

The copyright © of this thesis belongs to its rightful author and/or other copyright owner. Copies can be accessed and downloaded for non-commercial or learning purposes without any charge and permission. The thesis cannot be reproduced or quoted as a whole without the permission from its rightful owner. No alteration or changes in format is allowed without permission from its rightful owner.



**TOTAL FACTOR PRODUCTIVITY, TECHNOLOGY TRANSFER AND  
ABSORPTIVE CAPACITY IN DEVELOPING ASIAN COUNTRIES**

**By**

**CHUAH SOO CHENG**



**UUM**  
**Universiti Utara Malaysia**

**Thesis Submitted to  
School of Economics, Finance and Banking,  
Universiti Utara Malaysia,  
Fulfillment of the Requirement for the Degree of Doctor of Philosophy**

## PERMISSION TO USE

In presenting this thesis in fulfillment of the requirements for a Post Graduate degree from the Universiti Utara Malaysia (UUM), I agree that the Library of this university may make it freely available for inspection. I further agree that permission for copying this thesis in any manner, in whole or in part, for scholarly purposes may be granted by my supervisor(s) or in their absence, by the Dean of Othman Yeop Abdullah Graduate School of Business where I did my thesis. It is understood that any copying or publication or use of this thesis or parts of it for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the UUM in any scholarly use which may be made of any material in my thesis.

Request for permission to copy or to make other use of materials in this thesis in whole or in part should be addressed to:

Dean of School of Economics, Finance and Banking

Universiti Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman



UUM  
Universiti Utara Malaysia

## ABSTRACT

Technological progress or total factor productivity (TFP) is the main factor in sustaining economic growth in the long run. As technological follower, technology transfer is the main source of technology progress in developing Asian countries. Effectiveness of technology transfer requires adequate human capabilities to absorb and adapt foreign technological knowledge. This study attempts to study the relative contribution of TFP growth to economic growth and technological absorption of human capital in the technology transfer process by looking into gender aspect at different levels of education. Solow neoclassical growth accounting method is applied to investigate the contribution of TFP growth to economic growth. The logistic technology diffusion model is used to determine the impact of human capital gender on TFP growth through dual dimensions – innovation and technology transfer for a sample of 12 developing Asian countries over the period of 1970 -2009 by using panel data pooled Ordinary Least Square (OLS), fixed/ random effects model. The growth accounting estimation supports the assimilation views that TFP growth has significantly contributed to the output growth of developing Asian countries. The empirical results indicated that the aggregate of female and male educations is significant in the technology transfer process. In terms of gender disaggregate educational levels, female and male tertiary education showed higher absorptive capacity in facilitating technology transfer. The results also showed that autonomous technology transfer has significant impact on TFP growth. This study shows the absorptive capacity of female and higher education in the technology transfer in enhancing the growth of productivity. As such, several policies may be implemented to enhance the effectiveness of technology transfer process by augmenting tertiary education, reducing the gender education disparity, enhancing the rate of female participation in labour force. Sustaining the economic growth which is based on productivity is important at accelerating the economic development of Asian developing countries.

Keywords: total factor productivity, human capital, technology transfer, absorptive capacity

## ABSTRAK

Kemajuan teknologi atau produktiviti faktor keseluruhan (*TFP*) merupakan faktor utama dalam mengekalkan pertumbuhan ekonomi dalam jangka masa panjang. Sebagai pengikut teknologi, pemindahan teknologi ialah punca utama kemajuan teknologi di negara Asia yang sedang membangun. Keberkesanan pemindahan teknologi memerlukan tahap keupayaan sumber manusia tertentu untuk menyerap dan menggunakan pengetahuan teknologi asing. Kajian ini bertujuan untuk mengkaji sumbangan relatif pertumbuhan *TFP* kepada pertumbuhan ekonomi dan kapasiti penyerapan teknologi modal insan dalam proses pemindahan teknologi dengan meninjau daripada aspek jantina di peringkat pendidikan yang berlainan. Kaedah perakaunan pertumbuhan Solow Neoklasikal digunakan untuk menyiasat sumbangan pertumbuhan *TFP* kepada pertumbuhan ekonomi. Model penyebaran teknologi logistik digunakan untuk menentukan kesan jantina insan terhadap pertumbuhan *TFP* melalui dual dimensi - inovasi dan pemindahan teknologi bagi sampel 12 negara Asia sedang membangun untuk tempoh 1970–2009 dengan menggunakan data panel *OLS* dikumpulkan, model kesan tetap/ rawak. Anggaran perakaunan pertumbuhan menyokong pandangan asimilasi bahawa pertumbuhan *TFP* telah memberikan sumbangan yang besar kepada pertumbuhan pengeluaran di negara-negara Asia sedang membangun. Daripada segi penyerapan teknologi, hasil kajian menunjukkan bahawa agregat pendidikan wanita dan lelaki agregat adalah penting dalam proses pemindahan teknologi. Tahap pendidikan daripada segi jantina dipecahkan yang menunjukkan bahawa wanita dan lelaki berkelulusan pengajian tinggi mempunyai tahap kapasiti penyerapan teknologi yang lebih tinggi dalam memudahkan pemindahan teknologi. Hasil kajian juga menunjukkan bahawa pemindahan teknologi autonomi mempunyai kesan yang besar ke atas pertumbuhan *TFP*. Berdasarkan hasil kajian ini, ia menunjukkan bahawa pendidikan wanita dan tahap pengajian tinggi adalah kapasiti penyerapan pemindahan teknologi yang penting dalam meningkatkan pertumbuhan produktiviti. Justeru itu, beberapa polisi boleh dilaksanakan untuk meningkatkan keberkesanan proses pemindahan teknologi melalui peningkatan pendidikan tertiar, mengurangkan perbezaan jurang pendidikan jantina, meningkatkan kadar penyertaan buruh wanita. Mengekalkan pertumbuhan ekonomi berasaskan produktiviti adalah juga penting dalam memacu pertumbuhan ekonomi negara Asia yang sedang membangun.

Kata Kunci: produktiviti faktor keseluruhan, modal insan, pemindahan teknologi, kapasiti penyerapan

## ACKNOWLEDGEMENT

I would like to convey great appreciation and gratitude for the following persons that have contributed to this study. Foremost, I would like to express my deepest gratitude to my supervisor, Dr. Nor Azam bin Abdul Razak for his supervision, patience and knowledge sharing. His guidance helped me a lot in the completion of this study.

I would like to thank my co-supervisor, Associate Professor Dr. Hussin bin Abdullah for his support and encouragement. My sincere thank also go to Associate Professor Dr. Sallahuddin bin Hassan for his suggestions and comments on the proposal of this study and special thanks to Associate Professor Liew Mee Lin for her comments.

My appreciation goes to Kementrian Pendidikan Malaysia and Universiti Teknologi MARA for the sponsorship of my study, Othman Yeop Abdullah Graduate School of Business, Universiti Utara Malaysia and school of Economics, Finance and Banking, University Utara Malaysia for their co-operations and assistance.

Finally, I would like to thank my husband, children and parents for their support, understanding and encouragement during my study years.

## TABLE OF CONTENT

	PAGE
<b>TITLE PAGE.....</b>	<b>i</b>
<b>CERTIFICATION OF THESIS WORK.....</b>	<b>ii</b>
<b>PERMISSION TO USE.....</b>	<b>iv</b>
<b>ABSTRACT.....</b>	<b>v</b>
<b>ABSTRAK.....</b>	<b>vi</b>
<b>ACKNOWLEDGEMENT.....</b>	<b>vii</b>
<b>TABLE OF CONTENT.....</b>	<b>viii</b>
<b>LIST OF TABLES.....</b>	<b>xi</b>
<b>LIST OF FIGURES.....</b>	<b>xiv</b>
<b>LIST OF ABBREVIATIONS.....</b>	<b>xv</b>
<b>CHAPTER ONE: INTRODUCTION .....</b>	<b>1</b>
1.1 Background of Study .....	1
1.2 A Glance at Developing Asian Countries .....	8
1.3 Problem Statement .....	22
1.4 Research Questions .....	25
1.5 Objectives of the Study .....	26
1.6 Scope of the Study.....	27
1.7 Significance of the Study .....	27
1.8 Organisation of the Study.....	30
<b>CHAPTER TWO: LITERATURE REVIEW .....</b>	<b>31</b>
2.1 Introduction .....	31
2.2 TFP and Economic Growth.....	31
2.3 Human Capital and Economic Growth .....	34
2.3.1 Human Capital Role in Theoretical Model of Economic Growth.....	35
2.3.1.1 Main Characteristics of the Solow Model.....	36
2.3.1.2 Exogenous Growth Model – The Human Capital Augmented Solow Model .....	37
2.3.1.3 Endogenous Growth Model – Human Capital Accumulation.....	38
2.3.1.4 Endogenous Growth Model – Stock of Human Capital and Technological Progress .....	39
2.4 Theoretical Framework .....	42
2.4.1 The Standard Growth Accounting Framework.....	42
2.4.2 Technological Catch-up Model.....	43
2.4.3 Confined Exponential Technology Diffusion Model.....	45
2.4.4 Logistic Model of Technology Diffusion.....	46

2.4.5	A Nested Specification .....	48
2.5	Concept of Technology Transfer .....	49
2.6	What is Human Capital?.....	50
2.6.1	Measures of Human Capital.....	51
2.7	Empirical Evidence on TFP on Asian Economies .....	52
2.8	Empirical Evidence on the Impact of Human Capital on TFP.....	56
2.8.1	Aggregate Human Capital and TFP .....	56
2.8.2	Gender Human Capital and TFP .....	62
2.9	Technology-Adopting Role of Human Capital and TFP Growth .....	66
2.9.1	Human Capital and TFP Gap .....	68
2.9.2	Human Capital and FDI .....	74
2.9.3	Human Capital and Openness .....	76
2.9.1	Human Capital and R&D .....	77
2.10	Conclusion.....	81
<b>CHAPTER THREE: METHODOLOGY .....</b>		<b>87</b>
3.1	Introduction .....	87
3.2	The Empirical Model.....	87
3.2.1	The Growth Accounting Method: The Decomposition Equation.....	87
3.2.2	Total Factor Productivity, Technology Transfer and Absorptive Capacity.....	89
3.2.2.1	Level Effect of Aggregate Human Capital.....	90
3.2.2.2	Level Effect of Gender Human Capital.....	92
3.2.2.3	Gender Composition Effect of Human Capital .....	92
3.3	Hypothesis Development .....	94
3.4	Data Measurement.....	95
3.5	Estimation Techniques .....	98
3.5.1	Orthogonalizing Normality .....	98
3.5.2	Panel Data Analysis .....	99
3.5.2.1	Pooled Ordinary Least Square (OLS) Regression.....	99
3.5.2.2	The Fixed Effects Model.....	100
3.5.2.3	The Random Effects Model.....	101
3.5.2.4	Hausman Test: Fixed Effects versus Random Effects Model.....	102
3.6	Conclusion.....	103
<b>CHAPTER FOUR: RESULTS AND DATA ANALYSIS .....</b>		<b>104</b>
4.2	Introduction .....	104
4.2	TFP Growth.....	104
4.3	Descriptive Analysis.....	109
4.4	Human Capital based Absorptive Capacity and Technology Transfer .....	113
4.4.1	Average Human Capital Level.....	114
4.4.2	Gender Aggregate Human Capital Level .....	118



4.4.3	Female Human Capital Composition .....	123
4.4.4	Male Human Capital Composition.....	131
4.5	Endogeneity Issues .....	139
4.6	Robustness Checks .....	140
4.6.1	Alternative Data Set of Human Capital Attainment .....	141
4.6.2	Include More Control Variables.....	151
4.7	Conclusion.....	161
<b>CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS.....</b>		<b>162</b>
5.1	Introduction .....	162
5.2	Summary of Findings .....	163
5.3	Policy Implications and Recommendations .....	165
5.3.1	Promote further the Growth and Contribution of TFP.....	165
5.3.2	Enhance Flow of Technology Transfer of Foreign Technologies Developed Elsewhere.....	166
5.3.3	Further Improve the Progress of the Educational Attainment.....	166
5.3.4	Encourage and Augment Tertiary Education .....	167
5.3.5	Reduce Gender Education Inequality.....	168
5.3.6	Enhance Female Labour Force Participation and Industry Employment .....	169
5.4	Recommendation for Future Research .....	170
5.4	Conclusion.....	171
<b>REFERENCES.....</b>		<b>172</b>
<b>APPENDIX.....</b>		<b>189</b>

## LIST OF TABLES

<b>Table</b>		<b>page</b>
Table 1.1	Returns to Education by Gender.....	8
Table 1.2	FDI Inflow in Developing Asian Countries, 1970–2009 (US dollar in current prices).....	11
Table 1.3	Imports of Machineries and Equipments in Developing Asian Countries, 1990 –2009.....	12
Table 1.4	Government Spending on Education as % of GDP in Developing Asian Countries, 1970 – 2010.....	13
Table 1.5	Educational Attainment of the Total Population 15 Year and Above: Developing Asian Countries, Advanced Countries and Developing Countries, 1970– 2010.....	15
Table 1.6	Educational Attainment Trends of the Total, Female and Male Population Aged 15 Years and Above: Developing Asian Countries: 1970–2010.....	18
Table 2.1	Studies on Absorptive Capacity and Technology Transfer (Based on Aggregate Data).....	82
Table 4.1	Descriptive Statistics, 1970–2009.....	110
Table 4.2(a)	Correlation Matrix: Aggregate Human Capital Level Specification.....	111
Table 4.2(b)	Correlation Matrix: Aggregate Gender-Separate Human Capital Level Specification.....	111
Table 4.2(c)	Correlation Matrix: Female Human Capital Composition Level Specification.....	112
Table 4.2(d)	Correlation Matrix: Male Human Capital Composition Level Specification.....	112
Table 4.3	TFP Growth Estimation of Aggregate Human Capital Based Absorptive Capacity, 1970–2009.....	115
Table 4.4	TFP Growth Estimation of Female and Male Human Capital Based Absorptive Capacity, 1970–2009.....	120
Table 4.5(a)	TFP Growth Estimation of Female Primary Education Based Absorptive Capacity, 1970–2009.....	125

Table 4.5(b)	TFP Growth Estimation of Female Secondary Education Based Absorptive Capacity, 1970–2009.....	127
Table 4.5(c)	TFP Growth Estimation of Female Tertiary Education Based Absorptive Capacity, 1970–2009.....	129
Table 4.6(a)	TFP Growth Estimation of Male Primary Education Based Absorptive Capacity: 1970–2009.....	132
Table 4.6(b)	TFP Growth Estimation of Male Secondary Education Based Absorptive Capacity, 1970–2009.....	134
Table 4.6(b)	TFP Growth Estimation of Male Tertiary Education Based Absorptive Capacity, 1970–2009.....	135
Table 4.7	Durbin-Wu-Hausman Test for the Endogeneity of Human Capital.....	140
Table 4.8	TFP Growth Estimation of Aggregate Human Capital Based Absorptive Capacity, 1970–2009.....	142
Table 4.9	TFP Growth Estimation of Female and Male Human Capital Based Absorptive Capacity, 1970–2009.....	143
Table 4.10(a)	TFP Growth Estimation of Female Primary Education Based Absorptive Capacity, 1970–2009.....	145
Table 4.10(b)	TFP Growth Estimation of Female Secondary Education Based Absorptive Capacity, 1970–2009.....	146
Table 4.10(c)	TFP Growth Estimation of Female Tertiary Education Based Absorptive Capacity, 1970–2009.....	147
Table 4.11(a)	TFP Growth Estimation of Male Primary Education Based Absorptive Capacity, 1970–2009.....	148
Table 4.11(b)	TFP Growth Estimation of Male Secondary Education Based Absorptive Capacity, 1970–2009.....	149
Table 4.11(c)	TFP Growth Estimation of Male Tertiary Education Based Absorptive Capacity, 1970–2009.....	150
Table 4.12	TFP Growth Estimation of Aggregate Human Capital Based Absorptive Capacity, 1970–2009.....	152
Table 4.13	TFP Growth Estimation of Female and Male Human Capital Based Absorptive Capacity, 1970–2009.....	153

Table 4.14(a)	TFP Growth Estimation of Female Primary Education Based Absorptive Capacity, 1970–2009.....	155
Table 4.14(b)	TFP Growth Estimation of Female Secondary Education Based Absorptive Capacity, 1970–2009.....	156
Table 4.14(c)	TFP Growth Estimation of Female Tertiary Education Based Absorptive Capacity, 1970–2009.....	157
Table 4.15(a)	TFP Growth Estimation of Male Primary Education Based Absorptive Capacity, 1970–2009.....	158
Table 4.15(b)	TFP Growth Estimation of Male Secondary Education Based Absorptive Capacity, 1970–2009.....	159
Table 4.15(c)	TFP Growth Estimation of Male Tertiary Education based Absorptive Capacity: 1970–2009.....	160



**UUM**  
 Universiti Utara Malaysia

## LIST OF FIGURES

Figure		page
Figure 1.1	Regional Total R&D Exepnditure (GRED) as Percentage of World R&D Expenditure, 2002, 2007 and .....	4
Figure 1.2	Developing Asia's Share of World GDP and Exports, (1980 – 2010).....	10
Figure 1.3	GDP per Capita, Developing Asian Economies versus Industrial Economies.....	14
Figure 2.1	A Monotonic Technology Model (Rogers, 2004).....	45
Figure 4.1	Contribution Shares of Economic Growth, 1970–2009.....	106
Figure 4.2	Individual Countries' Average Annual TFP Growth, 1970–2009 (percent).....	107



**UUM**  
Universiti Utara Malaysia

## LIST OF ABBREVIATIONS

TFP	Total Factor Productivity
FDI	Foreign Direct Investment
NIEs	Newly Industrialised Economies
ASEAN	Association of Southeast Asian Nations
GDP	Gross Domestic Product
ADB	Asian Development Bank
APO	Asian Productivity Organisation
ICT	Information and Communication Technology
UNESCO	United Nations Educational, Scientific and Cultural Organization
R&D	Research and Development
OLS	Ordinary Least Square
FEM	Fixed Effects Model
REM	Random Effects Model
LSDV	Least Square Dummy Variable
VIF	Variance Inflation Factor
PWT	Penn World Table
UNCTAD	United Nation Conference on Trade and Development
IIASA	International Institute for Applied Systems
VID	Vienna Institute of Demography



**UUM**  
Universiti Utara Malaysia

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of Study

One of the overriding objectives of a nation is to achieve sustained economic growth because it enables the nation to enjoy greater economic prosperity over time which, in turn, elevates the standard of living of its population. If this is the case, then what does it take to attain sustained economic growth? In the past, nations have competed with each other primarily through the political means (i.e. through the colonial power). In the modern world, however, nations choose to compete with each other mainly through the economic means (i.e. through growth-oriented policy). Smith (1776) once posed the question “what determines long-term economic growth rate and hence the prosperity of nations?” Since then, the search for the fundamental determinants of growth has become a continuing research theme.

Basically, a country’s economy grows with the combination of factors of production such as capital, labour, land and natural resources. However, economic growth is not just determined by factor accumulation alone, but also by total factor productivity (TFP) which represents the relative efficiency of a country to produce goods and services. TFP is commonly referred so as a measure for technological progress. It incorporates the impact of technological change and other factors that rise further than the quantified contribution of factor accumulation (Solow, 1957).

TFP growth is crucial for sustaining an economy’s long-run growth. A country could not sustain its growth by relying on factor accumulation alone because it is subject to diminishing marginal returns. The law of diminishing marginal returns

The contents of  
the thesis is for  
internal user  
only



## REFERENCES

- Abramovitz, M. (1986). Catching-up, forgoing ahead, and falling behind. *The Journal of Economic Theory*, 46(2), 385–406.
- Abreu, M., De Groot, H. L. F., & Florax, R. J. G. M. (2004). Spatial patterns of technology diffusion: An empirical analysis using TFP. Tinbergen Discussion Paper, no. 04-079/3. Retrieved from <http://www.tinbergen.nl/discussionpapers/04079.pdf>
- Acaroglu, H., & Ada, A. A. (2014). The relation between human capital and economic growth in MENA countries. *Journal of Public Administration and Governance*, 4(3), 205–216.
- Acemoglu, D. (2000). Technical change, inequality and the labor market. *Journal of Economic Literature*, XL, 7–72.
- Adam, S. (1776). *An inquiry into the nature and causes of the wealth of nations (1<sup>st</sup> edition)*. London: Strahan. Retrieved from 2012–12–07, volume via Google Books
- ADB. (2010). *Asian 2050: Realizing the Asian Century*. Asian Development Bank: Manila.
- ADB. (2011). *Asia 2050: Realizing the Asian century*. Manila: Philippines.
- Aghion, P., & Howitt, P. (1998). *Endogenous growth theory*. Cambridge, MA: MIT Press.
- Aghion, P., & Durlauf, S. (2007). From growth theory to policy design. Commission on Growth and Development Working Paper Series No. 57. Retrieved from <http://www.growthcommission.org/storage/cgdev/documents/gcwp057web.pdf>

- Aghion, P., & Howitt, P. (2006). Appropriate growth policy: A unifying framework. *Journal of the European Economic Association*, 4, 269–314.
- Aghion, P., Boustan, L., Hoxby, C., & Vandenbussche, J. (2009). The causal impact of education on economic growth: Evidence from United States. In Romer, D. & Wolfers, J. (Eds.), *Brookings Papers on Economic Activity: Conference Draft* (pp. 1–74). Washington: Brookings Institution.
- Ahmed, E. M. (2011). Measuring the effects of labour productivity on ASEAN5 plus 3 Economic Growth. *Journal of Business Management and Economics*, 2(2), 069–074.
- Ainuddin, N., de Carvalho, M. G., Fan, P., Kelar, G., Munder, I., & Taeb, M., (2005). Revisiting women's participation in science and technology: Emerging challenges and agenda for reform policy report 2005. Retrieved from [http://i.unu.edu/media/unu.edu/publication/28002/WomenST\\_final.pdf](http://i.unu.edu/media/unu.edu/publication/28002/WomenST_final.pdf)
- Ang, J., Madsen J. B., & Islam, M. R. (2011). The effects of human capital composition on technological convergence. *Journal of Macroeconomics*, 33(3), 465–476.
- Anna, A. L., Chandler, G. N., Jansen, E., & Mero, N. P. (1999). Women business owner in traditional and non-traditional industries. *Journal of Business Venturing*, 15, 279–303.
- Asian Development Bank. (2010). *Asian development outlook 2010 update: The future of growth in Asia*. Mandaluyong City, Philippines: Asian Development Bank.
- Asian Development Outlook 2010. (2010). *Macroeconomic management beyond the crisis*. Manila: ADB

- Azariadies, C., & Draze, D. (1990). Threshold externalities in economic development. *Quarterly Journal of Economics*, CV, 500–526.
- Bairam, E. I., & Kulkolkarn, K. (2001). Human capital, production and growth in East Asia. University of Otago Discussion Paper No. 0106. Retrieved 9 April 2012, from <http://eprints.otago.ac.nz/291/DP0106.pdf>
- Balatchandirane, G. (2007). Gender discrimination in education and economic development: As study of Asia. Visiting Research Fellow Series No.426. Retrieved from <http://www.ide.go.jp/English/Publish/Download/Vrf/pdf/426.pdf>
- Baltagi, B. H. (2005). *Econometrics Analysis of Panel Data (3<sup>rd</sup> ed.)*. West Sussex, England: John Wiley & Sons, Ltd.
- Barro, R. J., (1991). Economic growth in a cross-section of countries. *Quarterly Journal of Economics*, 106(2), 407–443.
- Barro, R. J., (2001). *Determinants of economic growth: A cross-country empirical study*. Cambridge, Mass: the MIT Press.
- Barro, R. J., (2003). Determinants of economic growth in a panel of countries. *Annals of Economics and Finance*, 4(2), 231–274.
- Barro, R. J., & Lee, J-W. (1993). International comparison of educational attainment. *Journal of Monetary Economics*, 32, 363–394.
- Barro, R. J., & Lee, J-W. (1994). Sources of economic growth. *Carnegie-Rochester Conference Series on Public Policy*, 40, 1–46.
- Barro, R. J ,& Lee, J-W. (2001). International data on educational attainment: Updates an implication. *Oxford Economic Papers*, 53(3), 541–563.
- Barro, R. J., & Lee, J-W. (2013). A new data set of educational attainment in the world, 1950 – 2010. *Journal of Development Economics*, 104 (C), 184–198.

- Barro, R. J., & Sala-i-Martin. (1997). *Economic growth*. New York: McGraw Hill.
- Bascavusoglu, E. (2004). *Patterns of technology transfer to the developing countries: differentiating between embodied and disembodied knowledge*. Harvard University, mimeo.
- Basu, S., & Weil, D. N. (1998). Appropriate technology and growth. *The Quarterly Journal of Economics*, 113(4), 1025–1054.
- Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *The Journal of Political Economy*, 70(5), Part 2, 9–49.
- Becker, G. S. (1964, 1975). *Human capital*. New York: Columbia University Press.
- Becker, G. S., Murphy, K. M., & Tamura, R. (1994). Human capital, fertility and economic growth. In *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education* (Eds.) (pp. 323–350). The University of Chicago Press.
- Benavot, A. (1989). Education, gender and economic development: A cross-national study. *Sociology of Education*, 62(1), 14–32.
- Benhabib, J., & Spiegel, M. (1994). The role of human capital in economic development evidence from aggregate cross – country data. *Journal of Monetary Economics*, 34(2), 143-173.
- Benhabib, J., & Spiegel, M. (2005). Human capital and technology diffusion. In Aghion, P., & Durlauf, S. N (Eds.), *Handbook of Economic Growth* (pp. 935–966). Amsterdam: Elsevier.
- Benovot, A. (1989). Education, gender, and economic development: A cross-national study. *Sociology of Education*, 62, 14–32.

- Bils, M., & Klenow, P. (2000). Does schooling cause growth? *American Economic Review*, 90(5), 1160–1183.
- Borensztein, E., De Gregorio, J., & Lee, J-W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, 45(1), 115–135.
- Bosworth, B., & Collins, S. M. (2008). Accounting for growth: Comparing China and India. *Journal of Economic Perspective*, 22(1), 45–66.
- Bosworth, B., & Collins, S. M. (2003). The empirics of growth: An update. *Brooking Paper on Economic Activity*, 34(2), 113–206.
- Busse, M., & Nunenkamp, P. (2009). Gender disparity in education and the international composition for foreign direct investment. *Feminist Economics*, 15(3), 61–90.
- Campos, N. F., & Kinoshita, Y. (2002). Foreign direct investment as technology transferred: Some panel evidence from the transition economies. *Manchester School*, 70(3), 398–419.
- Carl, E. P. (1985). Private sector research and technology transfer in Asian agriculture: Report on phase 1 aid grant OTR-0091-G-SS-4195-00. Economic Development Center, Bulletin number 85-5. Retrieved from [http://pdf.usaid.gov/pdf\\_docs/pnabe694.pdf](http://pdf.usaid.gov/pdf_docs/pnabe694.pdf)
- Caselli, F., & Esquivel, G., & Lefort, F. (1996). Reopening the convergence debate: A new look at cross-country growth empirics. *Journal of Economic Growth*, 1(3), 363–389.

- Casseli, F., & Coleman, H. W., J. (2001). The U.S. structural transformation and regional convergence: A reinterpretation. *Journal of Political Economy*, 109(3), 584–616.
- Caselli, F., (2005). Accounting for cross-country income differences. In Agion, P., & Durflauf, S. N. (Eds.), *Handbooks of Economic Growth* (pp.679–741). Amsterdam: Elsevier.
- Coe, D., Helpman, E., & Hoffmaister, A. (1997). North-South spillovers. *Economic Journal*, 107(440), 134–149.
- Cohen, D., & Soto, M. (2007). Growth and human capital: Good data, good results. *Journal of Economic Growth*, 12(1), 51–76.
- Collins, S. M., & Bosworth, B. (1996). Economic growth in East Asia: Accumulation versus assimilation. *Brookings Papers on Economic Activity*, 2, 135–203.
- Cortright, J. (2001). New growth theory, technology and learning: A practitioner guide. *Reviews of Economic Development Literature and Practice* No. 4. Retrieved from <http://www2.stat.unibo.it/mazzocchi/macroeconomia/Growth.pdf>
- Crespo-Cuaresma, J., Foster, N., & Scharier, J. (2008). Barriers to technology adoption, international R&D spillovers and growth. *Economic Bulletin*, 3, 1–7.
- Crispolti, V., & Marconi, D. (2005). Technology transfer and economic growth in developing countries: An econometric analysis. (Temi di discussione del Servizio Studi No. 564). Retrieved from [http://www.bancaditalia.it/pubblicazioni/econo/temidi/td05/td564\\_05/td564en/en\\_tema\\_564.pdf](http://www.bancaditalia.it/pubblicazioni/econo/temidi/td05/td564_05/td564en/en_tema_564.pdf)

- Danquah, M., Quattara, O., & Speight, A. (2014). Productivity growth, human capital and distance to frontier in Sub-Saharan Africa. *Africa Journal of Economic Development*, 39(4), 27–48.
- De Jong, A., & Tsiachristas, A. (2008). *Can labor force participation growth and productivity growth be combined?* Spring Review by the SYSDERM Correspondent for the Netherlands. Retrieved from [http://www.google.com.my/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCAQFjAA&url=http%3A%2F%2Fwww.ape.nl%2Finclude%2FdownloadFile.asp%3Fid%3D10&ei=a\\_NmVIMmlai5BLilgKAH&usg=AFQjCNGR9jgYBD-4muZJK0y75VUtQ5Kr3g&bvm=bv.79142246,d.c2E](http://www.google.com.my/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCAQFjAA&url=http%3A%2F%2Fwww.ape.nl%2Finclude%2FdownloadFile.asp%3Fid%3D10&ei=a_NmVIMmlai5BLilgKAH&usg=AFQjCNGR9jgYBD-4muZJK0y75VUtQ5Kr3g&bvm=bv.79142246,d.c2E)
- De la Fuente, A., & Domenech, R. (2006). Human capital in growth regressions: How much differences does data quality make? *Journal of the European Economic Association*, 4(1), 1–36.
- Denison E. F. (1979) *Accounting for slower economic growth: The United States in the 1970s*. Washington, DC: Brookings Institution.
- Di Liberto, A., Pigliaru, F., & Chelucci, P. (2011). International TFP dynamics and human capital stocks: A panel data analysis, 1960–2003. *Review of Income and Wealth*, 57(1), 156–182.
- Dollar, D., & Gatti, R. (1999). Gender inequality, income and growth: Are good times good for women? Policy Research Report on Gender and Development Working Paper Series No. 1. Retrieved from <http://siteresources.worldbank.org/INTGENDER/Resources/wp1.pdf>
- Doms, M., Dunne, T., & Troske, K. (1997). Workers, wages and technology. *The Quarterly Journal of Economics*, 112(1), 253–290.

- Easterly, W., & Levine, R. (2001). It's not factor accumulation: Stylized facts and growth models. *World Bank Economic Review*, 15, 177–219.
- Eaton, J., & Kortum, S. (1996). Measuring technology diffusion and the international sources of growth. *Eastern Economic Journal*, 22, 401–410.
- Eaton, J., & Kortum, S. (1999). International patenting and technology diffusion: theory and evidence. *International Economic Review*, 40(3), 537-570.
- Elborgh-Woytek, K., Newiak, M., Kochhar, K., Fabrizio, S., Kpodar, K., Wingender, P.,... Schwartz, G. (2013). Women, work, and the economy: Macroeconomic gains from gender equity. IMF Staff Discussion Note SDN/13/10. Retrieved from <https://www.imf.org/external/pubs/ft/sdn/2013/sdn1310.pdf>
- Engelbrecht, H. J. (1997). International R&D spillovers, human capital and productivity in OECD economies: An empirical investigation. *European Economic Review*, 41, 1479–1488.
- Engelbrecht, H. J. (2002). Human capital and international knowledge spillovers in TFP growth of a sample of developing countries: An exploration of alternative approaches. *Applied Economics*, 34, 831–841.
- Etzkowitz, H., Gupta, N. & Komelgor, C. (2010). The gender revolution in science and technology. *Journal of International Affairs*, 64(1), 83–89.
- Fagerberg, J. (1994). Technology and international differences in growth rates. *Journal of Economic Literature*, XXXII, S1147–S1175.
- Felipe, J. (1997). Total factor productivity growth in East Asia: A critical survey. Asian Development Bank Paper, no. 65. Retrieved from <https://ideas.repec.org/p/fth/asdbed/65.html>



- Fernandez-Arias, E., Rodolfo M., & Juan S. B. (2005). Why Latin America is falling behind. (pp. 3–54) in Eduardo Fernandez-Arias, Rodolfo Manuelli, and Juan Blyde (eds.), *Sources of Growth in Latin America: What is Missing?* Washington, D.C.: Interamerican Development Bank.
- Foster, A. D., & Rosenzweig, M. (1996). Technical change and human capital returns and investments: Evidence from the green revolution. *American Economic Review*, 86, 931–953.
- Frobes, K. J. (1998). A reassessment of the relationship between inequality and growth. *American Economic Review*, 90(2000), 869 – 887.
- Gemmell, N. (1996). Evaluating the impacts of human capital stocks and accumulation on economic growth: Some new evidence. *Oxford Bulletin of Economics and Statistics*, 58(1), 9–28.
- Gerschenkron, A. (1962). *Economic backwardness in historical perspective*. Cambridge: Balknap Press of Harvard University Press.
- Gollin, D. (2002). Getting income shares right. *Journal of Political Economy*, 110(2), 458–474.
- Griffith, R., Redding, S., & Van Reenen, J. (2003). R&D and absorptive capacity: theory and empirical evidence. *Scandinavian Journal of Economics*, 105(1), 99–118.
- Griffith, R., Redding, S., & Van Reenen, J. (2004). Mapping the two faces of R&D: productivity growth in a panel of OECD industries. *Review of Economic and Statistics*, 86(4), 883–895.
- Grossman, G. M., & Helpman, E. (1991). Trade, innovation, and growth. *The American Economic Review*, 80(2), 86–91.

- Grossman, G. M., & Helpman, E. (1991). Trade, knowledge spillovers, and growth. *European Economic Review*, 35(2-3), 517–526.
- Ha, J., Kim, Y. J., & Lee, J. W. (2009). Optimal structure of technology adoption and creation: Basic versus development research in relation to the distance from the technological frontier. *Asian Economic Journal*, 23(2), 373–395.
- Haggard, S., & E. Kim (1997) The sources of East Asia's economic growth. *Access Asia Review*, 1(1), 35–72.
- Hall, R. E. & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others? *The Quarterly Journal of Economics*, 114(1), 83–116.
- Hanushek, E. A., & Woessmann. (2011). How much do educational outcomes matter in OECD countries? *Economic Policy*, 26(67), 427–491.
- Harberger, A. (1978). Perspectives on capital and technology in less developed countries. In M. J. Artis and A. R. Nobay (Eds.), *Contemporary Economic Analysis* (p.42–72). London: Croom Helm.
- Hassan, G. M., & Cooray, A. (2013). Effects of male and female education on economic growth: Some evidence from Asia using the extreme bounds analysis. Working Papers in Economics 13/10. Retrieved from <ftp://mngt.waikato.ac.nz/RePEc/wai/econwp/1310.pdf>
- Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica*, 46(6), 1251–1271.
- Hayami, Y., & Ruttan, V. W. (1971). *Agricultural development: An international perspective*. The Johns Hopkins University Press: Baltimore.

- Heston, A., Summers, R., & Aten, B. (2012). *Penn World table version 7.1*. Retrieved from [http://pwt.econ.upenn.edu/php\\_site/pwt\\_index.php](http://pwt.econ.upenn.edu/php_site/pwt_index.php)
- Hoekman, B. M., Maskus, K. E., & Saggi, K. (2005). Transfer of technology to developing countries: Unilateral and Multilateral policy options. *World Development*, 33(10), 1587–1602.
- Holz, C. A. (2006). *Measuring Chinese productivity growth, 1952–2005*. Mimeo, Social Science Division, Hong Kong University of Science and Technology. Retrieved 30 May 2013, from <http://dx.doi.org/10.2139/ssrn.928568>
- Howitt, P., & Mayer-Foulkes, D. (2005) R&D, implementation, and stagnation: A Schumpeterian theory of convergence clubs. *Journal of Money, Credit and Banking*, 37(1), 147–177.
- Howitt, P. (2000). Endogenous growth and cross-country income differences. *The American Economic Review*, 90(4), 829–846.
- Hsiao, C. (1986). *Analysis of panel data*. Cambridge University Press: Cambridge.
- Hsieh, C-T. (2002). What explains the industrial revolution in East Asia? Evidence from the factor markets. *American Economic Review*, 92(3), 502–526.
- Islam, N. (1995). Growth empirics: A panel data approach. *The Quarterly Journal of Economics*, 110(4), 1127–1170.
- Islam, M. R. (2009). R&D intensity, technology transfer and absorptive capacity. (Monash Economics Working Paper 13-09). Retrieved from Department of Economics, Monash University website: [www.buseco.monash.edu.au/eco/.../2009/1309intensityislam.pdf](http://www.buseco.monash.edu.au/eco/.../2009/1309intensityislam.pdf)

- Iwata, S., Khan, M., & Murao, H. (2003). Sources of economic growth in East Asia: A nonparametric analysis. *International Monetary Fund Staff Papers*, 50(2), 157–177.
- Jones, C. I. (1995). R&D based models of economic growth. *Journal of Political Economy*, 137, 759–784.
- Judson, R. (2002). Measuring human capital like physical capital: What does it tell us? *Bulletin of Economic Research*, 54(3), 209–231.
- Kalaitzidakis, P., Mamuneas, T. P., Savvides, A., & Stengos, T. (2001). Measures of human capital and nonlinearities in economic growth. *Journal of Economic growth*, 6, 229–254.
- Keller, R. T. (1994). Technology-information processing fir and the performance of R&D project group: A test of contingency theory. *Academy of Management Journal*, 37(1), 167–179.
- Keller, W. (1996). Absorptive capacity: On the creation and acquisition of technology in development. *Journal of Development Economics*, 49(1), 199–227.
- Keller, W. (2004). International technology diffusion. *Journal of Economic Literature*, 42 (3), 752–782.
- Kim, J-I., & Lau L-J. (1994). The sources of economic growth of the East Asian newly industrialized countries. *Journal of the Japanese and International Economies*, 8(3), 235–271.
- Kim, J-I., & Lau, L-J. (1995). The role of human capital in the economic growth of the East Asian Newly Industrialized Countries, *Asia-Pacific Economic Review*, 1(3), 3–22.

- Kim, J-I., & Lau, L-J. (1996). *The sources of Asian Pacific economic growth*. Canadian Journal Economic, 29, S448–S454.
- Kim, J-I. (2001). Total factor productivity in East Asia: Implications for the future. *Asian Economic Papers*, 1(2), 50–70.
- Kim, Y-J., & Terada-Hagiwara, A. (2010). A survey on the relationship between education and growth with implications for developing Asia. ADB Economics Working Paper Series 236. Retrieved from <http://dx.doi.org/10.2139/ssrn.1751825>
- Klenow, D. J., & Rodriguez-Clare, A. (1997). Economic growth: A review essay. *Journal of Monetary Economics*, 40(3), 597–617.
- Klenow, S., Lorgelly, P. K., & Owen, P. D. (2002). Are educational gender gaps a brake on economic development? Some cross-country empirical evidence. *Oxford Economic Papers*, 54(1), 118–149.
- Kmenta, J. (1986). *Elements of econometrics*. New York: Macmillan Publishing Company.
- Kneller, R., & Steven, P. A. (2006). Frontier technology and absorptive capacity: Evidence from OECD manufacturing industries. *Oxford Bulletin of Economics and Statistics*, 68(1), 1–21.
- Kneller, R. (2005). Frontier technology, absorptive capacity and distance. *Oxford Bulletin of Economics and Statistics*, 67(1), 1–23.
- Krueger, A. B., & Lindahl, M. (2001). Education for growth: Why and for whom? *Journal of Economic Literature*, 39(4), 1101–1136.
- Krugman, P. (1994). The myth of East Asian miracle. *Foreign Affairs*, 73(6), 28–44.

- Kwark, N.S., & Shyn, Y. S. (2006). International R&D spillovers revisited: Human capital as an absorptive capacity for foreign technology. *International Economic Journal*, 20(2), 179–196.
- Lance, C. E. (1988). Residual centering, explanatory and confirmatory moderator analysis, and decomposition of effects in path models containing interactions. *Applied Psychological Measurement*, 12(2), 163–175.
- Lau, L., & Park, J. (2003). The sources of East Asian economic growth revisited. Conference on International and Development Economics in Ithaca. Retrieved from: <http://www.stanford.edu/~ljlau/RecentWork/RecentWork/030921.pdf>
- Lee, J. W., & Hong, K. (2010). Economic growth in Asia: Determinants and prospects. (ADB economics Working Paper Series No.224). Retrieved from Asia Development Bank website: <http://www.asiandevbank.org/documents/working-papers/2010/economics-wp220.pdf>
- Lee, J. W. (2001) Educational for technology readiness: Prospects for developing countries. *Journal of Human Development*, 2(1), 115–151.
- Lee, L. W., & Francisco, R. (2010), Human capital accumulation in emerging Asia, 1970-2030. ADB Economics Working Paper Series No. 216. Retrieved from <http://dx.doi.org/10.2139/ssrn.1678386>
- Leoning, J. L. (2005). Effects of primary, secondary, and tertiary education on economic growth: Evidence from Guatemala. Policy Research Working Paper Series 3610. Retrieved from <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-3610>
- Levine, R., & Renelt, D. (1992). A sensitivity analysis of cross-country growth regression. *The American Economic Review*, 82(4), 942–963.

- Liberto, A. D., Pigliaru, F., & Chelucci, P. (2011). International TFP dynamics and human capital stocks: A panel data analysis, 1960–2003. *Review of Income and Wealth*, 57(1), 156–182.
- Little, T.D., Bovaird, J. A., & Willian, K. F. (2006). On the merits of orthogonalizing powered and product terms: Implications for modelling latent variable interactions. *Structural Equation Modeling*, 13, 479–519.
- Ljung, J., & Nilson, A. (2009). Human capital and economic growth: Sweden 1870–2000. *Cliometrica*, 3(1), 71–95.
- Lloyd, C. B., Meter, C., & Sathar, Z. A. (2005) The effect of gender differences in primary school access, type, and quality on the decision to enroll in rural Pakistan. *Economic Development and Structural Change*, 53(3), 685–710 .
- Lorgelly, P. K., & Owen, D. P. (1999). The effect of female and male schooling on economic growth in the Barro-Lee model. *Empirical Economics*, 24(3), 537–557.
- Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22, 3–42.
- Lucas, R. E., Jr. (1990). Why doesn't capital flow from rich to poor countries? *American Economic Review*, 80, 92–96.
- Lutz, W., Goujon, A., Samir, K. C., & Sanderson, W. (2007). Reconstruction of population by age, sex and level of educational attainment for 120 countries for 1970 – 2000. *Vienna Yearbook of Population Research 2006*, 19–235.
- Madsen, J., Islam, M., & Ang, J. (2010). Catching-up to the technology frontier: the dichotomy between innovation and imitation. *Canadian Journal of Economics*, 43(4), 1389–1411.

- Mammen, K., & Paxson, C. (2000). Women's work and economic development. *The Journal of Economic Perspective*, 14(4), 141–164.
- Manca, F. (2009). Technology Catching-up and the role of institutions. Research Institute of Applied Economics 2009 Working Papers 2009/12. Retrieved from [http://www.ub.edu/irea/working\\_papers/2009/200912.pdf](http://www.ub.edu/irea/working_papers/2009/200912.pdf)
- Manca, F. (2010). Technology catch-up and the role of institutions. *Journal of Macroeconomics*, 32(4), 1041–1053.
- Manca, F. (2011). The farthest needs the best. Human capital composition and development specific economic growth. DEGIT Conference Papers no. c016\_048. Retrieved from: [http://www.degit.ifw-kiel.de/papers/degit\\_16/c016\\_048.pdf](http://www.degit.ifw-kiel.de/papers/degit_16/c016_048.pdf)
- Manfield, E. (1975). East–West technology transfer issues and problems, international technology transfer forms, resource requirements and policies. *American Economic Review*, 65(2), 372–376.
- Mankiw, N., Romer, D., & Weil, D. (1992). A contribution to the empiric of economic growth. *Quarterly Journal of Economics*, 107(2), 407–437.
- Mansfield, E., Schwartz, M., & Wagner, S. (1981). Imitation costs and patents: An empirical study. *The Economic Journal*, 91(364), 907–918.
- Marshall, M. G. (2013). *Major episodes of political violence (MEPV), 1946–2012*. Fairfax, VA: Center for Systemic Peace, George Mason University.
- Marshall, M. G., Jaggers, K., & Gurr, T. R. (2011). *Polity IV Project: Dataset user manual*. Arlington: Polity IV Project.



- Mayer, J. (2001). Technology diffusion, human capital and economic growth in developing countries. UNCTAD Discussion Paper No.154. Retrieved from United Nations Conference on Trade and Development website: [http://www.unctad.org/en/docs/dp\\_154.en.pdf](http://www.unctad.org/en/docs/dp_154.en.pdf)
- McMahon, W. (1998). Education and growth in East Asia. *Economics of Education Review*, 17, 159 – 172.
- Miller, S. M., & Upadhyay, M. P. (2000). The effects of openness, trade Orientation, and human capital on total factor productivity. *Journal of Development Economics*, 63(2), 399–423.
- Mincer, J. (1962). Labor force participation of married women: A study of labor supply. In H. G. Lewis (Eds.), *Aspects of Labor Economics* (pp. 63–97). Princeton: Princeton University Press.
- Mincer, J. (1974). *Schooling, experience and earnings*. National Bureau of Economic Research, New York: Columbia University Press.
- Narula, R., & Marin, A. (2003). FDI spillovers, absorptive capacities and human capital development: Evidence from Argentina. *MERIT memorandum 2003–016*. Retrieved from <http://digitalarchive.maastrichtuniversity.nl/fedora/get/guid:781e369f-4fba-49f4-a282-44ecaf015036/ASSET1>
- Nehru, V., & A. Dhareshwar. (1993). A new database on physical capital stock: Sources, methodology, and results. *Rivista de Analisis Economico*, 8, 37–59.
- Nehru, V., Swanson, E., & Dubey, A. (1995). A new database on human capital stock: Sources, methodology and results. *Revista de Analisis Economico*, 8(1), 37–59.

- Nelson, R. R. (2005). *Technology, Institutions and Economic Growth*. Cambridge, Mass.: Harvard University Press.
- Nelson, R. R., & Park, H. (1999). The Asian miracle and modern growth theory. *The Economic Journal*, 109(457), 416–436.
- Nelson, R. R., & Phelps, E. S. (1966). Investment in Humans, Technological Diffusion, and Economic Growth. *The American Economic Review*, 56(1/2), 69–75.
- Oxley, L., Le, T., & Gibso, J. (2008). Measuring human capital: Alternative methods and international evidence. *Korean Economic Review*, 24(2), 283–344.
- Papakonstantinou, M. (2014). Composition of human capital, distance to the frontier and productivity. IARIW 33<sup>rd</sup> General Conference. Retrieved 21 December 2014, from <http://www.iariw.org/papers/2014/PapakonstantinouPaper.pdf>
- Papageorgiou, C. (2002). Technology adoption, human capital, and growth theory. *Review of Development Economics*, 6(3), 351–368.
- Park, D., & Park, J. (2010). Drivers of developing Asia's growth: Past and future. ADB Economics Working Paper Series 235. Retrieved from <http://dx.doi.org/10.2139/ssrn.1743188>
- Park, J. (2010). Projection of long-term total factor productivity growth for 12 Asian economies. ADB Economics Working Paper Series No. 227. Retrieved from <http://bibpurl.oclc.org/web/40920/2010/Economics-WP227.pdf>
- Park, J-S., & Ryu, H. (2006). Accumulation, technical progress, and increasing returns in the economic growth of East Asia. *Journal of Productivity Analysis*, 25(3), 243–255.

- Pigliaru, F., (2003). Detecting technological catch-up in economic convergence. *Metroeconomica*, 54(2-3), 161–178.
- Pritchett, L. (2001). Where has all the education gone? *The World Bank Economic Review*, 15(3), 367–391.
- Psacharopoulos, G. (1994). Returns to investment in education: A global update. *World Development*, 22(9), 1325–1343.
- Psacharopoulos, G., & Ariagada, A. M. (1986). The educational comparison of the labor force: An international comparison. *International Labor Review*, 125(5), 561–574.
- Psacharopoulos, G., & Patrinos, H. A. (2004). Returns to investment in education: A further update. *Education Economics*, 12(2), 111–134.
- Ramanathan, K. (2009). An overview of technology transfer and technology transfer models. A Paper prepared for the Asian and Pacific Centre for Transfer of Technology (APCTT). Retrieved from: [http:// www.technology4sme.net](http://www.technology4sme.net).
- Rebelo, S. (1991). Long-run policy analysis and long-run growth. *Journal of Political Economy*, 99, 500–521.
- Ricardo, D. (1951–1973). *The works and correspondence of David Ricardo*, edited by Piero Sraffa with the collaboration of Maurice H. Dobb. II Vols. Cambridge: Cambridge University Press, in the text referred to as Works.
- Roessner, J. D. (2010). Technology transfer. In Hill, C. (Ed.), *Science and Technology Policy in the US, A time of Change*. Longman: London.
- Rogers, E. M. (1995). *Diffusion of innovations*. (4th ed.). New York: Free Press.

- Romer, P. M. (1986). Increasing returns & long-run growth. *Journal of Political Economy*, 94(5), 1002–1037.
- Romer, P. M. (1989). Human capital and growth: Theory and evidence. *Carnegie-Rochester Conference Series on Public Policies*, 32, 251–286.
- Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5), S71–S102.
- Saavedra, J. E., & Garcia, S. (2012). Impacts of conditional cash transfer programs on educational outcomes in developing countries: a Meta analysis. RAND Labor and Population Working Paper Series, WR-921-1. Retrieved from [https://www.rand.org/content/dam/rand/pubs/working\\_papers/2012/RAND\\_WR\\_921-1.pdf](https://www.rand.org/content/dam/rand/pubs/working_papers/2012/RAND_WR_921-1.pdf)
- Sala-i-Martin, X. (2002). 15 years of new growth economics: What have we learnt? *Journal Econom í Chilena* , 5(2), 5–15.
- Sarel, M. (1996). Growth in East Asia: What we can and what we cannot infer. *IMF Economic Issues*, No.1, 237–259.
- Savvides, A., & Zachriadis, M. (2005). International technology diffusion and the growth of TFP in the manufacturing sector of developing economies. *Review of Development Economics*, 9(4), 482–501.
- Savvides, A., & Zaxhapiadis, m. (2003). International technology diffusion an the growth of TFP in the manufacturing sector of developing economies. *Review of Development Economics*, 9(1), 482–501.
- Scherer, F. M. (1999). *New perspectives on economic growth and technological innovation*. Washington DC: Brooking Institution Press.

- Schultz, T. P. (1993) Returns to women's schooling. In Elizabeth King and M Anne Hill (eds.), *Education in developing countries: barriers, benefits, and policy*. Baltimore: Johns Hopkin University Press.
- Schultz, T. P. (1998). Eroding the economic foundations of marriage and fertility in the United States. *Structural Change and Economic Dynamics*, 9(4), 391–413.
- Schultz, T. P. (2002). Wage gains associated with height as a form of health human capital. *American Economic review*, 9(2), 349–353.
- Schultz, T. W. (1960). Capital formation by education. *Journal of Political Economy*, 68(6), 571–583.
- Schultz, T. W. (1961). The investment in human capital. *American Economic Review*, 5(1), 1–17.
- Schumpeter, J. A. (1954). *History of economic analysis*. Oxford: Oxford University Press.
- Self, S., & Grabowski, R. (2004). Does education at all levels cause growth? India, a case study. *Economics of Education Review*, 23(1), 47–65.
- Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65–94.
- Solow, R. M. (1957). Technical change and the aggregate production function. *Review of Economics and Statistics*, 39(3), 312–320.
- Souder, W. (1987). *Managing new product innovations*. Lexington, MA: Lexington.
- Stokey, N. (1994). Sources of economic growth: Comments on Barro and Lee. *Carnegie-Rochester Conference Series*, 40, 47–57.
- Swan, W. (1956). Economic growth & capital accumulation. *The Economic Record*, 32, 334–361.

- Taeb, M., Munder, I., Kelar, G., an, P., de Carvalho, M. G., & Aunuddin, N. (2005). Revisiting women's participation in science and technology: emerging challenges and agenda for reform policy report 2005, United Nations University.
- Tran, T. V. (2013). The middle-income trap: Issues for members of the Associations of Southeast Asia Nations. ADB Institute Paper No. 421. Retrieved from <http://www.adbi.org/files/2013.05.16.wp421.middle.income.trap.issues.asean.pdf>
- Ucan, E. (2013). Increasing girls' secondary education attainment in Turkey. Retrieved from [http://isites.harvard.edu/fs/docs/icb.topic1203150.files/Panel%2020-%20Finishing%20the%20Treatment/Elif%20Ucan\\_GirlsSecondaryEdTurkey\\_Conference%20Paper.pdf](http://isites.harvard.edu/fs/docs/icb.topic1203150.files/Panel%2020-%20Finishing%20the%20Treatment/Elif%20Ucan_GirlsSecondaryEdTurkey_Conference%20Paper.pdf)
- UNCTAD. (2012). *Foreign direct investment database*. World Investment report Interactive Database. Retrieved 11 May 2012, from <http://www.unctad.org>
- UNESCO. (1993). *World Education Report*. France: UNESCO.
- UNDP. (2010). *The real wealth of nations: Pathways to human development*. Human development Report. Palgrave Macmillan, New York.
- Vandenbussche, J., Aghion, A., & Meghir, C. (2006). Growth distance to frontier and composition of human capital. *Journal of Economic Growth*, 11(2), 97–127.
- World Bank. (1994). *Enhancing women's participation in economic development*. Washington DC: World Bank.
- World Bank. (2008). *Global economic prospects: Technology diffusion in the developing World*. Washington: The World Bank.

- World Development Indicators. (2011). Retrieved from [http://data.worldbank.org/data-catalog/worlddevelopment\\_indicators](http://data.worldbank.org/data-catalog/worlddevelopment_indicators)
- Xu, B. (2000). Multinational enterprises, technology diffusion, and host country productivity growth. *Journal of Development Economics*, 62, 477–493.
- Yamarik, S. & Ghosh, S. (2004). Are regional trading arrangement trade creating? : An application of extreme bound analysis. *Journal of International Economics*, 63(2), 369–395.
- Young, A. (1992). A tale of two cities: Factor accumulation and technical change in Hong Kong and Singapore. In *NBER Macroeconomics Annual 1992*, ed. Olivier Blanchard and Stanley Fischer (pp. 13–53). Cambridge, Mass.: MIT Press.
- Young, A. (1994). Lessons from the East Asian NICs: A contrarian View. *European Economic Review*, 38, 964–973.
- Young, A. (1995). The tyranny of numbers: confronting the statistical realities of the East Asian growth experience. *Quarterly Journal of Economics*, 110(3), 641–680.