0.150, and 0.200, which was greater than the full-sampled coefficient, while in the other five; namely clerks, service workers, craft workers, plant operators, and elementary occupations, they were 0.107, 0.089, 0.134, 0.081, and 0.120, which was equivalent to or less than the full-sampled coefficient of 0.135. Seven of them were statistically significant at 1%, while the coefficients of legislators and skilled agricultural workers were at 5% and for the armed forces were at 10%. This means that the relative values of self-efficacy compared with years of schooling and work experience were not equal across the ten occupations.

CHAPTER 6

CONCLUSION AND DISCUSSION

6.1 Theoretical Concept

It can be seen that non-cognitive skills are clearly distinct from cognitive skills. Non-cognitive skills are the worker's psychological characteristics that signal his or her skill or ability to provide individual effort or to improve the group's "effort." Not relating to traditional human capitals, these characters can be observed through personality, traits, behaviours, habits and attitudes and make workers heterogeneous. Similar to cognitive skills, individual productivity is raised by individual effort while the group's productivity is raised by the group's effort.

The level of individual effort depends on the strength of the individual's motivation, which is determined by both pre-determined and situational factors; *motive*, the existing individual characteristics in approaching or avoiding certain behaviours; *self-efficacy*, the belief as to whether the person can perform required actions; *outcome expectation*, the belief concerning whether the actions will lead to the desired outcomes; and *incentive value*, attractiveness of the foreseen outcomes.

In the long term, the level of effort responds to the individual's long-term goals in fulfilling his or her desires, and is determined by *motive*, generalized *self-efficacy*, and generalized *outcome expectation*. In the short term, the level of effort is determined by *motive*, specific *self-efficacy*, and situational *outcome expectation*, and responds to the foreseen tangible and intangible rewards.

Reward preference keeps changing as a function of individual experience, as explained by Maslow's hierarchy of needs. Hence work productivity in a particular situation or period can be maximised by awarding workers with the *highest-valued reward*, which provides the highest marginal *incentive value* and induces the highest additional effort.

6.2 Empirical Study

It can be seen clearly that non-cognitive skills make a contribution to individual earnings in the Thai labour market, as in other western economies. The impact of the worker's psychological characteristic of generalized *self-efficacy* regarding earning differences was statistically significant in almost all sub-samples and model specifications. The analysis of four different model specifications also confirms the endogenous nature of self-efficacy.

Self-efficacy positively contributes to annual earnings and its impact is independent of the demographic variables of gender, religion, and marital status. Its impact on earnings is unrelated to years of schooling and work experience, implying that individuals can fully utilise their latent abilities developed from schooling and working, only when these schooling and working mastery experiences strengthen their perceived abilities. The inclusion of self-efficacy in the model proves occupational selection bias, underestimation of female earnings, and overestimation of earnings in the rural areas. Self-efficacy also contributes to extra earnings beyond in-cash wages or salaries, such as in-cash overtime, bonuses, and other welfare while the traditional human capitals do not.

From gender view point, the impact of self-efficacy on earnings was positive and statistically significant in both the male and female sub-samples. The contribution of self-efficacy to male earnings is just slightly higher than the contribution to female earnings. This finding confirms that self-efficacy is a desired psychological characteristic and is equally valued in both male and female. Unlike the trait of aggression, in which men from high-status occupations are rewarded but women from the same status are penalized for being aggressive, or the trait of withdrawal, in which women from high-status occupations are rewarded but men from the same status are penalized for being withdrawn (Osborne, 2000); one characteristic is desired in one gender but the opposite characteristic is desired in the other gender. Therefore a single policy on self-efficacy improvement can be applied to both genders.

From an employment sector viewpoint, the impact of self-efficacy on earnings was positive in all three sub-samples but statistically significant in only two sub-samples of government sector and private sector, not in state enterprises. This finding

confirms that self-efficacy is a desired characteristic in all employment sectors. Unlike the trait of aggression, in which men from high-status occupations are rewarded but men from low-status occupations are penalized for being aggressive, or the trait of withdrawal, in which women from high-status occupations are rewarded but women from low-status occupations are penalized for being withdrawn (Osborne, 2000); one characteristic is desired in one career but the opposite characteristic is desired in other careers.

The insignificance of self-efficacy in the state enterprises sub-sample may have resulted from the relatively small number of observations (471 observations of state enterprises, 5,504 observations of the government sector, and 12,938 observations of the private sector). Another possible reason is that the aim of the state enterprises is not to maximize profit but rather to maintain social welfare by accepting some losses. Hence the employees with stronger self-efficacy would not be clearly rewarded more highly than those with weaker self-efficacy.

The contribution of self-efficacy to earnings in the private sector seemed to be equal to the contribution to earnings in the government sector. However, the contributions of years of schooling and work experience to earnings in the private sector were less than the contributions to earnings in the government sector. Therefore the relative values of self-efficacy compared with years of schooling and work experience were higher in the private sector than in the government sector. This indicates less structural payment in the private sector. This also suggests different policies to improve work productivity and to raise earnings in these two employment sectors. Self-efficacy improvement alone may be sufficient to improve work productivity and to raise earnings in the private sector, but both self-efficacy improvement and formal education are required in the government sector.

From an occupational viewpoint, the impact of self-efficacy on earnings was positive in all ten sub-samples but statistically significant in only nine sub-samples; namely (1) legislators, senior officials and managers, (2) professionals, (3) technicians and associate professionals, (4) clerks, (5) service workers, shop and market sale workers, (6) skilled agricultural and fishery workers, (7) craft and related trades workers, (8) plant and machine operators and assemblers, and (9) elementary occupations. The insignificance of self-efficacy in the occupation of the armed forces

may have been a result of the relatively small number of observations (only 73 observations). This finding confirms that self-efficacy is a desired characteristic in all occupations. Unlike the traits of aggression-withdrawal, men that display the characteristic of withdrawal are less likely to enter managerial occupations while men that display the characteristic aggression are less likely to enter higher technical occupations, but none of them has any impact on entry into professional occupations (Jackson, 2006); one characteristic is desired in one occupation but the opposite characteristic is desired in other occupations.

The contribution of self-efficacy, years of schooling and work experience to earnings varied across occupations As a result, the value of self-efficacy, relatively to year of schooling and work experience also varied. In other words, self-efficacy is relatively more important than year of schooling or work experience in some occupations. This suggests that different policies be applied to different occupations in order to improve work productivity and to raise earnings. In the occupations in which the relative values of self-efficacy are high, self-efficacy improvement alone may be sufficient to improve work productivity and raise earnings, but both self-efficacy improvement as well as formal education are required in the occupations in which the relative values of self-efficacy is low.

6.3 Policy Recommendations on Self-Efficacy Improvement

It can be also seen that the worker's psychological characteristic of generalized *self-efficacy* is as valuable as the traditional human capitals, i.e. years of schooling and work experience, in determining individual earnings. Therefore it is worthwhile if this characteristic can be improved.

First of all, the findings from this study should be announced to the public. People should be aware that not only their cognitive skills accumulated from school and work experiences, but also the strength of self-efficacy or the belief about their own ability do contribute to their earnings. Once the public is well aware of this issue, the quality of schooling and work training, which can strengthen a student's and employee's perceived abilities as well as his or her true cognitive and work skills, can

be promoted. This study also makes brief policy recommendations to improve self-efficacy at three different stages of life, based on Bandura (1997).

6.3.1 Preschool Level

Parents must be more responsive to their children. The children that experience success in controlling their environment by their own action become more thoughtful to their behaviour. Intensive preschool programs that provide rich mastery experiences permanently raise the level and academic attainment of children from economically disadvantaged and undereducated families.

6.3.2 School Level

Other than building up cognitive and other non-cognitive skills, the fundamental goal of education should arm students with self-regulatory capabilities that enable them to educate themselves, including the skills of planning, organizing and managing instructional activities. Educational practice should also improve children's belief about their abilities other than skills and knowledge, with some practices for children at all levels.

6.3.3 Mature Level

In the sectors and occupations in which the relative values of self-efficacy are high, compared with years of schooling and work experience, work productivity should be improved by boosting the worker's competency rather than sending him or her back to school, i.e. to a formal education program. Work competency can be improved through mastery modelling, in which knowledge and skills are developed through direct experience. First, occupational skills are modelled by instructors to demonstrate basic rules and strategies. Then the learners receive guide practice under a simulated condition and with feedback to improve their skills. Lastly, employees apply their newly-learned skill in real work and supervisors provide assistance in perfecting their skills and strengthening their confidence. Such programs and curriculum should be promoted both at the industry level and national level.

CHAPTER 7

RECOMMENDATIONS FOR FURTHER STUDIES

Firstly this study recommends further research on the determinants of self-efficacy and the effects of early childhood development against training in labour market. So far this study has simply replied the first enquiry as to whether non-cognitive skills have impacts on economic outcomes. Previously labour economists believed that the economic and social outcomes of individuals were influenced by education, and so considered only years of schooling, as with Mincer's wage equation, until proxies of cognitive skills were included, such as IQ or test scores, when years of schooling became less relevant (Murnane et al., 1995). The literature has proved that non-cognitive skills are also important. One even asks whether schooling raises earnings by making individuals smarter (Bowles and Gintis, 2001). Then economists shifted their focus toward "true" skills or abilities. At this stage it was believed that human skills are inborn, as expressed in The Bell Curve by Herrnstein and Murray (1994).

Until panel data become available, the second enquiry, whether non-cognitive skills can be improved or invested and how, became answerable. This study does not have panel data to prove that human skills are improvable. However, this study highlights the importance of the new paradigms of human development, which are replacing the present human capital theory, and also presents case studies on child development programs in the west.

7.1 Development of the New Paradigms

The availability of panel data has led economists such as James Heckman into deeper study of the earlier stages of an individual's life and the new paradigms of human capability and technology of skill formation have been proposed. Studies on child development such as those of Heckman (2004, 2008), Heckman and Masterov

(2007), Carneiro and Heckman (2003), Cunha and Heckman (2006) and Cunha, Heckman, Lochner, and Masterov (2006) show some interesting points.

First, when categorizing the data from NLSY into family income quartiles, (1) the average percentile rank on math scores in the Peabody Individual Achievement Test (PIAT-math score) and (2) the average percentile rank on anti-social scores can be seen to be different but persistent from ages of six to twelve. However, once adjusted by mother's education, mother's Armed Forces Qualification Test (AFQT) score and incidences of broken home at each age, the differences due to family incomes disappear (Figures D.1 - D.4, Appendix D). This finding confirms that "[the] ability gaps between individuals and across socio-economic groups open up at early ages, for both cognitive and non-cognitive skills [which] are strongly correlated with family background" (Heckman, 2004: 180). This highlights that parents can pass on abilities to their children through genetic transfer, or natural gifts.

Second, among the adults that came from poor and disadvantage American families, those that participated in early-child development programs during their toddler years, such as the Chicago Child-Parent Centre Program (CPC), the Perry Preschool Program and Abecedarian Project, exhibited better economic and social outcomes (Figures D.5 - D.13, Appendix D). When intervened as early as age three, the participating children scored higher on IQ tests than the non-program students and the earlier the intervention, the longer this advantage remained. The participants were also more likely to graduate from high schools and colleges, earn more and have their own houses later, and were less likely to commit any wrongdoings than the non-program individuals. This finding confirms the importance of early interventions, which contribute to performances in childhood to adulthood.

Third, youth monitoring programs, such as Big Brother/Big Sister, and Sponsor-A-Scholar and the Quantum Opportunity Program make small improvements in academic scores but huge improvements in terms of behaviours (Table D.1, Appendix D). This finding confirms that different types of abilities appear to be malleable at different ages (Heckman, 2004: 180). Early interventions at the toddler age effectively improve cognitive skills or intelligence, while late interventions in the adolescent years improve desired personalities and behaviours or non-cognitive skills. This notion is strongly supported by the neuroscience, which has revealed that the

prefrontal cortex, the region of the brain governing emotion and self-regulation, is malleable up to the early 20s (Knudsen, Heckman, Cameron and Shonkoff, 2006).

Fourth, a study on adopted Romanian infants confirmed that the later the remediation, the less effective it is (Heckman, 2004: 197). O'Connor et al. (2000) studied 165 children that were adopted from Romania into UK families between 1990 and 1992. Since the fall of the Ceausescu regime in 1989, there were up to 170,000 Romanian children left in 700 overcrowded and inadequate-resourced state orphanages. Without social or intellectual stimulation and often tied down or locked in rooms to keep them under control, most children exhibited a range of emotional, behavioural and medical problems. The study found that the older the infants were adopted the more difficult it was for them to catch up (Figure D.14, Appendix D). This also highlights the importance of childrearing regarding skill development, or nurturing, and the critical periods of the developments.

It is clear now that both cognitive abilities or intelligence, and non-cognitive skills such as personality and behaviour, are malleable and can be improved or invested in at the very early stage of individual life. Skill developments are a result of both nature and nurture. This knowledge contrasts with the previous belief that human differences are totally due to genetic differences. Based on these findings, Heckman proposed the new paradigms.

7.2 Human Capability and Technology of Skill Formation

Heckman (2007, 2008), Cunha and Heckman (2006, 2007), and Cunha et al. (2006) define human capability as a stock, θ, of cognitive skills, θ^C, non-cognitive skills, θ^N, and health, θ^H, at any period t of life, i.e.

$$\theta_t = (\theta_t^C, \theta_t^N, \theta_t^H). \tag{7.1}$$

Technology of skill formation makes use of the production function concept, in which the skill acquired in each period is built upon the skill acquired from the previous period, i.e. self-productivity. Skill accumulation, θ_{t+1}, is based on the current

stock, θ_t, recent parental investment, I_t, and parental characteristics, h; in other words, children's skill improvement in each period rests upon the original genetic transfer, the childrearing in each period, and the previous conditions of the children themselves, i.e.

$$\theta^k_{t+1} = f^k_t (\theta^k_t, I^k_t, h^k), k \in \{C, N, H\}. \quad (7.2)$$

In different periods of life, skills accumulate at different rates, either of one's own production of the same skills or cross production of different skills. For example, to master the math skill, students must have sound pre-requisite math skills, learning discipline, and sufficient nutrition intake for brain functioning. In the "sensitive period" a certain skill is more effectively produced while there is only a certain "critical period" in which a particular skill can be produced. From the previous examples, the sensitive period for cognitive skills seems to occur before that of non-cognitive skills. Cunha and Heckman (2008) also confirmed the sensitive period for cognitive skills as being between the ages of 6 and 7 and the sensitive period for non-cognitive skills as between the ages of 8 and 9.

The technology of skill formation also provides the concept of "dynamic complementarity," stating that the more skills that are acquired from the previous period, the more productive an investment in the current period will be, i.e.

$$\partial^2 f_t (h, \theta_t, I_t) / \partial \theta_t \partial I_t > 0. \quad (7.3)$$

This concept seems to be a good explanation for the gap among socio-economic classes and obstacles to intergenerational mobility, where those that came from advantage class, have resources and continue investing in their children while those that came from disadvantage class, are limited by their scarce resources. For example, the rich invest in their infants, becoming smart, discipline and healthy children. Then these children become smarter, better discipline, and healthier teenagers, and these teenagers become smarter, better disciplined and healthier adolescents, and so on.

The cost-benefit analysis of these intervention programs also shows that education and training programs for adults from disadvantage class produce low economic return. Even if "later intervention showed some benefits, the performance of disadvantaged children was still behind the performance of children who experienced earlier interventions in the preschool years" (Heckman, 2008: 309). The benefits gained from effective early interventions are best sustained when followed by continued interventions. As a result, "the returns on school investment are higher for persons with higher ability, where ability is formed in the early years" (Heckman, 2008: 309). Figure 7.1 provides a rough idea of the economic efficiency of investments in human capital.

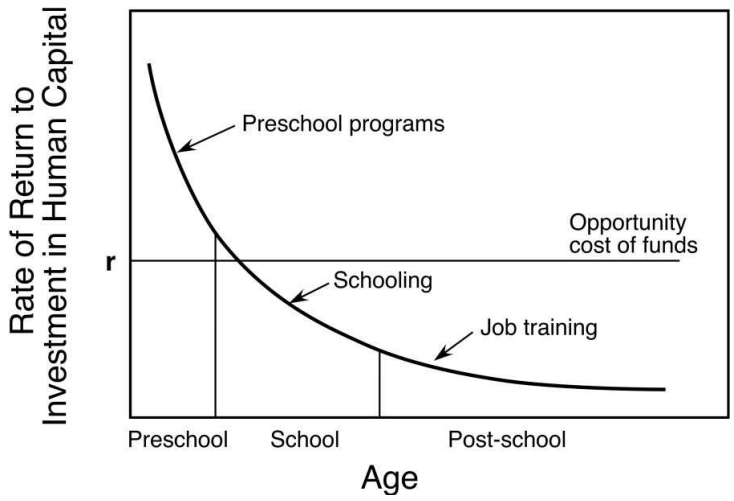


Figure 7.1 Rates of Return to Investment in Human Capital as a Function of the Age When the Investment Was Initiated

Source: Figure 3 in Knudsen, Heckman, Cameron and Shonkoff, 2006: 10157.

Note: The data were derived from a life cycle model of dynamic human capital accumulation with multiple periods and credit constraints. Investments were initially set to be equal across all ages.

BIBLIOGRAPHY

American Psychological Association. 2002. **Glossary of Psychological Terms.** Retrieved March 10, 2010 from http://www.apa.org/research/action/glossary.aspx

Andrisani, Paul J. 1977. Internal-External Attitudes, Personal Initiative, and the Labor Market Experience of White and Black Men. **The Journal of Human Resources.** 12 (3): 308-328.

Andrisani, Paul J. 1981. Internal-External Attitudes, Sense of Efficacy and Labor Market Experience: A Reply to Duncan and Morgan. **The Journal of Human Resources.** 16 (4): 658-666.

Apichai Mongkol. The Arthur of the Development and Testing of Thai Mental Health Indicator Version 2007. 2013 (September 10). Personal Interview.

Apichai Mongkol; Yongyuth Vongpiromsan; Tavee Tangseree; Watchanee Huttapanom; Praiwan Romsai and Worawan Chutha. 2009. **The Development and Testing of Thai Mental Health Indicator Version 2007.** Bangkok: The Agricultural Co-operative Federation of Thailand Press.

Ashvin Ahuja; Thitima Chucherd and Kobsak Pootrakool. 2006. Human Capital Policy: Building a Competitive Workforce for 21st Century Thailand. **The Bank of Thailand Annual Symposium.** 9 - 10 August, Bangkok Thailand.

Atkinson, J. 1964. **An Introduction to Motivation.** Princeton, NJ: Van Nostrand.

Ayuppa, Kartinah and Kong, William. 2010. The Impact of Task and Outcome Interdependence and Self-Efficacy on Employees' Work Motivation: An Analysis of the Malaysian Retail Industry. **Asia Pacific Business Review.** 16 (1-2): 123-142.

Bandura, Albert. 1977. Self-efficacy: Toward a Unifying Theory of Behavioral Change. **Psychological Review.** 84 (2): 191-215.

Bandura, Albert. 1986. **Social Foundations of Thought and Action: A Social Cognitive Theory.** Englewood Cliffs, NJ: Prentice-Hall.

Bandura, Albert. 1994. Self-efficacy. In **Encyclopedia of Human Behavior.** Vol 4. V. S. Ramachaudran, ed. New York: Academic Press. Pp. 71-81.

Bandura, Albert. 1997. **Self-Efficacy: The Exercise of Control.** New York: W.H. Freeman and Company.

Bandura, Albert. 2002. Social Foundations of Thought and Action. In **The Health Psychology Reader.** David F. Marks, ed. London: SAGE Publications. Pp. 94-106.

Barrick, Murray R. and Mount, Michael K. 1991. The Big Five Personality Dimensions and Job Performance: A Meta-Analysis. **Personnel Psychology.** 44 (1): 1-26.

Baum, C. F. 2006. **An Introduction to Modern Econometrics Using Stata.** Texas: Stata Press.

Betz, Nancy E. and Hackett, Gail. 1981. The Relationship of Career-Related Self-Efficacy Expectations to Perceived Career Options in College Women and Men. **Journal of Counseling Psychology.** 28 (5): 399-410.

Blanden, Jo; Gregg, Paul and Macmillan, Lindsey. 2007. Accounting for Intergenerational Income Persistence: Noncognitive Skills, Ability and Education. **The Economic Journal.** 117 (519): C43-C60.

Blau, Francine D. and Kahn, Lawrence M. 2006. The US Gender Pay Gap in The 1990s: Slowing Convergence. **Princeton University Working Paper.** No.508.

Borg, Mary O. and Stranahan, Harriet. 2002. The Effect of Gender and Race on Student Performance in Principles of Economics: The Importance of Personality Type. **Applied Economics.** 34 (5): 589-598.

Borg, Mary O.; Mason, Paul M. and Shapiro, Stephen L. 1989. The Case of Effort Variables in Student Performance. **The Journal of Economic Education.** 20 (3): 308-313.

Borghans, Lex; Duckworth, Angela L.; Heckman, James J. and ter Weel, Bas. 2008. The Economics and Psychology of Personality Traits. **The Journal of Human Resources.** 43 (4): 972-1059.

Borghans, Lex; Golsteyn, Bart H. H.; Heckman, James J. and Meijers, Huub. 2009. Gender Differences in Risk Aversion and Ambiguity Aversion. **Journal of the European Economic Association.** 7 (2-3): 649-658.

Borghans, Lex; Meijers, Huub and ter Weel, Bas. 2008. The Role of Noncognitive Skills in Explaining Cognitive Test Scores. **Economic Inquiry.** 46 (1): 2-12.

Borghans, Lex; ter Weel, Bas and Weinberg, Bruce A. 2008. Interpersonal Styles and Labor Market Outcomes. **The Journal of Human Resources.** 43 (4): 815-858.

Bouffard-Bouchard, Therese. 1990. Influence of Self-Efficacy on Performance in Cognitive Task. **The Journal of Social Psychology.** 130 (3): 353-363.

Bowles, Samuel and Gintis, Herbert. 2001. Does Schooling Raise Earnings by Making People Smarter? In **Meritocracy and Economic Inequality.** Kenneth J. Arrow, Samuel Bowles and Steven N. Durlauf, eds. Princeton: Princeton University Press. Pp. 118-136.

Bowles, Samuel and Gintis, Herbert. 2002. The Inheritance of Inequality. **The Journal of Economic Perspectives.** 16 (3): 3-30.

Bowles, Samuel; Gintis, Herbert and Osborne, Melissa. 2001a. Incentive-Enhancing Preferences: Personality, Behavior and Earnings. **The American Economics Review.** 91 (2): 155-158.

Bowles, Samuel; Gintis, Herbert and Osborne, Melissa. 2001b. The Determinants of Earnings: A Behavioral Approach. **Journal of Economic Literature.** 39 (4): 1137-1176.

Butler, Gillian and Hope, Tony. 1995. **Managing Your Mind: The Mental Fitness Guide.** Oxford.

Cameron, A. C. and Trivedi, P. K. 2009. **Microeconometrics Using Stata.** Texas: Stata Press.

Campbell, Nancy K. and Hackett, Gail. 1986. The Effects of Mathematics Task Performance on Math Self-Efficacy and Task Interest. **Journal of Vocational Behavior.** 28 (2): 149-162.

Cantril, Hadley. 1965. **The Pattern of Human Concerns.** New Brunswick, NJ: Rutgers University Press.

Carneiro, P. and Heckman, James J. 2003. Human Capital Policy. In **Inequality in America: What Role for Human Capital Policy?** James J. Heckman and Alan B. Krueger, eds. Cambridge, MA: MIT Press. Pp. 77-239.

Carnevale, Anthony P.; Fry, Richard A. and Lowell, B. Lindsay. 2001. Understanding, Speaking, Reading, Writing and Earnings in the Immigrant Labor Market. **The American Economic Review.** 91 (2): 159-163.

Cawley, John; Heckman, James J. and Vytlacil, Edward. 2001. Three Observations on Wages and Measured Cognitive Ability. **Labour Economics.** 8 (4): 419-442.

Cebi, Merve. 2007. Locus of Control and Human Capital Investment Revisited. **The Journal of Human Resources.** 42 (4): 919-932.

Coleman, Margo and DeLeire, Thomas. 2003. An Economic Model of Locus of Control and the Human Capital Investment Decision. **The Journal of Human Resources.** 38 (3): 701-721.

Costa, Paul T. and McCrae, Robert R. 1988. Personality in Adulthood: A Six-Year Longitudinal Study of Self-Reports and Spouse Ratings on the NEO Personality Inventory. **Journal of Personality and Social Psychology.** 54 (5): 853-863.

Costa, Paul T. and McCrae, Robert R. 1994. Set Like Plaster? Evidence for the Stabilty of Adult Personality. In **Can Personality Change?** Todd F. Heatherton and Joel L. Weinberger, eds. Washington, DC: American Psychological Association. Pp. 21-40.

Costa, Paul T. and McCrae, Robert R. 1995. Domains and Facets: Hierarchical Personality Assessment Using the Revised NEO Personality Inventory. **Journal of Personality Assessment.** 64 (1): 21-50.

Costa, Paul T.; Terracciano, Antonio and McCrae, Robert R. 2001. Gender Differences in Personality Traits across Cultures: Robust and Surprising Findings. **Journal of Personality and Social Psychology.** 81 (2): 322-331.

Cunha, Flavio and Heckman, James J. 2006. Investing in Our Young People. Unpublished Manuscript.

Cunha, Flavio and Heckman, James J. 2007. The Technology of Skill Formation. **The American Economic Review.** 97 (2): 31-47.

Cunha, Flavio and Heckman, James J. 2008. Formulating, Identifying and Estimating the Technology of Cognitive and Noncognitive Skill Formation. **The Journal of Human Resources.** 43 (4): 738-782.

Cunha, Flavio and Heckman, James J. 2009. The Economics and Psychology of Inequality and Human Development. **Journal of the European Economic Association.** 7 (2-3): 320-364.

Cunha, Flavio; Heckman, James J.; Lochner, Lance L. and Masterov, Dimitriy V. 2006. Interpreting the Evidence on Life Cycle Skill Formation. In **Handbook of the Economics of Education.** Vol 1. Erik Hanushek and F. Welch, eds. North-Holland. Pp. 697-812.

Currie, Janet and Thomas, Duncan. 2001. Early Test Scores, School Quality and SES: Longrun Effects on Wage and Employment Outcomes. **Research in Labor Economics.** 20: 103-132.

Currie, Janet. 2001. Early Childhood Education Programs. **The Journal of Economic Perspectives.** 15 (2): 213-238.

Darity, William A. and Williams, Rhonda M. 1985. Peddlers Forever?: Culture, Competition and Discrimination. **The American Economic Review.** 75 (2): 256-261.

Dearden, Lorraine M.; Machin, Stephen and Reed, Howard. 1997. Intergenerational mobility in Britain. **The Economic Journal.** 107 (440): 47-66.

Duckworth, Angela L. and Seligman, Martin E.P. 2005. Self-Discipline Outdoes IQ in Predicting Academic Performance of Adolescents. **Psychological Science.** 16 (12): 939-944.

Duncan, Greg J. and Morgan, James N. 1981. Sense of Efficacy and Subsequent Change in Earnings - A Replication. **The Journal of Human Resources.** 16 (4): 649-657.

Dunifon, Rachel and Duncan, Greg J. 1998. Long-Run Effects of Motivation on Labor-Market Success. **Social Psychology Quarterly.** 61 (1): 33-48.

Dunifon, Rachel; Duncan, Greg J. and Brooks-Gunn, Jeanne. 2001. As Ye Sweep, So Shall Ye Reap. **The American Economic Review.** 91 (2): 150-154.

Easterlin, Richard A. 2001. Income and Happiness: Towards a Unified Theory. **The Economic Journal.** 111 (473): 465-484.

Easterlin, Richard A. 2002. The Income-Happiness Relationship. In **Rich and Poor: Disparities, Perceptions, Concomitants.** Wolfgang Glatzer, ed. Boston: Kluwer Academic. Pp. 157-175.

Easterlin, Richard A. 2003a. Explaining Happiness. **Proceedings of the National Academy of Sciences.** 100 (19): 11176-11183.

Easterlin, Richard A. 2003b. Building a Better Theory of Well-Being. **IZA Discussion Paper.** No.742.

Farkas, George. 2003. Cognitive Skills and Noncognitive Traits and Behaviors in Stratification Processes. **Annual Review of Sociology.** 29: 541-562.

Filer, Randall K. 1981. The Influence of Affective Human Capital on Wage Equation. **Research in Labor Economics.** 4: 367-416.

Filer, Randall K. 1983. Sexual Differences in Earnings: The Role of Individual Personalities and Tastes. **The Journal of Human Resources.** 43 (1): 82-99.

Filer, Randall K. 1986. The Role of Personality and Tastes in Determining Occupational Structure. **Industrial and Labor Relations Review.** 39 (3): 412-424.

Flammer, August. 1997. Developmental Analysis of Control Beliefs. In **Self-Efficacy in Changing Societies.** Albert Bandura, ed. Cambridge: Cambridge University Press. Pp. 69-113.

Fortin, Nicole M. 2005. Gender Role Attitudes and the Labour-Market Outcomes of Women across OECD Countries. **Oxford Review of Economic Policy.** 21 (3): 416-438.

Fortin, Nicole M. 2008. The Gender Wage Gap among Young Adults in the United States: The Importance of Money versus People. **The Journal of Human Resources.** 43 (4): 884-918.

Frank, Robert. 1984. Are Workers Paid their Marginal Products? **The American Economic Review.** 74 (4): 549-571.

Garces, Eliana; Thomas, Duncan and Currie, Janet. 2002. Longer-Term Effects of Head Start. **The American Economic Review.** 92 (4): 999-1012.

Gecas, Viktor. 1989. The Social Psychology of Self-Efficacy. **Annual Review of Sociology.** 15: 291-316.

Gelissen, John and de Graaf, Paul M. 2006. Personality, Social Background and Occupational Career Success. **Social Science Research.** 35 (3): 702-726.

Ghodsian, M. 1977. Children's Behaviour and the BSAG: Some Theoretical and Statistical Consideration. **British Journal of Social and Clinical Psychology.** 16 (1): 23-28.

Goldsmith, Arthur H.; Veum, Jonathan R. and Darity, William A. 1997. The Impact of Psychological and Human Capital on Wages. **Economic Inquiry.** 35 (4): 815-829.

Goldsmith, Arthur H.; Veum, Jonathan R. and Darity, William A. 2000a. Motivation and Labor Market Outcomes. **Research in Labor Economics.** 19: 109-146.

Goldsmith, Arthur H.; Veum, Jonathan R. and Darity, William A. 2000b. Working Hard for the Money? Efficiency Wages and Worker Effort. **Journal of Economic Psychology.** 21 (4): 351-385.

Gonzalez, Arturo. 2000. The Acquisition and Labor Market Value of Four English Skills: New Evidence from NALS. **Contemporary Economic Policy.** 18 (3): 259-269.

Groves, Melissa O. 2005. How Important is Your Personality? Labor Market Returns to Personality for Women in the US and UK. **Journal of Economic Psychology.** 26 (6): 827-841.

Gujarati, Damodar N. 2003. **Basic Econometrics.** 4th ed. New York: McGraw-Hill.

Hackett, Gail and Betz, Nancy E. 1995. Self-Efficacy and Career Choice and Development. In **Self-Efficacy, Adaptation, and Adjustment: Theory, Research, and Application.** James E. Maddux, ed. New York: Plenum Press. Pp. 249-279.

Hackett, Gail and Campbell, Nancy K. 1987. Task Self-Efficacy and Task Interest as a Function of Performance on a Gender-Neutral Task. **Journal of Vocational Behavior.** 30 (2): 203-215.

Hackett, Gail. 1985. Role of Mathematics Self-Efficacy in the Choice of Math-Related Majors of College Women and Men: A Path Analysis. **Journal of Counseling Psychology.** 32 (1): 47-56.

Hackett, Gail. 1997. Self-Efficacy in Career Choice and Development. In **Self-Efficacy in Changing Societies.** Albert Bandura, ed. Cambridge: Cambridge University Press. Pp. 232-258.

Heatherton, Todd F. and Nichols, Patricia A. 1994. Conceptual Issues in Assessing Whether Personality Can Change. In **Can Personality Change?** Todd F. Heatherton and Joel L. Weinberger, eds. Washington, DC: American Psychological Association. Pp. 3-18.

Heckman, James J. 1995. Lessons from the Bell Curve. **The Journal of Political Economy.** 103 (5): 1091-1120.

Heckman, James J. 2000. Policies to Foster Human Capital. **Research in Economics.** 54 (1): 3-56.

Heckman, James J. 2004. Lessons from the Technology of Skill Formation. **Annals of the New York Academy of Sciences.** 1038 (1): 179-200.

Heckman, James J. 2006. Skill Formation and the Economics of Investing in Disadvantaged Children. **Science.** 312 (5782): 1900-1902.

Heckman, James J. 2007. The Economics, Technology and Neuroscience of Human Capability Formation. **The Proceedings of the National Academy of Sciences.** 104 (33): 13250-13255.

Heckman, James J. 2008. Schools, Skills and Synapses. **Economic Inquiry.** 46 (3): 289-324.

Heckman, James J. and LaFontaine, Paul A. 2006. Bias Corrected Estimates of GED Returns. **Journal of Labor Economics.** 24 (3): 661-700.

Heckman, James J. and Masterov, Dimitriy V. 2007. The Productivity Argument for Investing in Young Children. **Review of Agricultural Economics.** 29 (3): 446-493.

Heckman, James J. and Rubinstein, Yona. 2001. The Importance of Noncognitive Skills: Lessons from the GED Testing Program. **The American Economic Review.** 91 (2): 145-149.

Heckman, James J.; Cunha, F. and Schennach, S. 2010. Estimating the Technology of Cognitive and Noncognitive Skill Formation. **Econometrica.** 78 (3): 883-931.

Heckman, James J.; Hsse, Jingjing and Rubinstein, Yona. 2002. The GED is a "Mixed Signal": The Effect of Cognitive and non-Cognitive Skills on Human Capital and Labor Market Outcomes. Unpublished Manuscript.

Heckman, James J.; Lochner, Lance J. and Todd, Petra E. 2003. Fifty Years of Mincer Earnings Regressions. **NBER Working Paper.** No.9732.

Heckman, James J.; Lochner, Lance J. and Todd, Petra E. 2009. Earnings Functions and Rates of Return. **Journal of Human Capital.** 2 (1): 1-31.

Heckman, James J.; Stixrud, Jora and Urzua, Sergio. 2006. The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior. **Journal of Labor Economics.** 24 (3): 411-482.

Heineck, Guido and Anger, Silke. 2010. The Returns to Cognitive Abilities and Personality Traits in Germany. **Labour Economics.** 17 (3): 535-546.

Herrnstein, Richard and Murray, Charles. 1994. **The Bell Curve: Intelligence and Class Structure in American Life.** New York: Free Press.

Hettler, Paul. 2007. The Decomposition of Firm-Size Wage Differentials. **Journal of Labor Research.** 28 (3): 477-486.

Idson, Todd and Oi, Walter. 1999. Workers Are More Productive in Large Firms. **The American Economic Review.** 89 (2): 104-108.

Internet Center for Management and Business Administration. 2002. Maslow's Hierarchy of Needs. **NetMBA Business Knowledge Center.** Retrieved October 30, 2010 from http://www.netmba.com/mgmt/ob/motivation/maslow/

Jackson, Michelle. 2006. Personality Traits and Occupational Attainment. **European Sociological Review.** 22 (2): 187-199.

Jacob, Brian A. 2002. Where the Boys Aren't: Non-Cognitive Skills, Returns to School and the Gender Gap in Higher Education. **Economics of Education Review.** 21 (6): 589-598.

Jarrell, Stephen and Stanley, T. D. 2004. Declining Bias and Gender Wage Discrimination? A Meta-Regression Analysis. **Journal of Human Resources.** 39 (3): 828-838.

Jencks, Christopher. 1979. **Who Gets Ahead? The Determinants of Economic Success in America.** New York: Basic Books.

John, Oliver P. and Sanjay Srivastava. 1999. The Big Five Trait Taxonomy: History, Measurement and Theoretical Perspectives. In **Handbook of Personality: Theory and Research.** Lawrence A. Pervin and Oliver P. John, eds. New York: The Guilford Press. Pp. 102-138.

Judge, Timothy A.; Erez, Amir; Bono, Joyce E. and Thoresen, Carl J. 2002. Do the Traits Self-Esteem, Neuroticism, Locus of Control, and Generalized Self-Efficacy Indicate a Common Core Construct? **Journal of Personality and Social Psychology.** 83 (3): 693-710.

Judge, Timothy A.; Heller, Daniel and Mount, Michael K. 2002. Five-Factor Model of Personality and Job Satisfaction: A Meta-Analysis. **Journal of Applied Psychology.** 87 (3): 530-541.

Judge, Timothy A.; Jackson, Christine L.; Shaw, John C.; Scott, Brent A. and Rich, Bruce L. 2007. Self-Efficacy and Work-Related Performance: The Integral Role of Individual Differences. **Journal of Applied Psychology.** 92 (1): 107-127.

Kassin, Saul. 2003. **Psychology.** USA: Prentice-Hall.

Kenrick, Douglas T. and Funder, David C. 1991. The Person-Situation Debate: Do Personality Traits Really Exist? In **Personality: Contemporary Theory and Research.** Valerian J. Derlega, Barbara A. Winstead and Warren H. Jones, eds. Belmont, CA: Thomson/Wadsworth.

Knudsen, Eric I.; Heckman, James J.; Cameron, Judy L. and Shonkoff, Jack P. 2006. Economic, Neurobiological and Behavioral Perspectives on Building America's Future Workforce. **The Proceedings of the National Academy of Sciences.** 103 (27): 10155-10162.

Krueger, Alan B. and Schkade, David A. 2008. Sorting in the Labor Market: Do Gregarious Workers Flock to Interactive Jobs? **The Journal of Human Resources.** 43 (4): 859-883.

Kuhn, Peter and Weinberger, Catherine. 2005. Leadership Skills and Wages. **Journal of Labor Economics.** 23 (3): 395-436.

Lacy, William B.; Bokemeier, Janet L. and Shepard, Jon M. 1983. Job Attribute Preferences and Work Commitment of Men and Women in the United States. **Personnel Psychology.** 36 (2): 315-329.

Lallemand, Thierry; Plasman, Robert and Rycx, Francois. 2005. Why do Large Firms Pay Higher Wages? Evidence from Matched Worker-Firm Data. **International Journal of Manpower.** 26 (7/8): 705-723.

Lazear, Edward P. and Oyer, Paul. 2004a. Internal and External Labor Markets: A Personnel Economics Approach. **Labour Economics.** 11 (5): 527-554.

Lazear, Edward P. and Oyer, Paul. 2004b. The Structure of Wages and Internal Mobility. **The American Economic Review.** 94 (2): 212-216.

Lent, Robert W.; Brown, Steven D. and Larkin, Kevin C. 1986. Self-Efficacy in the Prediction of Academic Performance and Perceived Career Options. **Journal of Counseling Psychology.** 33 (3): 265-269.

Lent, Robert W.; Lopez, Frederick G. and Bieschke, Kathleen J. 1991. Mathematics Self-Efficacy: Sources and Relation to Science-Based Career Choice. **Journal of Counseling Psychology.** 38 (4): 424-430.

Lent, Rovert W.; Brown, Steven D. and Larkin, Kevin C. 1984. Relation of Self-Efficacy Expectations to Academic Achievement and Persistence. **Journal of Counseling Psychology.** 31 (3): 356-362.

Linz, Susan J. and Semykina, Anastasia. 2008. Attitudes and Performance: An Analysis of Russian Workers. **The Journal of Socio-Economics.** 37 (2): 694-717.

Linz, Susan J. and Semykina, Anastasia. 2009. Personality Traits as Performance Enhancers? A Comparative Analysis of Workers in Russia, Armenia and Kazakhstan. **Journal of Economic Psychology.** 30 (1): 71-91.

Lleras, Christy. 2008. Do Skills and Behaviors in High School Matter? The Contribution of Noncognitive Factors in Explaining Differences in Educational Attainment and Earnings. **Social Science Research.** 37 (3): 888-902.

Maddux, James E. 1995. Self-Efficacy Theory: An Introduction. In **Self-Efficacy, Adaptation, and Adjustment: Theory, Research, and Application.** James E. Maddux, ed. New York: Plenum Press. Pp. 3-33.

Maddux, James E. and Meier, Lisa J. 1995. Self-Efficacy and Depression. In **Self-Efficacy, Adaptation, and Adjustment: Theory, Research, and Application.** James E. Maddux, ed. New York: Plenum Press. Pp. 143-169.

Maddux, James E.; Brawley, Lawrence and Boykin, Angela. 1995. Self-Efficacy and Health Behavior: Prevention, Promotion and Detection. In **Self-Efficacy, Adaptation, and Adjustment: Theory, Research, and Application.** James E. Maddux, ed. New York: Plenum Press. Pp. 173-201.

Manat Boonprakob and Pannee Boonprakob. 2007. Factors Affecting Work Behaviors after the Retirement of the Government Officials at Srinakharinwirot University. **International Journal of Behavioral Science.** 2 (1): 41-53.

Manning, Alan and Swaffield, Joanna K. 2008. The Gender Gap in Early-Career Wage Growth. **The Economic Journal.** 118 (530): 983-1024.

Mavis, Brain. 2001. Self-Efficacy and OSCE Performance among Second Year Medical Students. **Advances in Health Sciences Education.** 6: 93-102.

Mincer, Jacob. 1974. **Schooling, Experience and Earnings.** New York: Columbia University Press.

Mincer, Jacob. 1958. Investment in Human Capital and Personal Income Distribution. **Journal of Political Economy.** 66 (4): 281-302.

Mohan, Kanu P. 2007. The Role of Person and Perceived Situation Variables Leading to Job Well-Being of International School Teachers. **International Journal of Behavioral Science.** 2 (1): 130-150.

Mone, Mark A.; Baker, Douglas D. and Jeffries, Frank. 1995. Predictive Validity and Time Dependency of Self-Efficacy, Self-Esteem, Personal Goals, and Academic Performance. **Educational and Psychological Measurement.** 55 (5): p716-727.

Mueller, Gerrit and Plug, Erik J.S. 2006. Estimating the Effect of Personality on Male and Female Earnings. **Industrial and Labor Relations Review.** 60 (1): 3-22.

Multon, Karen D.; Brown, Steven D. and Lent, Robert W. 1991. Relation of Self-Efficacy Beliefs to Academic Outcomes: A Meta-Analytic Investigation. **Journal of Counseling Psychology.** 38 (1): 30-38.

Murnane, Richard J.; Willett, John B. and Levy, Frank. 1995. The Growing Importance of Cognitive Skills in Wage Determination. **The Review of Economics and Statistics.** 77 (2): 251-266.

Murnane, Richard J.; Willett, John B.; Braatz, M. Jay and Duhaldeborde, Yves. 2001. Do Different Dimensions of Male High School Students' Skills Predict Labor Market Success a Decade Later? Evidence from the NLSY. **Economics of Education Review.** 20 (4): 311-320.

Neill, James. 2003. **Situation vs. Personality Debate.** Retrieved October 30, 2010 from http://www.wilderdom.com/personality/L6-3SituationVsPersonality.html

Neuman, Shoshana and Oaxaca, Ronald L. 2004. Wage Differentials in the 1990s in Israel: Endowments, Discrimination and Selectivity. **IZA Discussion Paper.** No.1362.

Nguyen, N. T.; Allen, Larry C. and Fraccastoro, K. 2005. Personality Predicts Academic Performance: Exploring the Moderating Role of Gender. **Journal of Higher Education Policy and Management.** 27 (1): 105-116.

Nollen, Stanley D. and Gaertner, Karen N. 1991. Effects of Skill and Attitudes on Employee Performance and Earnings. **Industrial Relations.** 30 (3): 435-455.

Nyhus, Ellen K. and Pons, Empar. 2005. The Effects of Personality on Earnings. **Journal of Economic Psychology.** 26 (3): 363-384.

O'Connell, Michael and Sheikh, Hammad. 2007. Growth in Career Earnings and the Role of Achievement-Related Traits. **Journal of Economic Psychology.** 28 (5): 590-605.

O'Connell, Michael and Sheikh, Hammad. 2008. Achievement-Related Attitudes and the Fate of 'At-Risk' Groups in Society. **Journal of Economic Psychology.** 29 (4): 508-521.

O'Connor, T. G.; Rutter, M.; Beckett, C.; Keaveney, L.; Kreppner, J. M. and the English and Romanian Adoptees Study Team. 2000. The Effects of Global Severe Privation on Cognitive Competence: Extension and Longitudinal Follow-Up. **Child Development.** 71 (2): 376-390.

O'Hare, Marianne M. and Beutell, Nicholas J. 1987. Sex Differences on Coping with Career Decision Making. **Journal of Vocational Behavior.** 31 (2): 174-181.

Osborne, Melissa A. 2000. **The Power of Personality: Labor Market Rewards and the Transmission of Earnings.** Doctoral dissertations, University of Massachusetts - Amherst.

Palifka, Bonnie J. 2009. Personality and Income in Mexico: Supervisor Assessments vs. Self-Assessments. **Journal of Economic Psychology.** 30 (1): 92-106.

Pranot Kaochim. 2006. The Level of Academic Achievement, Learning Behavior and Social Support of Students in the Faculty of Humanities, Srinakharinwirot University. **Journal of Behavioral Science.** 12 (1): 72-93. (In Thai)

Pungpond Rukumnuaykit. 2011. Mental Health and Happiness of the Thai People. The Thailand Research Fund. (Unpublished)

Rabe-Hesketh, S. and Everitt, B. 2000. **A Handbook of Statistical Analyses Using Stata.** 2nd ed. Florida: Chapman & Hall.

Randhawa, Bikkar S.; Beamer, James E. and Lundberg, Ingvar. 1993. Role of Mathematics Self-Efficacy in the Structural Model of Mathematics Achievement. **Journal of Educational Psychology.** 85 (1): 41-48.

Ransom, Michael and Oaxaca, Ronald L. 2005. Intrafirm Mobility and Sex Differences in Pay. **Industrial and Labor Relations Review.** 58 (2): 219-237.

Reder, M. W. 1955. The Theory of Occupational Wage Differentials. **The American Economic Review.** 45 (5): 833-852.

Rosenberg, Morris. 1965. **Society and the Adolescent Self-Image.** Princeton, NJ: Princeton University Press.

Rosenbloom, Joshua L.; Ash, Ronald A.; Dupont, Brandon and Coder, LeAnne. 2008. Why are There So Few Women in Information Technology? Assessing the Role of Personality in Career Choices. **Journal of Economic Psychology.** 29 (4): 543-554.

Ross, Catherine E. and Broh, Beckett A. 2000. The Roles of Self-Esteem and the Sense of Personal Control in the Academic Achievement Process. **Sociology of Education.** 73 (4): 270-284.

Rossetti, Stefania and Tanda, Paola. 2000. Human Capital, Wages and Family Interactions. **Labour.** 14 (1): 5-34.

Rotter, Julian B. 1966. Generalized Expectancies for Internal versus External Control of Reinforcement. **Psychological Monographs.** 80 (1): 1-28.

Ryckman, R. 2004. Theories of Personality. Belmont, CA: Thomson/Wadsworth.

Salgado, Jesus F. 1997. The Five Factor Model of Personality and Job Performance in the European Community. **Journal of Applied Psychology.** 82 (1): 30-43.

Schneewind, Klaus. 1997. Impact of Family Processes on Control Beliefs. In **Self-Efficacy in Changing Societies.** Albert Bandura, ed. Cambridge: Cambridge University Press. Pp. 114-148.

Schunk, Dale H. 1982. Effects of Effort Attributional Feedback on Children's Perceived Self-Efficacy and Achievement. **Journal of Educational Psychology.** 74 (4): 548-556.

Schunk, Dale H. 1983. Ability versus Effort Attributional Feedback: Differential Effects on Self-Efficacy and Achievement. **Journal of Educational Psychology.** 75 (6): 848-856.

Schunk, Dale H. 1995. Self-Efficacy and Education and Instruction. In **Self-Efficacy, Adaptation, and Adjustment: Theory, Research, and Application.** James E. Maddux, ed. New York: Plenum Press. Pp. 281-303.

Schwarzer, Ralf and Fuchs, Reinhard. 1997. Changing Risk Behaviors and Adopting Health Behaviors: The Role of Self-Efficacy Beliefs. In **Self-Efficacy in Changing Societies.** Albert Bandura, ed. Cambridge: Cambridge University Press. Pp. 259-288.

Schwoerer, Catherine E.; May, Douglas R.; Hollensbe, Elaine C. and Mencl, Jennifer. 2005. General and Specific Self-Efficacy in the Context of a Training Intervention to Enhance Performance Expectancy. **Human Resource Development Quarterly.** 16 (1): 111-129.

Segal, Carmit. 2008. Classroom Behavior. **The Journal of Human Resources.** 43 (4): 783-814.

Semeijn, Judith; Boone, Christophe; van der Velden, Rolf and van Witteloostuijn, Arjen. 2005. Graduates' Personality Characteristics and Labor Market Entry an Empirical Study among Dutch Economics Graduates. **Economics of Education Review.** 24 (1): 67-83.

Semykina, Anastasia and Linz, Susan J. 2007. Gender Differences in Personality and Earnings: Evidence from Russia. **Journal of Economic Psychology.** 28 (3): 387-410.

Siegel, Ross G.; Galassi, John P. and Ware, William B. 1985. A Comparison of Two Models for Predicting Mathematics Performance: Social Learning versus Math Aptitude-Anxiety. **Journal of Counseling Psychology.** 32 (4): 531-538.

Srivastava, Sanjay; John, Oliver P.; Gosling, Samuel D. and Potter, Jeff. 2003. Development of Personality in Early and Middle Adulthood: Set Like Plaster or Persistent Change? **Journal of Personality and Social Psychology.** 84 (5): 1041-1053.

Sui-Chu, Esther Ho and Willms, J. Douglas. 1996. Effects of Parental Involvement on Eighth-Grade Achievement. **Sociology of Education.** 69 (2): 126-141.

Ter Weel, Bas. 2008. The Noncognitive Determinants of Labor Market and Behavioral Outcomes: Introduction to the Symposium. **The Journal of Human Resources.** 43 (4): 729-737.

Tesser, A. 1993. On the Importance of Heritability in Psychological Research: The Case of Attitudes. **Psychological Review.** 100 (1): 129-142.

Tett, Robert P.; Jackson, Douglas N. and Rothstein, Mitchell. 1991. Personality Measures as Predictors of Job Performance: A Meta-Analysis Review. **Personnel Psychology.** 44 (4): 703-742.

Tomer, John F. 2003. Personal Capital and Emotional Intelligence: An Increasingly Important Intangible Source of Economic Growth. **Eastern Economic Journal.** 29 (3): 453-470.

Urzua, Sergio. 2008. Racial Labor Market Gaps: The Role of Abilities and Schooling Choices. **The Journal of Human Resources.** 43 (4): 919-971.

Van Wyk, R. and Boshoff, A. B. 2003. Entrepreneurial Attitudes: What are Their Sources? **South African Journal of Economic and Management Sciences, NS.** 6 (1): 1-24.

Veerawan Sukin. 2008. The Effects of Psychological Characteristics and Working Situations on Effective Teaching Behavior of Engineering Lecturers. **Journal of Behavioral Science.** 14 (1): 1-20. (In Thai)

Verhoogen, Eric A.; Burks, Stephen V. and Carpenter, Jeffrey P. 2007. Fairness and Freight-Handlers: Local Labor Market Conditions and Wage-Fairness Perceptions in a Trucking Firm. **Industrial and Labor Relations Review.** 60 (4): 477-498.

Trochim, William M.K. 2006. Convergent & Discriminant Validity. **Research Methods Knowledge Base.** Retrieved June 23, 2012 from http://www.socialresearchmethods.net/kb/convdisc.php

Wikipedia. 2010a. **Personality psychology.** Retrieved March 10, 2010 from http://en.wikipedia.org/wiki/Personality_psychology

Wikipedia. 2010b. **Trait theory.** Retrieved September 4, 2010 from http://en.wikipedia.org/wiki/Trait_theory

Wikipedia. 2010c. **Behavior.** Retrieved March 10, 2010 from http://en.wikipedia.org/wiki/Behavior

Wikipedia. 2010d. **Habit (psychology).** Retrieved March 10, 2010 from http://en.wikipedia.org/wiki/Habit_ (psychology)

Wikipedia. 2010e. **Attitude (psychology).** Retrieved March 10, 2010 from http://en.wikipedia.org/wiki/Attitude_ (psychology)

Wikipedia. 2012a. **Affect (psychology).** Retrieved March 15, 2012 from http://en.wikipedia.org/wiki/Affect_ (psychology)

Wikipedia. 2012b. **Emotion.** Retrieved June 23, 2012 from http://en.wikipedia.org/wiki/Emotional

Wikipedia. 2012c. **Happiness.** Retrieved June 23, 2012 from http://en.wikipedia.org/wiki/Happiness

Witt, L.A.; Burke, Lisa A.; Barrick, Murray R. and Mount, Michael K. 2002. The Interactive Effects of Conscientiousness and Agreeableness on Job Performance. **Journal of Applied Psychology.** 87 (1): 164-169.

Wood, W. and Neal, D.T. 2007. A New Look at Habits and the Habit-Goal Interface. **Psychological Review.** 114 (4): 843-863.

Wooldridge, Jeffrey M. 2006. **Introductory Econometrics: A Modern Approach.** Australia: Thomson/South-Western.

Zimmerman, Barry J. 1997. Self-Efficacy and Educational Development. In **Self-Efficacy in Changing Societies.** Albert Bandura, ed. Cambridge: Cambridge University Press. Pp. 202-231.

APPENDICES

APPENDIX A

CO-DETERMINATION OF COGNITIVE AND NON-COGNITIVE SKILLS ON ECONOMIC AND SOCIAL OUTCOMES

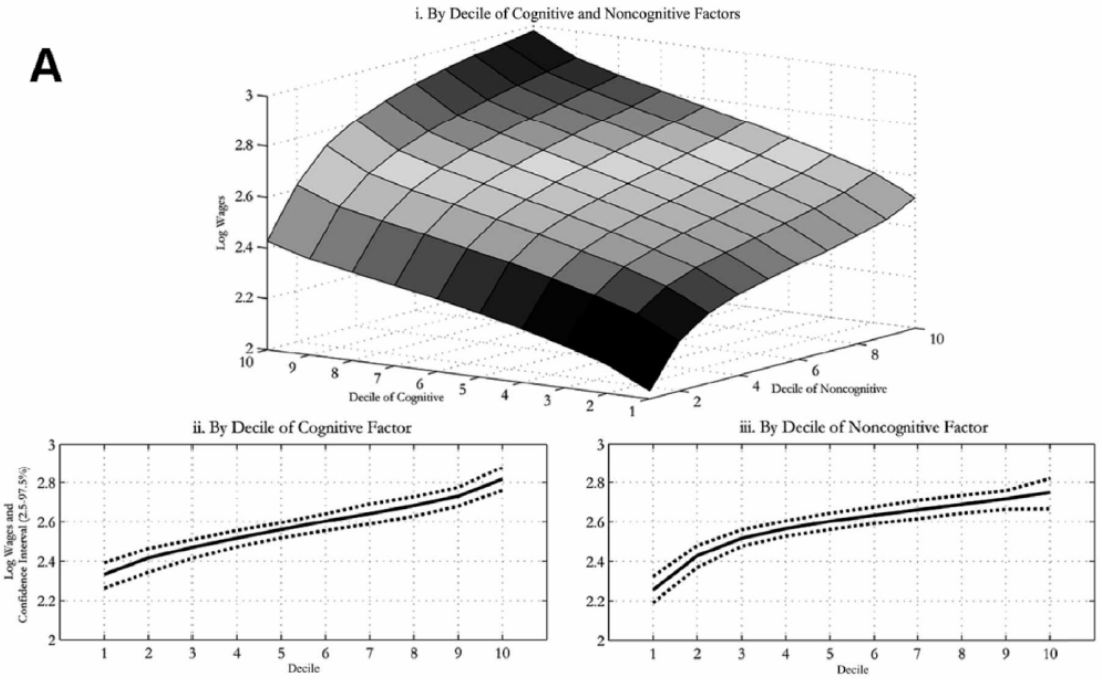


Figure A.1 Mean Log Wages by Age 30 for Males
Source: Figure 6(A) in Heckman, Stixrud and Urzua, 2006: 438.
Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

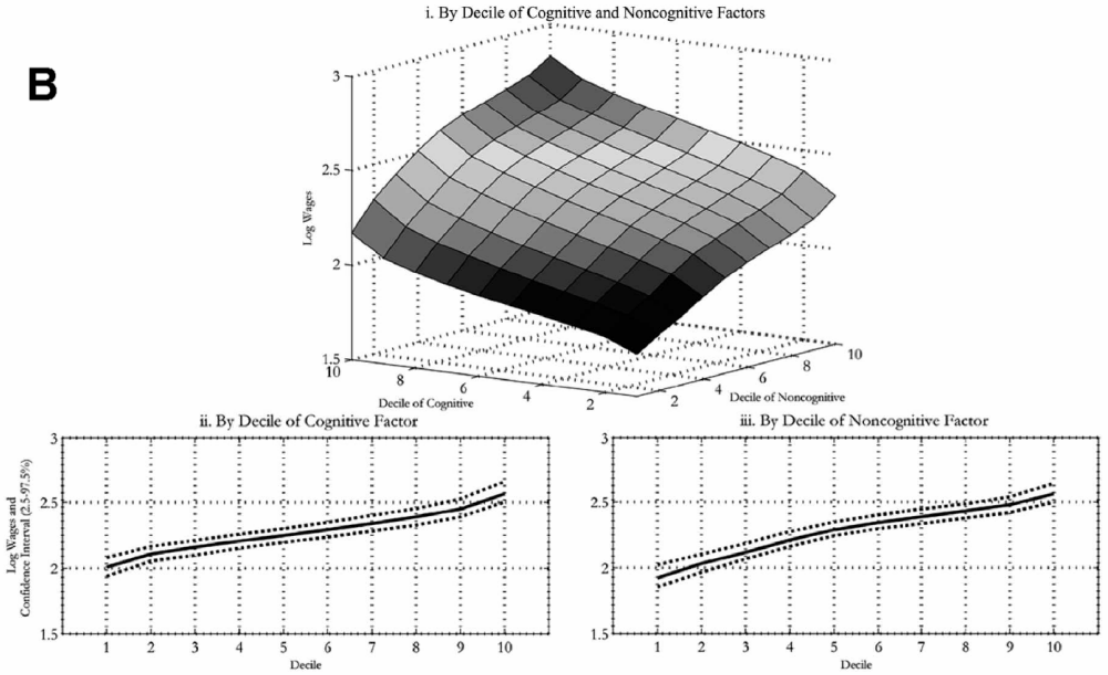


Figure A.2 Mean Log Wages by Age 30 for Females

Source: Figure 6(B) in Heckman, Stixrud and Urzua, 2006: 439.

Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

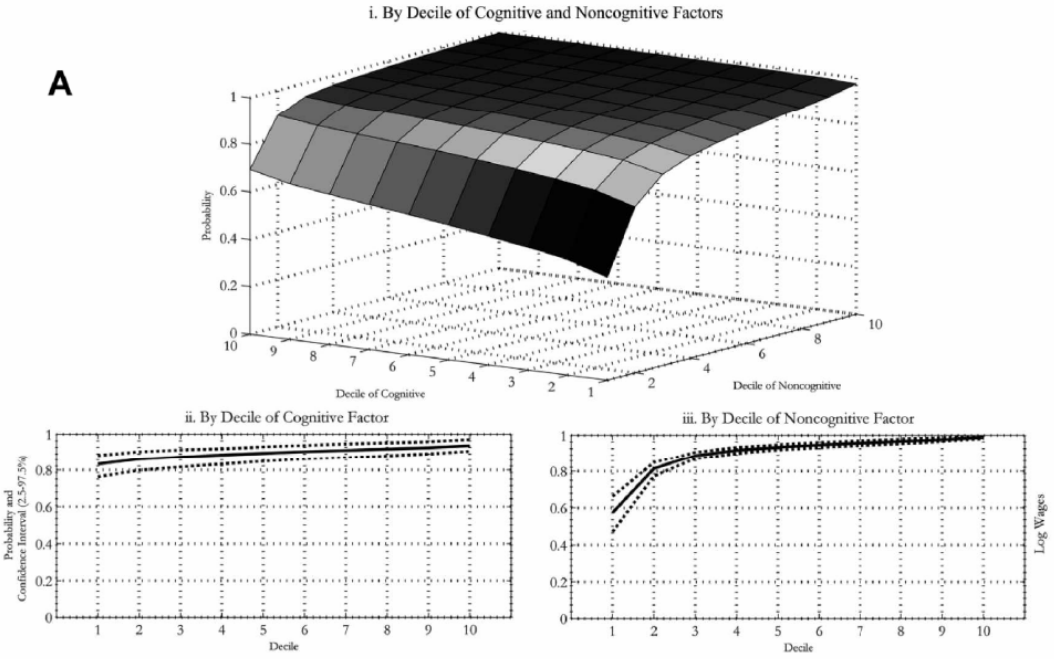


Figure A.3 Probability of Employment at Age 30 for Males

Source: Figure 13(A) in Heckman, Stixrud and Urzua, 2006: 454.

Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

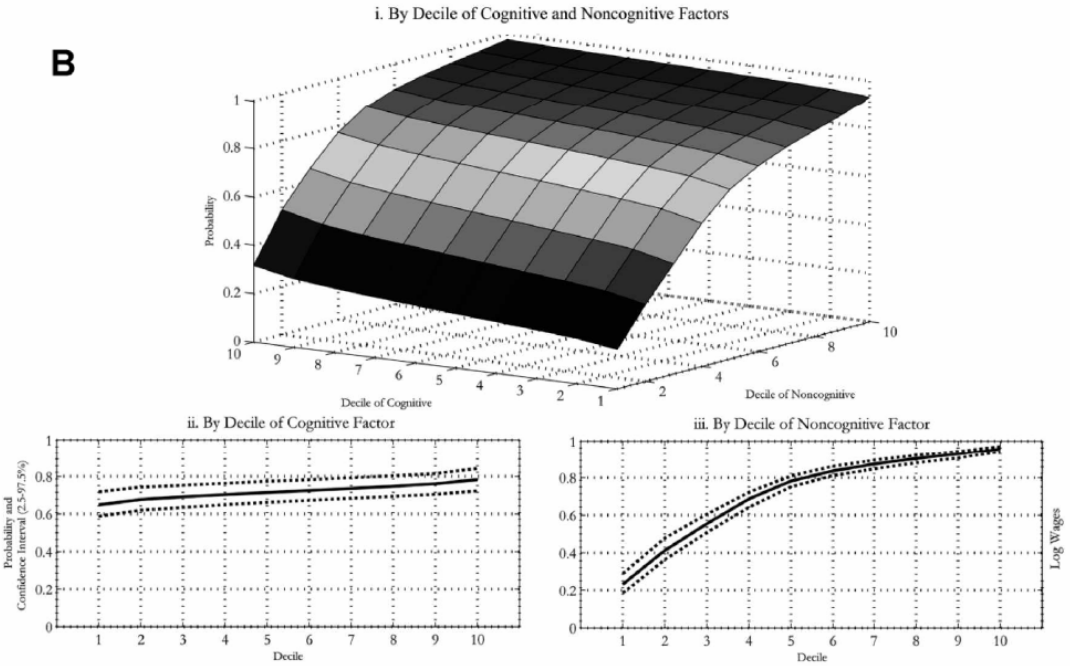


Figure A.4 Probability of Employment at Age 30 for Females

Source: Figure 13(B) in Heckman, Stixrud and Urzua, 2006: 455.

Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

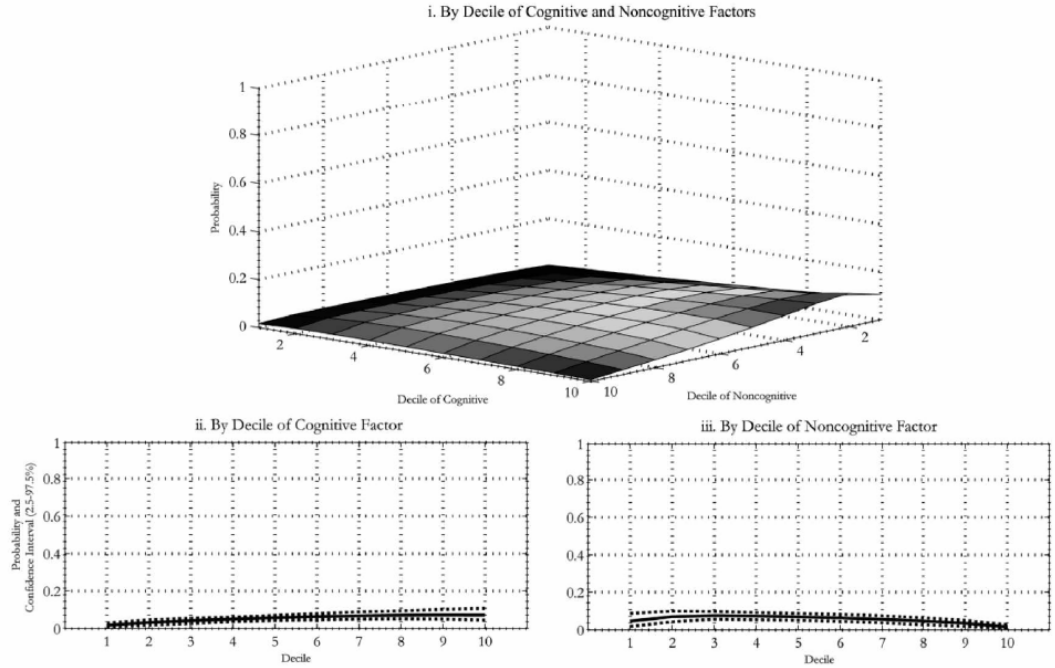


Figure A.5 Probability of Being a 2-year-college Graduate at Age 30, Males
Source: Figure 20 in Heckman, Stixrud and Urzua, 2006: 465.
Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

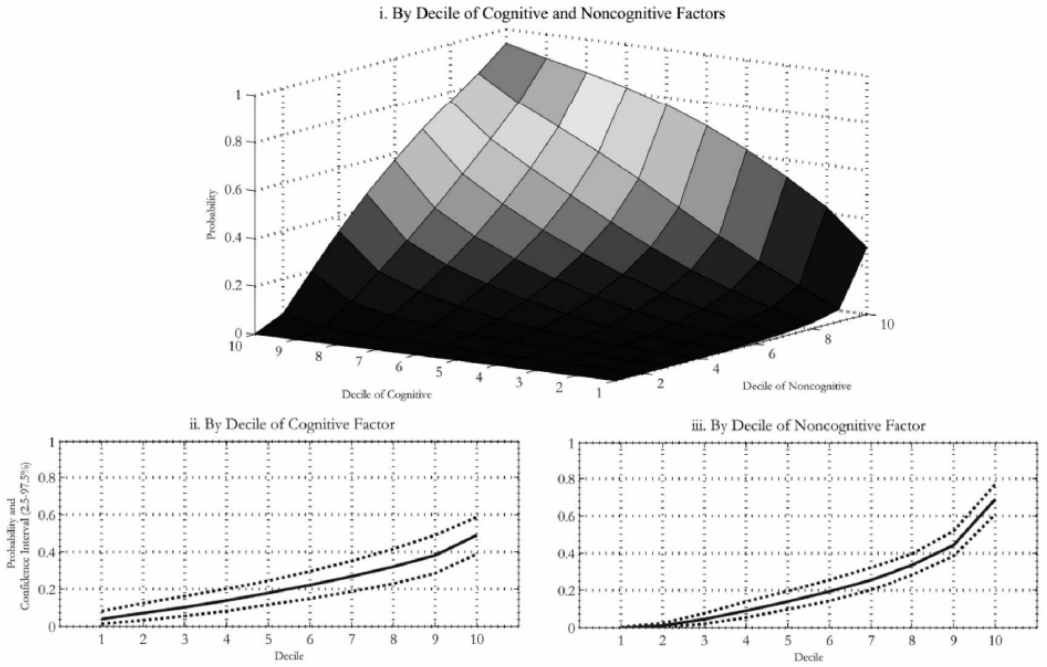


Figure A.6 Probability of Being a 4-year-college Graduate at Age 30, Males
Source: Figure 21 in Heckman, Stixrud and Urzua, 2006: 466.
Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

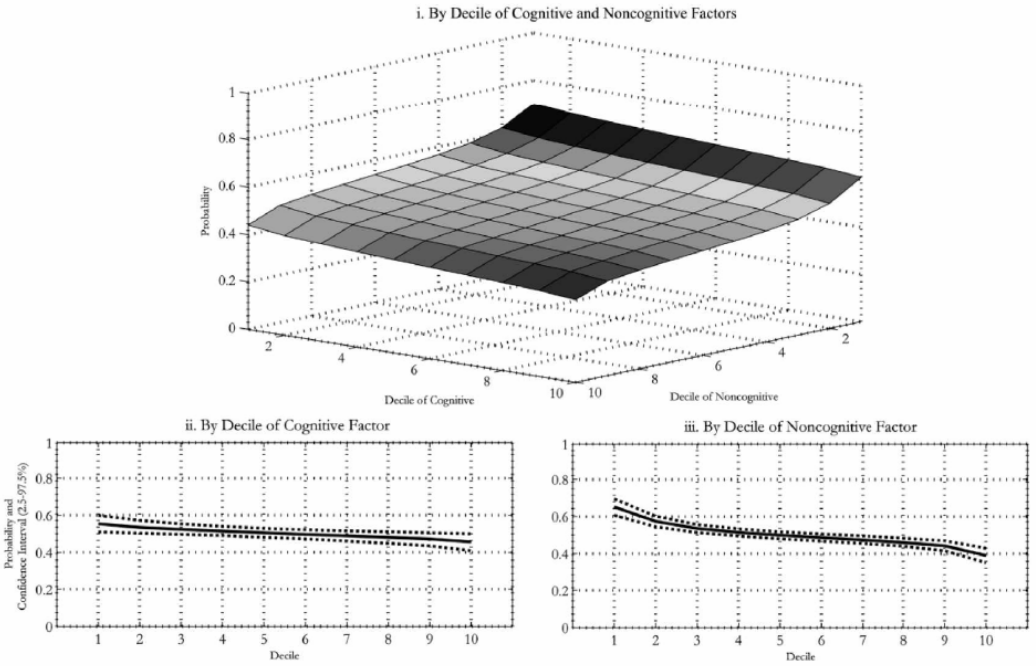


Figure A.7 Probability of Smoking Marijuana During 1979, Males
Source: Figure 23 in Heckman, Stixrud and Urzua, 2006: 470.
Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

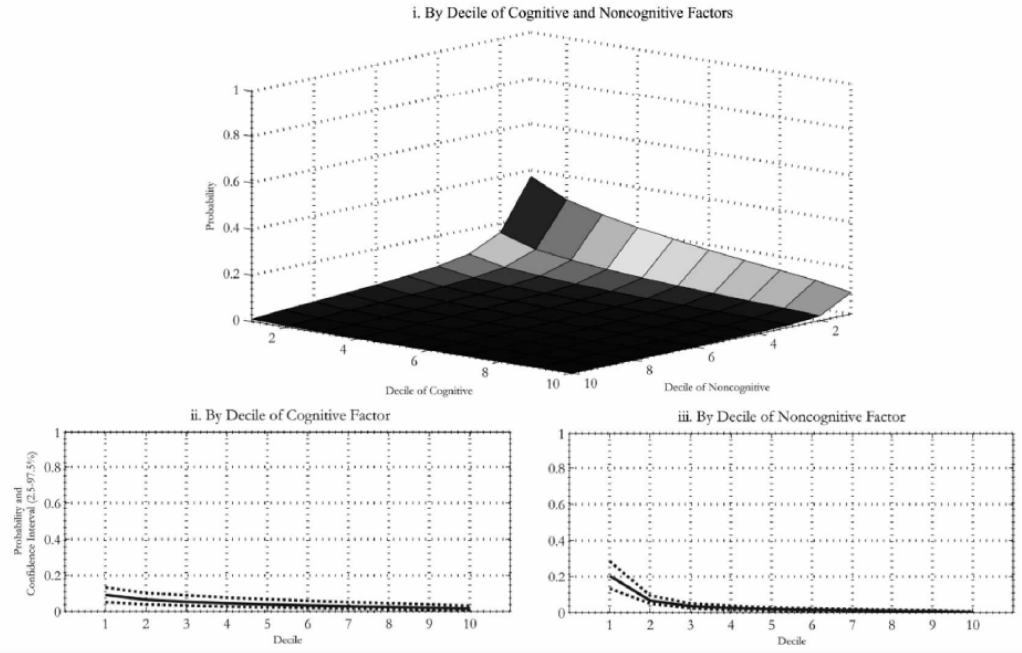


Figure A.8 Probability of Incarceration by Age 30, Males
Source: Figure 24 in Heckman, Stixrud and Urzua, 2006: 471.
Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

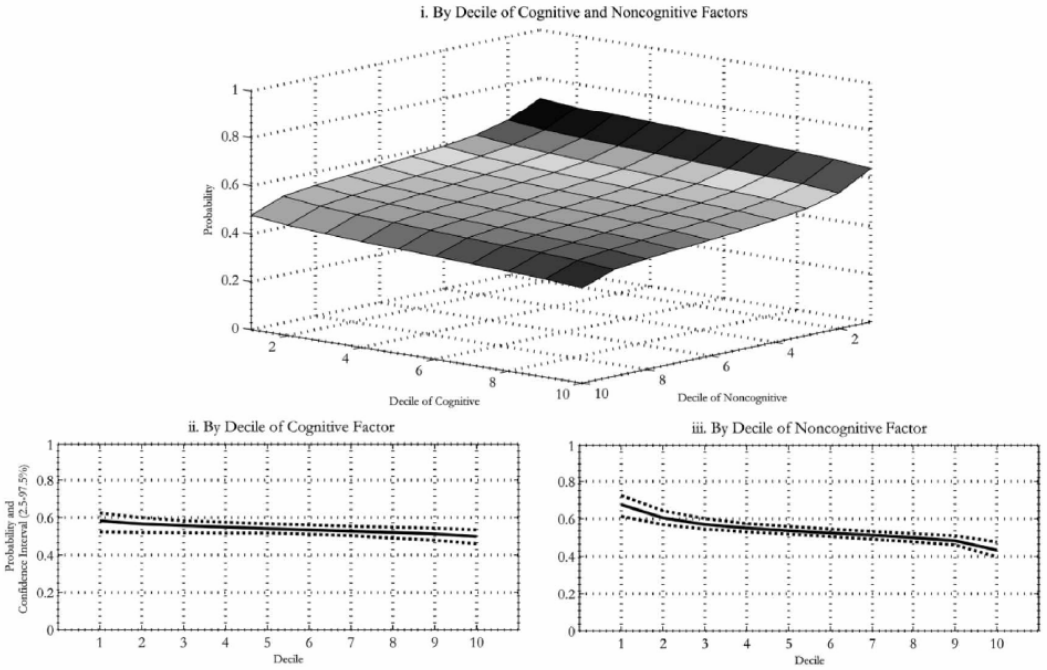


Figure A.9 Probability of Participating in Illegal Activities During 1979, Males
Source: Figure 25 in Heckman, Stixrud and Urzua, 2006: 472.
Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

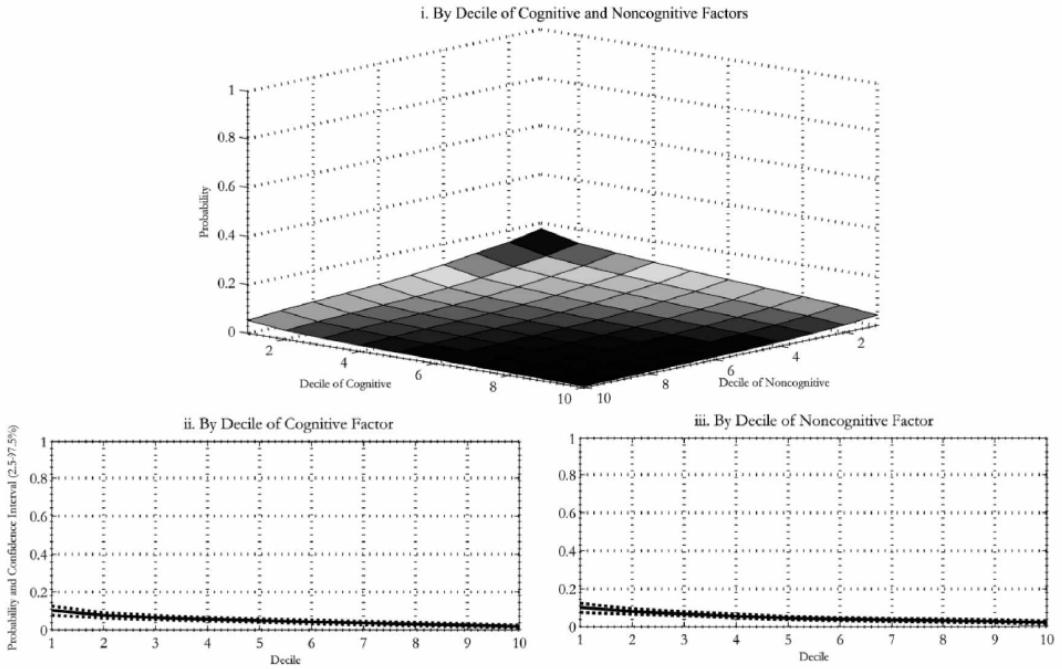


Figure A.10 Probability of Being Single with Child at Age 18, Females
Source: Figure 27 in Heckman, Stixrud and Urzua, 2006: 474.
Note: The data are simulated from the estimates of the model and NLSY79 sample. The confidence intervals are computed using bootstrapping (200 draws). Solid lines depict overall (log) wages, and dashed lines, 2.5%–97.5% confidence intervals.

APPENDIX B

DESCRIPTIVE STATISTIC

Table B.1 Descriptive Statistic

	%Obs.	Mean SE	%Female
All Samples	**18,913**	**5.64**	**49.54**
Age Groups			
15-19	2.10	5.36	40.30
20-29	20.36	5.49	51.48
30-39	30.40	5.60	51.05
40-49	27.04	5.68	49.87
50-59	16.83	5.84	45.98
60+	3.27	5.79	44.98
Religion			
Buddhist	96.03	5.64	49.71
Islam	3.36	5.61	43.15
Christian	0.61	5.85	58.62
Marital Status			
Never Married	22.53	5.59	51.03
Married	67.28	5.67	46.22
Widowed	3.81	5.54	78.36
Breakup (Divorced, Separated, Married-Unknown Status)	6.37	5.63	62.07
Educational level			
No Education	2.44	5.39	58.44
Pre-primary Education	0.01	6.00	0.00
Primary Education	31.88	5.46	47.68
Lower Secondary Education	13.75	5.50	41.12
Upper Secondary Education	16.16	5.65	41.71
Post-secondary Education	7.00	5.67	44.49
Bachelor Degree	24.64	5.89	62.19
Master Degree	3.97	6.16	50.40
Doctoral Degree	0.11	6.10	61.90
Other Education	0.04	5.38	37.50
Area of Residence			
Urban (Municipal Areas)	71.09	5.70	49.50
Rural (Non-municipal Areas)	28.91	5.51	49.64
Region			
Bangkok	9.69	5.34	50.38
Central	45.61	5.47	48.66
North	15.83	5.78	51.59
Northeast	15.66	6.13	49.86
South	13.21	5.70	49.14

Table B.1 (Continued)

	%Obs.	Mean SE	%Female
All Samples	**18,913**	**5.64**	**49.54**
Employment Status			
Government Sector	29.10	5.93	51.73
State Enterprise	2.49	5.89	26.11
Private Company	68.41	5.51	49.47
Business or Industry			
Buss01 - Agriculture, Hunting and Forestry	5.27	5.51	45.78
Buss02 - Fishery	0.70	5.58	31.58
Buss03 - Mining and Quarrying	0.30	5.63	23.21
Buss04 - Manufacturing	23.90	5.41	53.17
Buss05 - Electricity, Gas and Water Supply	1.14	5.92	20.93
Buss06 - Construction	7.24	5.67	20.44
Buss07 - Wholesale and Retail, Repairing Motor Vehicles/ Motorcycles/ Personal Goods/ Household Goods	12.89	5.54	46.00
Buss08 - Hotel and Restaurant	5.23	5.42	65.45
Buss09 - Transport, Storage and Communication	3.32	5.69	21.66
Buss10 - Financial Intermediate	2.74	5.85	58.49
Buss11 - Real Estate, Renting and Business Activities	2.84	5.53	45.35
Buss12 - Public Administration and Defence, Compulsory Social Security	13.39	5.98	36.22
Buss13 - Education	10.85	6.00	66.15
Buss14 - Health and Social Work	5.57	5.71	76.09
Buss15 - Other Activities Related to Community/Social/ Personal Service	2.95	5.55	59.14
Buss16 - Private Households with Employed Person	1.64	5.28	87.10
Buss17 - Extra-territorial Organization and Bodies	0.02	6.50	25.00
Occupation			
Occ0 - Armed Forces	0.39	6.27	8.22
Occ01 - Armed Forces	*0.39*	*6.27*	*8.22*
Occ1 - Legislators, Senior Officials and Managers	4.21	6.06	32.04
Occ11 - Legislators and Senior Officials	*0.80*	*6.19*	*23.68*
Occ12 - Corporate Managers	*2.57*	*6.02*	*34.29*
Occ13 - General Managers	*0.83*	*6.07*	*33.12*
Occ2 - Professionals	14.55	6.03	66.67
Occ21 - Physical, Mathematical and Engineering, Science Professionals	*1.01*	*6.01*	*19.90*
Occ22 - Life Science and Health Professionals	*2.57*	*6.04*	*78.03*
Occ23 - Teaching Professionals	*8.64*	*6.05*	*70.70*
Occ24 - Other Professionals	*2.32*	*5.93*	*59.36*
Occ3 - Technicians and Associate Professionals	9.44	5.76	52.04
Occ31 - Physical and Engineering Science Associate Professionals	*3.32*	*5.71*	*34.93*
Occ32 - Life Science and Health Associate Professionals	*1.18*	*5.63*	*79.46*
Occ33 - Teaching Associate Professionals	*0.24*	*5.64*	*88.89*
Occ34 - Other Associate Professionals	*4.70*	*5.84*	*55.34*
Occ4 - Clerks	10.81	5.61	67.43
Occ41 - Office Clerks	*8.79*	*5.59*	*68.25*
Occ42 - Customer Services Clerks	*2.02*	*5.69*	*63.87*

Table B.1 (Continued)

	%Obs.	Mean SE	%Female
All Samples	**18,913**	**5.64**	**49.54**
Occupation (continued)			
Occ5 - Service Workers, Shop and Market Sale Workers	12.62	5.55	54.17
Occ51 - Personal and Protective Services Workers	*7.31*	*5.60*	*47.51*
Occ52 - Models, Sales Persons and Demonstrators	*5.31*	*5.49*	*63.35*
Occ6 - Skilled Agricultural and Fishery Workers	1.96	5.49	38.11
Occ61 - Market-Oriented Skilled Agricultural and Fishery Workers	*1.96*	*5.49*	*38.11*
Occ7 - Craft and Related Trades Workers	14.77	5.59	26.89
Occ71 - Extraction and Building Trades Workers	*4.91*	*5.67*	*7.65*
Occ72 - Metal, Machinery and Related Trades Workers	*4.58*	*5.78*	*2.54*
Occ73 - Precision, Handicraft, Printing and Related Trades Workers	*1.06*	*5.29*	*46.77*
Occ74 - Other Craft and Related Trades Workers	*4.21*	*5.37*	*70.77*
Occ8 - Plant and Machine Operators and Assemblers	13.53	5.49	36.24
Occ81 - Stationary-Plant and Related Operators	*0.99*	*5.71*	*21.81*
Occ82 - Machine Operators and Assemblers	*7.25*	*5.28*	*62.58*
Occ83 - Drivers and Mobile-Plant Operators	*5.28*	*5.74*	*2.80*
Occ9 - Elementary Occupations	17.74	5.40	55.29
Occ91 - Sales and Services Elementary Occupations	*9.39*	*5.41*	*60.30*
Occ92 - Agricultural, Fishery and Related Laborers	*3.21*	*5.50*	*48.60*
Occ93 - Laborers in Mining, Construction, Manufacturing and Transport	*5.14*	*5.33*	*50.31*

Table B.2 Descriptive Statistic by Sub-Samples

	Mean	St.Dev.	Min.	Max.
All Sample (N = 18,913)				
Age	39.1	11.3	15	85
Year of education	10.5	5.0	0	23
Work Experience	22.7	13.0	0	79
Self-efficacy Index	5.64	1.76	0	9
Gender Sub-samples				
Male Sample (N = 9,543)				
Age	39.5	11.5	15	82
Year of education	10.1	4.8	0	23
Work Experience	23.3	12.9	0	72
Self-efficacy Index	5.86	1.72	0	9
Female Sample (N = 9,370)				
Age	38.8	11.1	15	85
Year of education	10.8	5.2	0	21
Work Experience	22.0	13.1	0	79
Self-efficacy Index	5.42	1.77	0	9
Employment Status Sub-samples				
Government Sector (N = 5,504)				
Age	42.6	9.9	19	80
Year of education	14.1	3.7	0	23
Work Experience	22.5	11.0	0	68
Self-efficacy Index	5.93	1.79	0	9
State Enterprise (N = 471)				
Age	43.7	9.3	21	74
Year of education	13.6	3.6	0	18
Work Experience	24.1	10.4	1	64
Self-efficacy Index	5.89	1.70	1	9
Private Company (N = 12,938)				
Age	37.5	11.6	15	85
Year of education	8.8	4.6	0	21
Work Experience	22.7	13.9	0	79
Self-efficacy Index	5.51	1.73	0	9
Occupational Sub-samples				
Armed Forces (N = 73)				
Age	43.3	9.9	22	60
Year of education	13.2	2.8	4	18
Work Experience	24.0	10.4	4	43
Self-efficacy Index	6.27	1.86	0	9
Legislators, Senior Officials & Managers (N = 796)				
Age	46.0	9.9	21	80
Year of education	14.9	3.7	0	21
Work Experience	25.1	11.0	1	64
Self-efficacy Index	6.06	1.71	0	9
Professionals (N = 2,751)				
Age	43.0	9.8	21	70
Year of education	16.1	1.4	4	23
Work Experience	20.9	9.8	0	60
Self-efficacy Index	6.03	1.73	0	9

Table B.2 (Continued)

	Mean	St.Dev.	Min.	Max.
Occupational Sub-samples (continued)				
Technicians & Associate Professionals (N = 1,785)				
Age	37.4	9.7	15	78
Year of education	13.7	3.3	0	18
Work Experience	17.7	10.8	0	68
Self-efficacy Index	5.76	1.77	0	9
Clerks (N = 2,045)				
Age	35.9	9.8	16	76
Year of education	13.5	3.2	0	18
Work Experience	16.3	10.9	0	66
Self-efficacy Index	5.61	1.76	0	9
Service Workers, Shop & Market Sale Workers (N = 2,387)				
Age	36.8	11.4	15	82
Year of education	9.8	4.3	0	18
Work Experience	20.9	13.2	0	72
Self-efficacy Index	5.55	1.77	0	9
Skilled Agricultural & Fishery Workers (N = 370)				
Age	39.9	12.0	15	68
Year of education	5.8	3.4	0	16
Work Experience	28.1	13.6	0	58
Self-efficacy Index	5.49	1.54	0	9
Craft & Related Trades Workers (N = 2,793)				
Age	38.6	11.8	15	85
Year of education	7.6	3.9	0	18
Work Experience	25.0	13.7	0	79
Self-efficacy Index	5.59	1.69	0	9
Plant & Machine Operators & Assemblers (N = 2,558)				
Age	36.3	10.2	15	76
Year of education	8.5	3.5	0	16
Work Experience	21.8	12.0	0	69
Self-efficacy Index	5.49	1.78	0	9
Elementary Occupations (N = 3,355)				
Age	41.4	12.5	15	84
Year of education	6.0	3.4	0	16
Work Experience	29.4	14.2	0	78
Self-efficacy Index	5.40	1.76	0	9

APPENDIX C

ESTIMATIONS OF SELF-EFFICACY

Table C.1 Descriptive Statistic of Instrumental Variables for Affective State

Instrument Variables	Sub-Categories	Mean (Std. Dev.)
Birth Cohorts	Current age 15-19 yrs	0.058 (0.234)
	Current age 20-29 yrs	0.118 (0.323)
	Current age 30-39 yrs	0.188 (0.390)
	Current age 40-49 yrs	0.231 (0.421)
	Current age 50-59 yrs	0.197 (0.398)
	Current age 60-69 yrs	0.116 (0.320)
	Current age 70-79 yrs	0.069 (0.254)
	Current age 80-89 yrs	0.021 (0.144)
	Current age 90-99 yrs	0.002 (0.047)
Socio-Economic Status	01 - Farm Operator	0.005 (0.067)
	02 - Farm Operator	0.010 (0.101)
	03 - Farm Operator	0.021 (0.142)
	04 - Farm Operator	0.037 (0.190)
	05 - Farm Operator	0.035 (0.184)
	06 - Farm Operator	0.018 (0.133)
	11 - Farm Operator	0.002 (0.046)
	12 - Farm Operator	0.012 (0.109)
	13 - Farm Operator	0.019 (0.136)
	19 - Fishing, Forestry, Hunting, Agricultural Services	0.017 (0.129)
	21 - Entrepreneurs	0.052 (0.222)
	22 - Entrepreneurs	0.189 (0.392)
	31 - Professional, Technical & Managerial	0.002 (0.047)
	32 - Professional, Technical & Managerial	0.119 (0.324)
	41 - Labourers	0.029 (0.169)
	42 - Labourers	0.010 (0.098)
	50 - Other Employees	0.177 (0.382)
	60 - Other Employees	0.102 (0.303)
	71 - Economically Inactive	0.135 (0.342)
	72 - Economically Inactive	0.008 (0.091)
Value of Household Physical Properties	<= 10,000 baht	0.034 (0.181)
	<= 30,000 baht	0.018 (0.133)
	<= 50,000 baht	0.046 (0.210)
	<= 100,000 baht	0.028 (0.166)
	<= 500,000 baht	0.043 (0.203)
	<= 1,000,000 baht	0.288 (0.453)
	<= 5,000,000 baht	0.226 (0.418)
	<= 10,000,000 baht	0.284 (0.451)
	> 10,000,000 baht	0.023 (0.151)

Table C.1 (Continued)

Instrument Variables	Sub-Categories	Mean (Std. Dev.)
Value of Household Financial Assets	<= 10,000 baht	0.001 (0.035)
	<= 30,000 baht	0.312 (0.463)
	<= 50,000 baht	0.241 (0.428)
	<= 100,000 baht	0.155 (0.362)
	<= 500,000 baht	0.131 (0.338)
	<= 1,000,000 baht	0.108 (0.310)
	<= 5,000,000 baht	0.032 (0.177)
	<= 10,000,000 baht	0.016 (0.125)
	> 10,000,000 baht	0.003 (0.052)
Average Monthly Total Income per Household	<= -50,000 baht	0.000 (0.011)
	<= -30,000 baht	0.000 (0.007)
	<= -10,000 baht	0.000 (0.018)
	<= 0 baht	0.001 (0.032)
	<= 10,000 baht	0.278 (0.448)
	<= 30,000 baht	0.489 (0.500)
	<= 50,000 baht	0.133 (0.340)
	<= 100,000 baht	0.079 (0.269)
	<= 500,000 baht	0.019 (0.137)
	<= 1,000,000 baht	0.001 (0.024)
	> 1,000,000 baht	0.000 (0.012)
Household Debt Problems (Binary Dummy)	Had many problems of paying bills or rent	0.009 (0.095)
	Could not borrow money	
	• for business or farm	0.060 (0.237)
	• for emergency payment	0.052 (0.223)
	HH has debt in present	0.597 (0.491)
	Borrowed or owed bills last month	
	• from formal sector	0.024 (0.154)
	• from informal sector	0.016 (0.127)
Household Composite (Binary Dummy)	No of Members age < 15 yrs	0.746 (0.931)
	No of Members age > 60 yrs	0.551 (0.759)
	No of Disabled Person	0.081 (0.346)

Note: Number of Observations is 81,019.

Table C.2 Two Estimations of Self-Efficacy from an Original Sample

Dependent Variable		**efficacy**	**efficacy**	**Mean (St.Dev.)**
Estimating Method		**OLS**	**IV**[a]	
Psychological Characters	Self-Efficacy	-	-	5.574 (0.483)
	Affective State	0.167 ***	0.141 ***	11.762 (2.217)
Female		-0.434 ***	-0.436 ***	0.564 (0.496)
Religion	Buddhist	B	B	0.951 (0.217)
	Muslim	0.081 **	0.081 **	0.043 (0.202)
	Christian	0.085	0.091	0.007 (0.081)
	Other	B	B	0.000 (0.014)
Marital Status	Never Married	B	B	0.176 (0.381)
	Married	0.019	0.019	0.678 (0.467)
	Widow	0.043	0.034	0.101 (0.301)
	Break Up	0.159 ***	0.139 ***	0.046 (0.209)
Disability	Non-disable, full capable	B	B	
	At birth	-0.037	-0.047	0.008 (0.088)
	Later	0.039	0.007	0.013 (0.114)
	Cannot take care self without assistant **only**	0.653 **	0.631 **	0.000 (0.022)
	Cannot go out without assistant **only**	-0.121 ***	-0.128 ***	0.023 (0.150)
	Cannot take care self **nor** go out without assistant	-0.032	-0.049	0.007 (0.082)
Schooling		0.029 ***	0.031 ***	7.661 (4.687)
Experience		0.018 ***	0.018 ***	32.182 (19.071)
Experience^2		0.000 ***	0.000 ***	
Employment Sectors	Employer	1.000	1.002	0.038 (0.191)
	Own-account worker	0.875	0.871	0.262 (0.440)
	Contributing family worker	0.774	0.775	0.135 (0.341)
	Government employee	0.725	0.724	0.087 (0.282)

Table C.2 (Continued)

Dependent Variable		**efficacy**	**efficacy**	**Mean (St.Dev.)**
Estimating Method		**OLS**	**IV**[a]	
Employment Sectors	State enterprise employee	0.712	0.710	0.007 (0.083)
	Private company employee	0.845	0.837	0.218 (0.413)
	Member of producers' cooperative	0.606	0.596	0.000 (0.016)
	Housewife	0.101 **	0.085 **	0.084 (0.277)
	Students	B	B	0.047 (0.212)
	Elderly person	0.005	-0.010	0.085 (0.279)
	Illness, disabled person	0.122 *	0.056	0.012 (0.110)
	Looking for a job	0.134	0.097	0.005 (0.067)
	Unemployed	0.042	0.016	0.005 (0.073)
	Others	0.246 ***	0.241 ***	0.016 (0.124)
Business/Industry	Buss01 - Agriculture, Hunting and Forestry	-0.476	-0.478	0.237 (0.425)
	Buss02 - Fishery	-0.522	-0.529	0.007 (0.085)
	Buss03 - Mining and Quarrying	-0.730	-0.717	0.001 (0.031)
	Buss04 - Manufacturing	-0.553	-0.551	0.094 (0.292)
	Buss05 - Electricity, Gas and Water Supply	-0.518	-0.514	0.003 (0.058)
	Buss06 - Construction	-0.539	-0.544	0.035 (0.185)
	Buss07 - Wholesale and Retail, Repairing Motor Vehicles/ Motorcycles/ Personal Goods/ Household Goods	-0.565	-0.565	0.148 (0.355)
	Buss08 - Hotel and Restaurant	-0.524	-0.533	0.058 (0.234)
	Buss09 - Transport, Storage and Communication	-0.505	-0.510	0.019 (0.135)
	Buss10 - Financial Intermediate	-0.438	-0.434	0.008 (0.090)
	Buss11 - Real Estate, Renting and Business Activities	-0.532	-0.530	0.012 (0.108)
	Buss12 - Public Administration and Defence, Compulsory Social Security	-0.341	-0.340	0.042 (0.200)

Table C.2 (Continued)

Dependent Variable		**efficacy**	**efficacy**	**Mean (St.Dev.)**
Estimating Method		**OLS**	**IV**[a]	
Business/Industry	Buss13 - Education	-0.403	-0.402	0.032 (0.176)
	Buss14 - Health and Social Work	-0.485	-0.481	0.017 (0.127)
	Buss15 - Other Activities Related to Community/Social/Personal Service	-0.564	-0.569	0.028 (0.165)
	Buss16 - Private Households with Employed Person	-0.580	-0.584	0.006 (0.075)
	Buss17 - Extra-territorial Organization and Bodies	B	B	0.000 (0.009)
Occupations	Occ0 - Armed Forces	B	B	0.001 (0.034)
	Occ1 - Legislators, Senior Officials and Managers	-0.121	-0.127	0.072 (0.259)
	Occ2 - Professionals	0.015	0.011	0.041 (0.199)
	Occ3 - Technicians and Associate Professionals	-0.027	-0.036	0.029 (0.168)
	Occ4 - Clerks	-0.108	-0.117	0.031 (0.172)
	Occ5 - Service Workers, Shop and Market Sale Workers	-0.062	-0.074	0.148 (0.355)
	Occ6 - Skilled Agricultural and Fishery Workers	-0.205	-0.216	0.203 (0.402)
	Occ7 - Craft and Related Trades Workers	-0.048	-0.064	0.077 (0.266)
	Occ8 - Plant and Machine Operators and Assemblers	-0.082	-0.094	0.050 (0.218)
	Occ9 - Elementary Occupations	-0.093	-0.115	0.095 (0.293)
Rural		-0.033 **	-0.033 **	0.399 (0.490)
Regions	Bangkok	B	B	0.053 (0.224)
	Central	0.106 ***	0.120 ***	0.323 (0.468)
	North	0.187 ***	0.206 ***	0.231 (0.421)
	Northeast	0.410 ***	0.427 ***	0.250 (0.433)
	South	0.313 ***	0.332 ***	0.143 (0.350)
Constant		2.909 ***	3.197 ***	

Table C.2 (Continued)

Dependent Variable	**efficacy**	**efficacy**	**Mean (St.Dev.)**
Estimating Method	**OLS**	**IV**[a]	
R^2	0.086	0.085	
Adjusted R^2	0.086	0.085	
RMSE	1.689	1.690	
N	81,019	81,019	

Note: *** p<0.01, ** p<0.05, * p<0.1; B - Baseline

[a] IV's for affective state include birth cohorts, household composite, socio-economic status, value of household physical properties and financial assets, average monthly total income per household and household financial problems

APPENDIX D

EVIDENCES OF THE NEW PARADIGMS

D.1 Ability Gaps Open Up at Early Ages

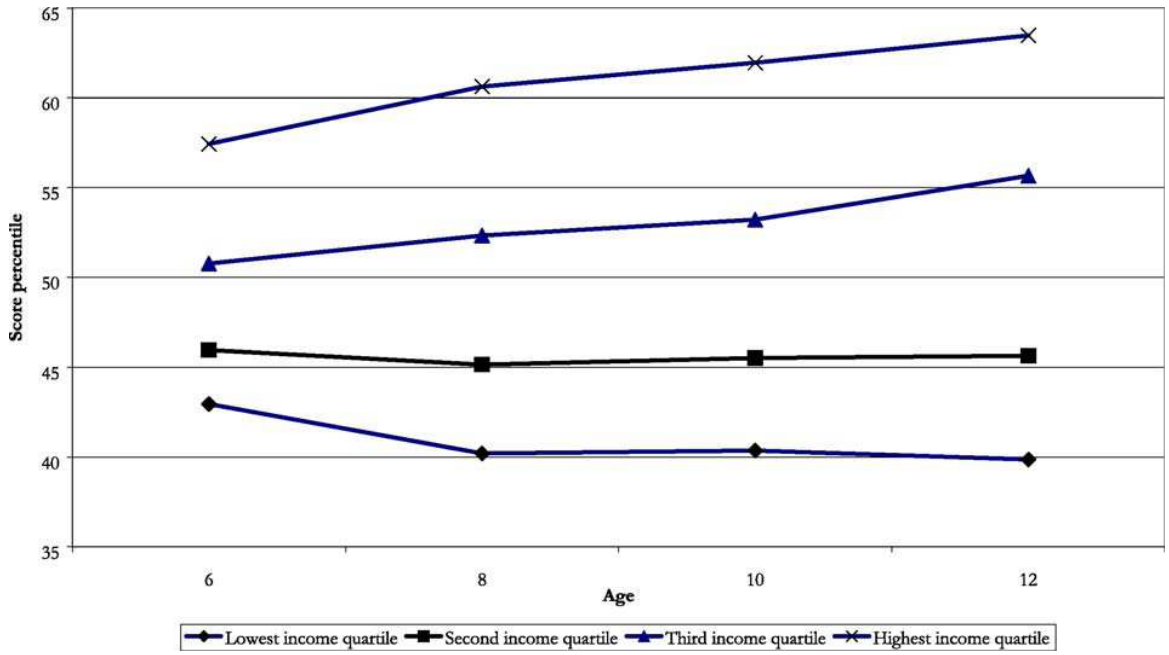


Figure D.1 Children of NLSY79, Average Percentile Rank on PIAT Math Score, by Income Quartile

Source: Figure 2A in Cunha et al., 2006: 712.

Note: Income quartiles are computed from average family income between the ages of 6 and 10

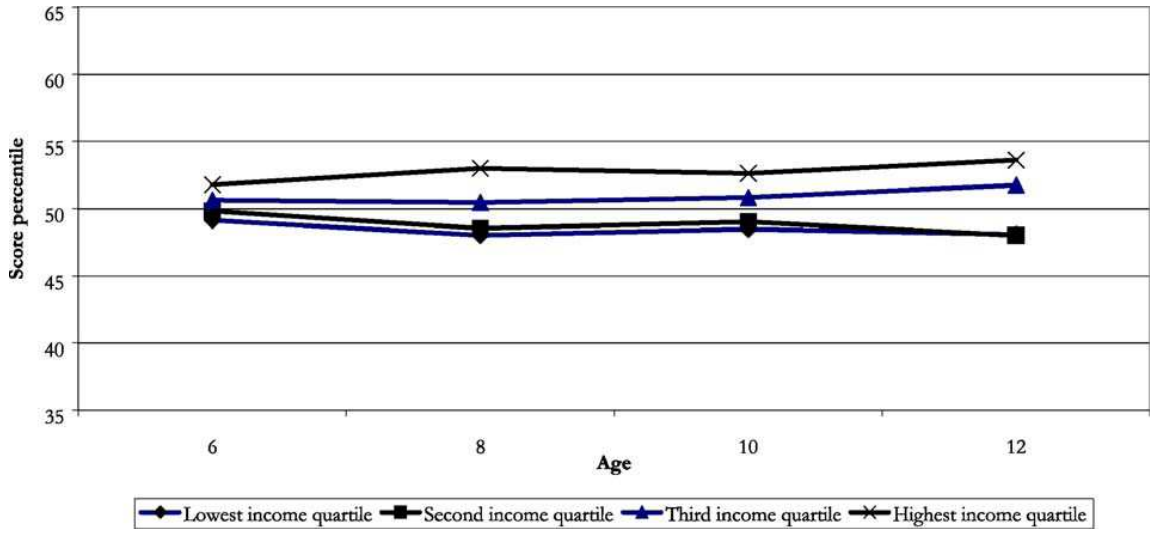


Figure D.2 Children of NLSY79, Adjusted Average PIAT Math Score Percentiles by Income Quartile

Source: Figure 3A in Cunha et al., 2006: 714.

Note: Adjusted by maternal education, maternal AFQT (corrected for the effect of schooling) and broken home at each age.

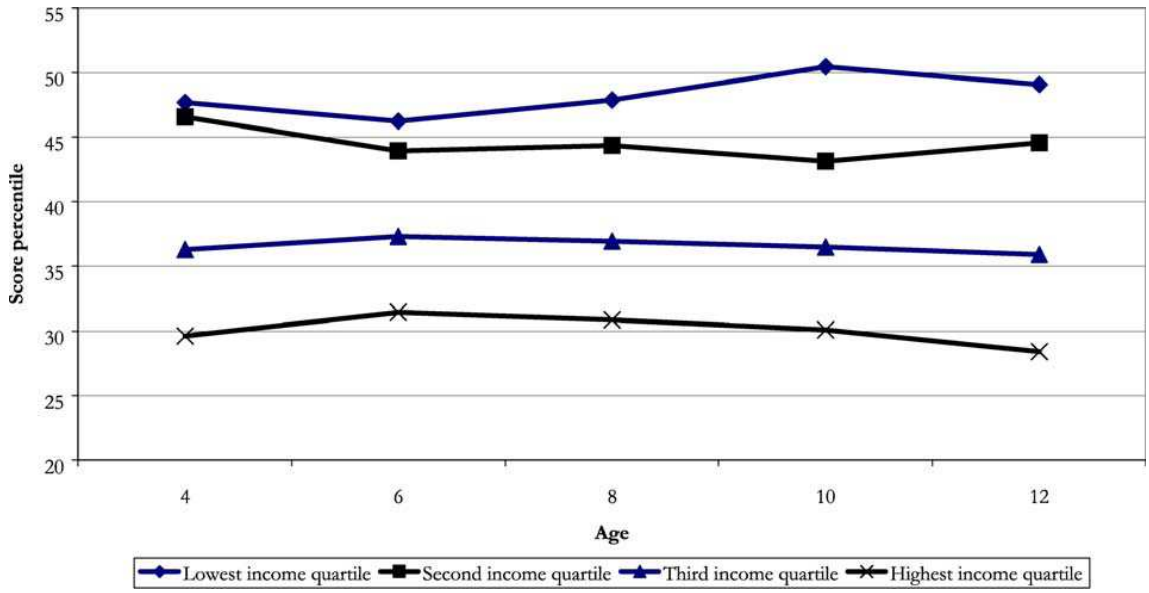


Figure D.3 Children of NLSY79, Average Percentile Rank on Anti-Social Behavior Score, by Income Quartile

Source: Figure 4A. in Cunha et al., 2006: 715.

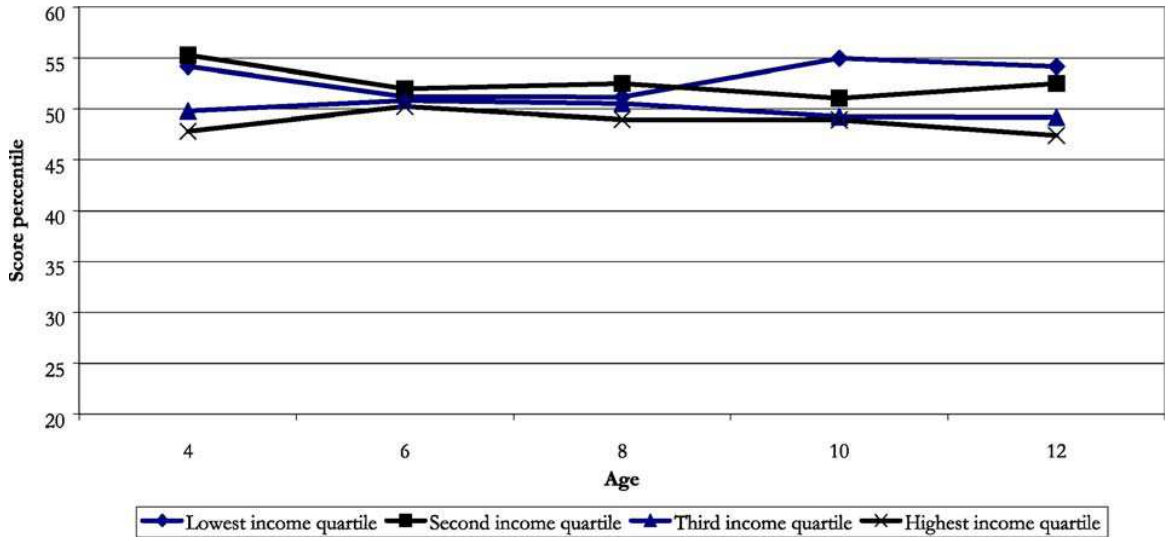


Figure D.4 Children of NLSY79, Adjusted Average Anti-Social Behavior Score Percentile by Income Quartile

Source: Figure 5A in Cunha et al., 2006: 716.

Note: Adjusted by maternal education, maternal AFQT (corrected for the effect of schooling) and broken home at each age.

D.2 Early Interventions Contribute to Performances from Childhood to Adulthood

D.2.1 Chicago Child-Parent Centre Program (CPC)

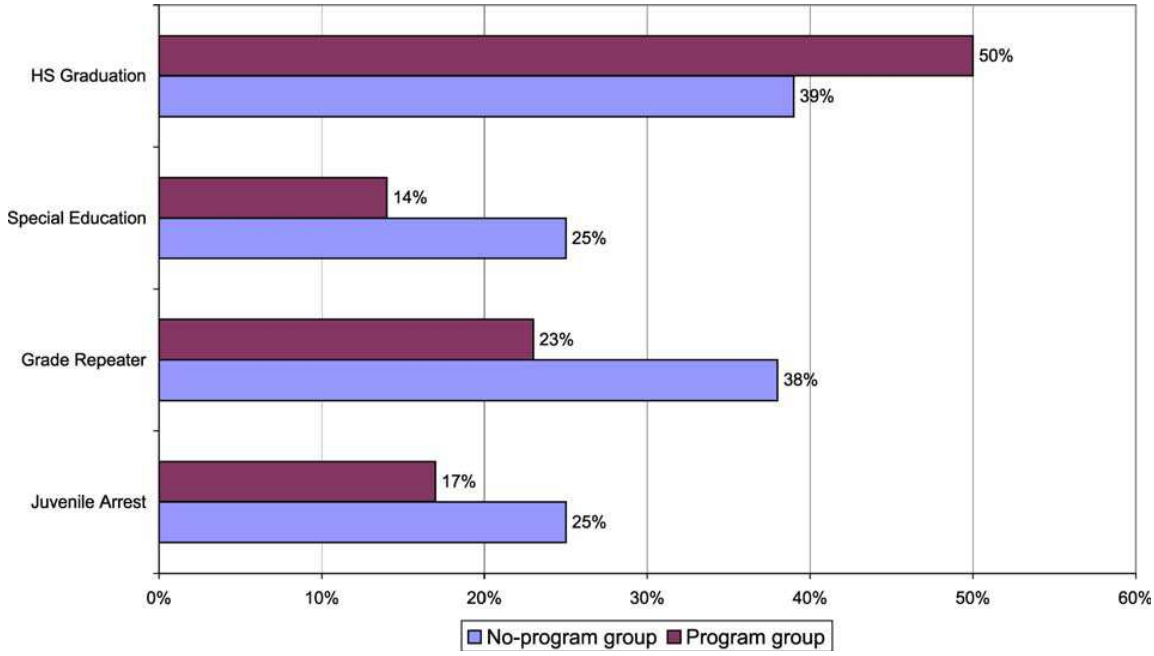


Figure D.5 Academic and Social Benefits at School Exit for CPC Participants

Source: Figure 13 in Cunha et al., 2006: 757.

D.2.2 Perry Preschool Program

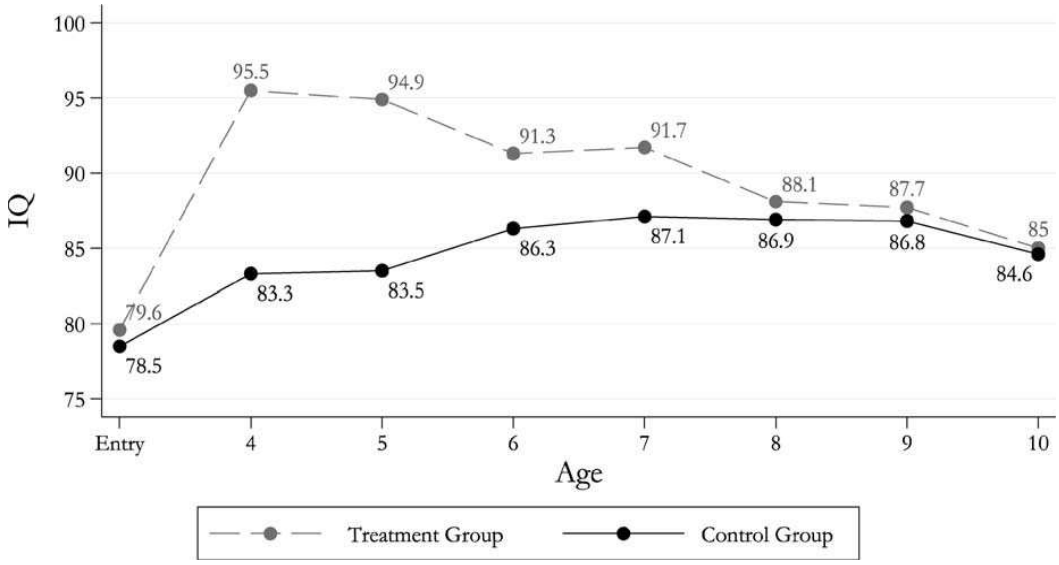


Figure D.6 Perry Preschool Program: IQ, by Age and Treatment Group

Source: Figure 14A in Cunha et al., 2006: 758.

Note: IQ measured on the Stanford–Binet Intelligence Scale. Test was administered at program entry and each of the ages indicated.

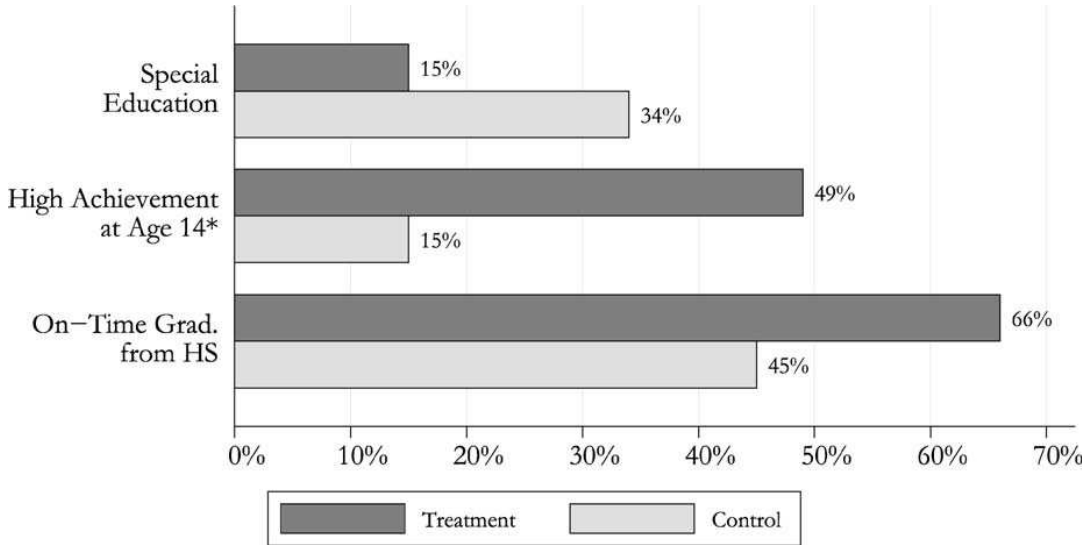


Figure D.7 Perry Preschool Program: Educational Effects, by Treatment Group

Source: Figure 14B in Cunha et al., 2006: 758.

Note: High achievement defined as performance at or above the lowest 10th percentile on the California Achievement Test.

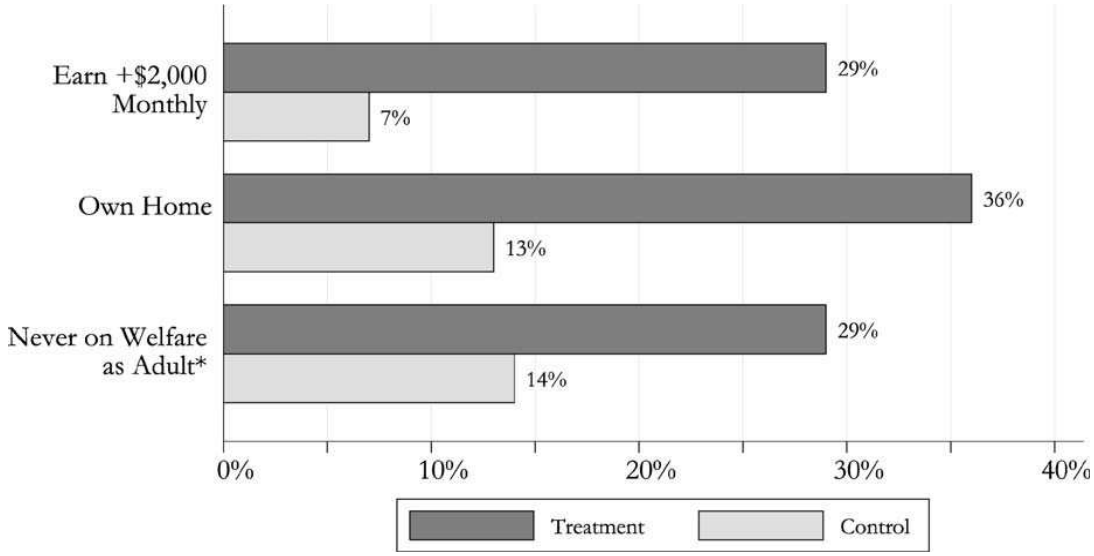


Figure D.8 Perry Preschool Program: Economic Effects at Age 27, by Treatment Group

Source: Figure 14C in Cunha et al., 2006: 759.

Note: Updated through age 40 using recent Perry Preschool Program data, derived from self-report and all available state records.

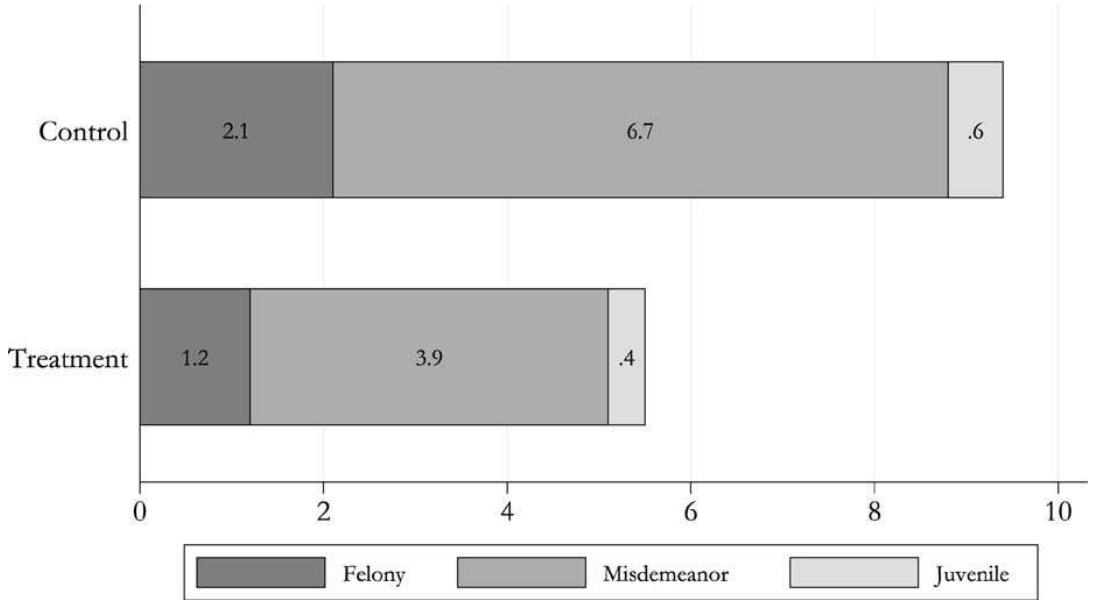


Figure D.9 Perry Preschool Program: Arrests per Person before Age 40, by Treatment Group

Source: Figure 14D in Cunha et al., 2006: 759.

Note: Juvenile arrests are defined as arrests prior to age 19.

D.2.3 Abecedarian Program

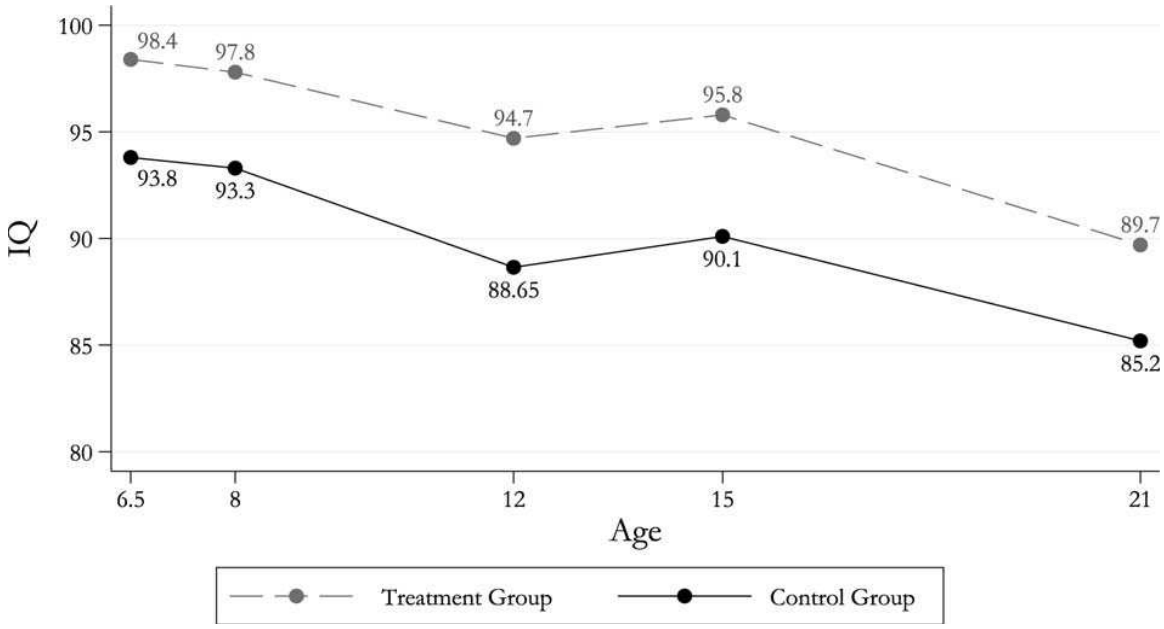


Figure D.10 Abecedarian Program: IQ, By Age and Treatment Group

Source: Figure 15A in Cunha et al., 2006: 760.

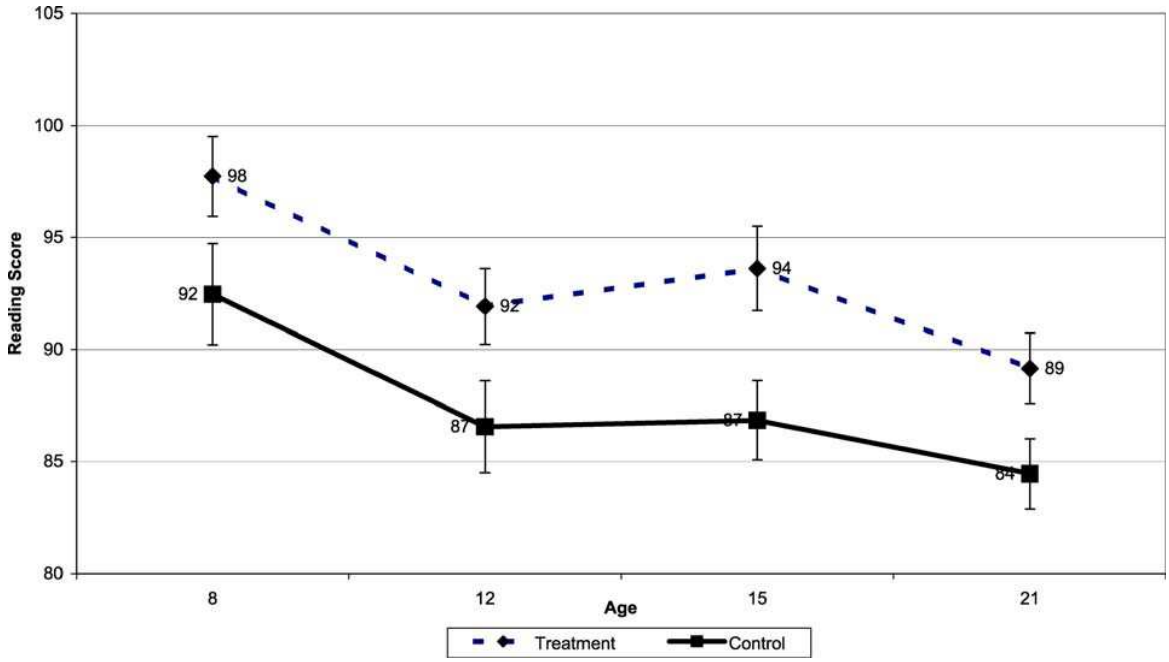


Figure D.11 Abecedarian Program: Reading Achievement over Time

Source: Figure 15B in Cunha et al., 2006: 760.

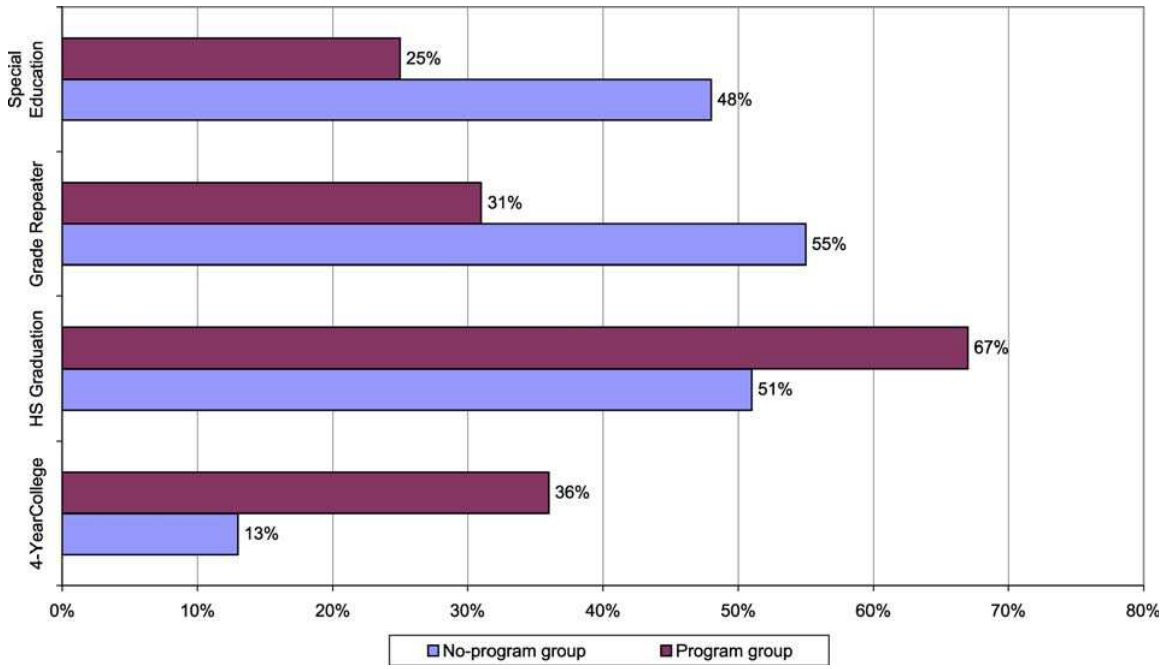


Figure D.12 Abecedarian Program: Academic Outcomes

Source: Figure 15D in Cunha et al., 2006: 761.

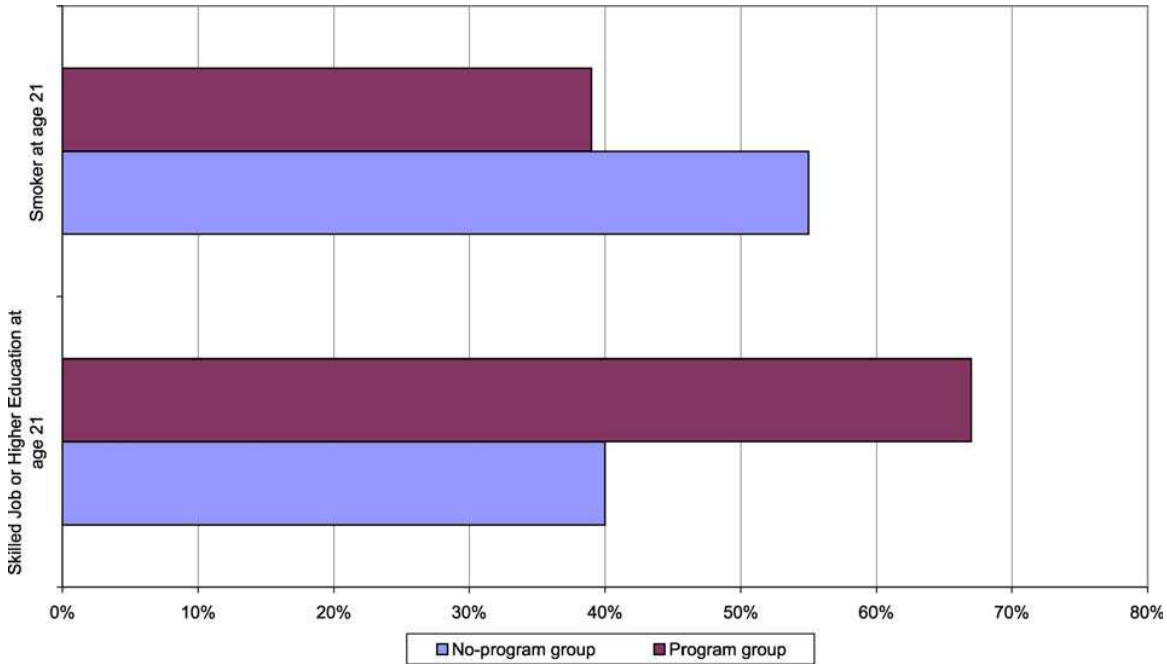


Figure D.13 Other Benefits of Abecedarian

Source: Figure 15E in Cunha et al., 2006: 762.

D.3 Late Interventions Improve Desired Personalities and Behaviours

Table D.1 Estimated Benefits of Mentoring Programs (Treatment Group Reductions Compared to Control Group)

Program	Outcome Measure	Change	Program Costs per Participant
Big Brother/Big Sister			$500 - $1500*
	Initiating drug use	-45.8%	
	Initiation alcohol use	-27.4%	
	Number of times hit someone	-31.7%	
	Number of times stole something	-19.2%	
	Grade Point Average	3.0%	
	Skipped Class	-36.7%	
	Skipped Day of School	-52.2%	
	Trust in Parent	2.7%	
	Lying to Parent	-36.6%	
	Peer Emotional Support	2.3%	
Sponsor - A - Scholar			$1485
	10th Grade GPA (100 point scale)	2.9	
	11th Grade GPA (100 point scale)	2.5	
	% Attending College (1 year after high school)	32.8%	
	% Attending College (2 years after high school)	28.1%	
Quantum Opportunity Program			
	Graduated High School or GED	+26%	
	Enrolled in 4-year college	+15%	
	Enrolled in 2-year college	+24%	
	Currently employed full time	+13%	
	Self receiving welfare	-22%	
	% ever arrested	-4%	

Source: Cunha et al., 2006: 772.

Note: *Costs, in 1996 dollars, for school-based programs are as low as $500 and more expensive community based mentoring programs cost as high as $1500.

D.4 Importance of Childrearing and Critical Periods of Developments

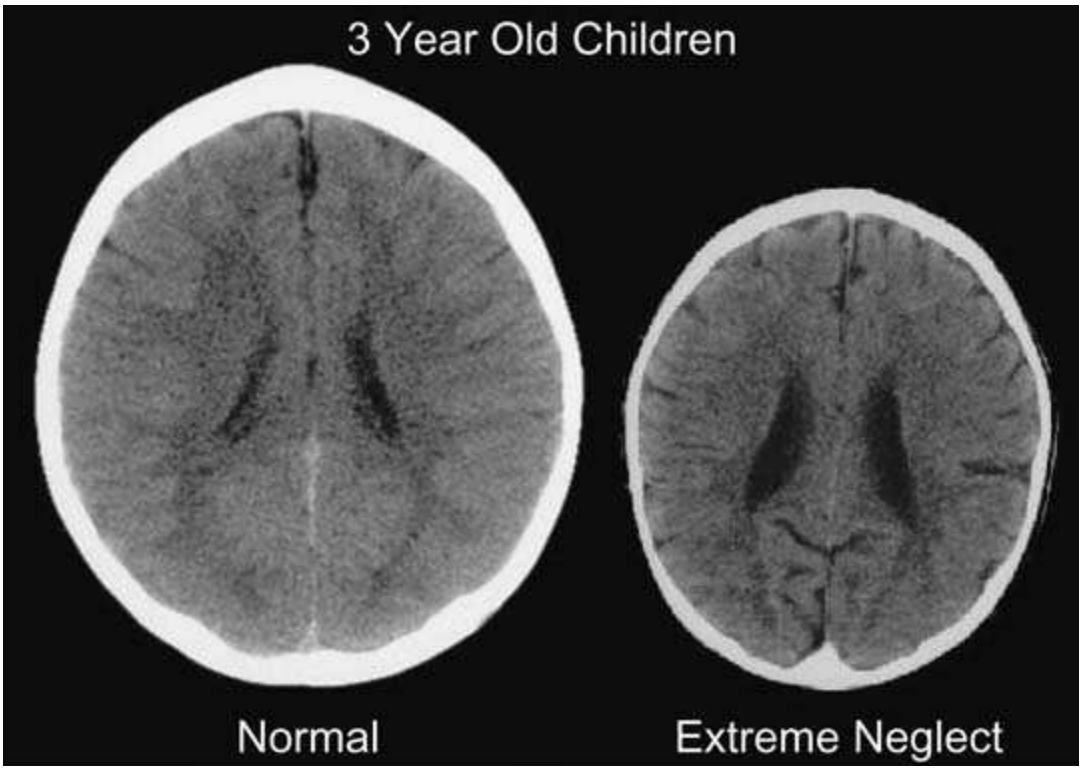


Figure D.14 Abnormal Brain Development Following Sensory Neglect in Early Childhood

Source: Figure 15 in Heckman, 2008: 308.

Note: These images illustrate the negative impact of neglect on the developing brain. The scan on the left is an image from a healthy three-year-old with an average head size (50^{th} percentile). The image on the right is from a three-year-old child suffering from severe sensory-deprivation neglect. This child's brain is significantly smaller than average (3^{rd} percentile) and has enlarged ventricles and cortical atrophy.

BIOGRAPHY

NAME	Ponlapat Rattana-Ananta (Lieutenant Colonel of the Royal Thai Army)
PRESENT POSITION (since 2003)	Lecturer, Department of Civil Engineering, Chulachomklao Royal Military Academy
ACADEMIC BACKGROUND	1998 BE (Civil) with Honours, UNSW, Australia 2000 MEngSc (Civil) UNSW, Australia 2006 MBE, NIDA, Thailand
MILITARY BACKGROUND	1996 Graduate Certificate, ADFA, Australia 1997 Graduate Certificate, RMC, Australia
EXPERIENCES	2001 - 2003: Platoon / Deputy Company Commander, 302nd Engineer Battalion