

**GEOGRAPHICAL CONCENTRATION OF MANUFACTURING
INDUSTRIES IN JAVA REGION, INDONESIA**

SETYO TRI WAHYUDI

**DOCTOR OF PHILOSOPHY
UNIVERSITI UTARA MALAYSIA
2011**

**GEOGRAPHICAL CONCENTRATION OF MANUFACTURING
INDUSTRIES IN JAVA REGION, INDONESIA**

A Thesis Submitted to the
Awang Had Salleh Graduate School of Arts and Sciences
Department of Economics College of Arts and Sciences
In Fulfillment of the Requirements for the degree of
Doctor of Philosophy (Economics)
Universiti Utara Malaysia

by

SETYO TRI WAHYUDI

M.Ec (2009), Universiti Utara Malaysia, Sintok, Malaysia
S.E (2004), Brawijaya University, Malang, Indonesia

July 2011

© Setyo Tri Wahyudi, 2011. All rights reserved.

CERTIFICATION OF THESIS

Put Here

PERMISSION TO USE

In presenting this thesis, the author agrees that Universiti Utara Malaysia's library may make this thesis freely available for reference and inspection. The author further agrees that permission for photocopying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the author's supervisor or, in her absence, by the Dean of Awang Had Salleh Graduate School of Arts and Sciences. It is understood that any photocopying, publication, use of this thesis, or parts there of for financial gain shall not be allowed without the author's written permission. It is also understood that, due to recognition shall be given to the author and Universiti Utara Malaysia for any scholarly use of the materials presented in this thesis.

Permission for photocopying or other use of materials in this thesis, in whole or in part, should be addressed to:

**Dean of Awang Had Salleh Graduate School of Arts and Sciences
UUM College of Arts and Sciences
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman**

DEDICATIONS

To My Father, Imam Bukhori, and *My Mother*, Siti Indriyah, S.Ag

To My Late Father in Law, Alm. Drh. M. Ichsan Thohir, and

My Mother in Law, Indriyati

To My Wife, Nunung Fatimah, SE., and

My Childrens, Callysta Az-Zahra Wahyudi and Maheswara Zhafif Wahyudi

And

To My Brothers and Sisters:

Aries Dwi Siswanto, ST., MT. and Lilik Machsunatin, SAB.,

Eril Rudi Cahyono, ST. and Megi Amalia, SE., MM

Ade Herawan, SPi. and Dewi Rachmawati, SPi.

Moh. Usman Efendi, SPd.

Desy Nurwijayanti

ACKNOWLEDGEMENTS

Alhamdulillah, by whose grace and blessings this thesis is finally complete.

In the name Allah, the most merciful, the more you learn, the more you realize how little you know. We come to understand that our accomplishments are not possible without the help of Allah.

I would like to express my sincere gratitude to my supervisor, Associate Prof. Dr. Mohd. Dan Jantan, for his guidance, patience, encouragement, and professional supervision throughout this study made this thesis possible to be finished. He was fostered my academic growth by challenging and inspiring me to reach deeper, to learn more, to expand my viewpoint, and to think critically. Yet, he allowed me to express my views openly and to disagree even when I was wrong. Thanks to Prof. Dr. Norshuhada Shiratuddin as chairman of viva, Prof. Dr. Idris Jarji (University of Malaya) as external examiner and Assoc. Prof. Dr. Ahmad Sobri Jaafar as internal examiner for their valuable comments and suggestions to my thesis.

I would like also to extend my gratitude to the Rector of Brawijaya University, the Dean and members of the Faculty of Economics and Business, and the Chairperson of Department of Economics for their endless support especially for financing and giving me the opportunity to further studies which made this study possible.

My thanks also go to the staffs of Department of Economics, College of Arts and Sciences, Sultanah Bahiyah Library, and my friends in Graduate Program for all friendships, helps, supports, and guidances during my study. Also, I would like to express my appreciation to my colleagues in Maybank residential: Pak Donni “Pakde/Mas Don” Abdul Latief and Mbak Dwi Hastuti (*New Couple, congratulation*), Bapak Zainal Fikri and Ibu Ina Mutmainah, Dr. Syaifuddin, Dr. Juhriansyah, Dr Lukman Hakim (UNS), Fachrizal Bachri and Syaipan Djambak (Unsri), Indra Maipita (UNIMED), and all of my friends for their sincere friendship and valuable help throughout the study.

Setyo Tri Wahyudi
Sintok, Malaysia 2011

Glossary

- Agglomeration economies:** The spatial concentration of economic activity in urban areas.
- Augmented Dickey-Fuller Test:** A test for a unit root that includes lagged changes of the variable as regressors.
- Concentration:** A specific economic activity is reflects the distribution of its regional shares.
- Economic growth:** Typically refers to an increase in a country's output of goods and services. It is usually measured by changes in real GDP
- Fixed Effect Model:** The unobserved effects panel data model where the unobserved effect is allowed to be arbitrarily correlated with the explanatory variables in each time period.
- Gross domestic product:** The total income earned domestically, including the income earned by foreign-owned factors of production; the total expenditure on domestically produced goods and services.
- Herfindahl Index:** A measure of the size of firms relative to the industry and an indicator of the amount of competition among the firms in the industry.
- Localization:** The degree to which an industry's economic activity takes place in one or a small number of geographical areas.
- Location Quotient Index:** The level of relative advantage of a sector in one region compared with other region.
- Manufacturing industry:** Refers to those industries which involve in the manufacturing and processing of items and indulge in either creation of new commodities or in value addition.
- Panel Data:** A data set constructed from repeated cross sections over time. With a *balanced* panel, the same units appear in each time period. With an *unbalanced* panel, some units do not appear in each time period, often due to attrition.
- Random Effect Model:** The unobserved effects panel data model where the unobserved effect is assumed to be uncorrelated with the explanatory variables in each time period.
- Specialization:** Defined as a distibutional indicator on its industry shares.
- Unit Root Process:** A highly persistent time series process where the current value equals last period's value, plus a weakly dependent disturbance.
- Urbanization:** refer to the cost savings associated with producing in a large city, more due to inexpensive intermediate goods and services, extensive knowledge spillovers, and large labor pool.

ABSTRACT

Previous studies on geographical concentration of manufacturing industry in Indonesia demonstrated that many firms were localized in major metropolitan areas as well as in a set of emerging regions. The aim of this study is to complement the findings of the previous studies by exploring whether regional specialization and industrial concentration patterns have changed during the 1998-2007 period. This study further aims to explore the driving forces of industrial concentration in Indonesia's manufacturing industry, particularly for Java region, using 43 three-digit manufacturing industries (SIC151 – SIC293) over the same time period. The contribution analysis, the Theil index, and the location quotient index were employed in the analysis of the location of the manufacturing industry. The Herfindahl-Hirschman and Krugman Dissimilarity indices were used to analyze the regional specialization and concentration. This study used the fixed effect regression model to analyze the relationship between the concentration of the manufacturing industry and economies of scale, wages, labor productivity, labor intensity, urbanization economies, localization economies, and export orientation. The sample of this study consisted of 42 out of 96 regencies in six provinces in Java region. It was found that the distribution of manufacturing industry in Java is geographically scattered. The Theil index shows an increasing trend implying that the disparity of the manufacturing industry within regencies has increased. The inequality between regencies shows a decreasing trend over the period of the study, implying that the manufacturing industry in Java spreads only in several regencies. The location quotient index shows an increasing trend that reveals the economy of some regencies are more dependent on manufacturing and simultaneously it shows that several new manufacturing areas have emerged in Java. Further analysis indicated that economies of scale and wages have a positive and significant effect on the concentration of manufacturing industry, whereas labor productivity, labor intensity, urbanization economies, localization economies, and export orientation have a negative impact on manufacturing concentration.

ABSTRAK

Banyak kajian lalu mengenai kepadatan geografi bagi industri pembuatan di Indonesia telah dilakukan. Hasil kajian menunjukkan bahwa lokasi kawasan perindustrian terletak di kawasan bandar utama dan kawasan perindustrian baru. Menyadari hakikat ini, kajian ini bertujuan untuk melengkapi kajian terdahulu. Oleh itu, pengkaji akan meneliti secara terperinci sama ada pola pengkhususan wilayah dan kawasan tumpuan geografi telah berubah sepanjang tahun 1998 hingga 2007. Selain itu, kajian ini juga bertujuan untuk meneliti faktor penggerak kepada kepadatan geografi dalam tiga-digit industri pembuatan di Indonesia khususnya di wilayah Jawa. Sebanyak 43 buah industri pembuatan (SIC151-SIC293) akan diteliti bagi tempoh yang sama. Dalam kajian ini analisis sumbangan, indeks Theil, dan indeks hasil bahagi lokasi akan digunakan dalam meneliti penempatan kawasan industri pembuatan. Indeks Herfindahl-Hirschman dan Ketaksamaan Krugman akan digunakan dalam menganalisis kepadatan dan pengkhususan industri. Selain itu, kajian ini juga menggunakan model Regresi Kesan Tetap dalam menganalisis perkaitan di antara kepadatan industri pembuatan dengan ekonomi skala, upah, produktiviti buruh, intensiti buruh, ekonomi urbanisasi, ekonomi lokalisasi, dan orientasi eksport. Sampel kajian ini terdiri daripada 42 kabupaten dari 96 kabupaten di dalam enam wilayah di Jawa. Hasil penelitian mendapati bahawa taburan kawasan industri pembuatan di Jawa adalah berselerak secara geografinya. Hal ini dapat diperhatikan dalam Indeks Theil yang menunjukkan satu trend kepincangan taburan kawasan industri pembuatan di dalam kabupaten telah meningkat. Situasi ini membawa kepada ketidakseimbangan kawasan taburan industri pembuatan yang tertumpu kepada beberapa kabupaten sahaja. Sementara itu, indeks hasil bahagi lokasi menunjukkan trend peningkatan ekonomi sesebuah kabupaten disebabkan kepesatan industri pembuatan. Ini telah membawa kepada wujudnya kawasan perindustrian baru di Jawa. Analisis seterusnya menunjukkan ekonomi skala dan upah mempengaruhi secara positif dan signifikan terhadap kepadatan industri pembuatan. Namun, produktiviti buruh, intensiti buruh, ekonomi urbanisasi, ekonomi lokalisasi, dan orientasi eksport menunjukkan kesan negatif terhadap kepadatan industri pembuatan.

TABLE OF CONTENTS

	Pages
PERMISSION TO USE	i
DEDICATIONS	ii
ACKNOWLEDGEMENTS	iii
GLOSSARY	iv
ABSTRACT	v
ABSTRAK	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	xii
LIST OF FIGURES	xiv
 Chapters	
1. INTRODUCTION	1
1.1 Background	1
1.2 Industrial Policy in Indonesia	7
1.3 Problem Statement	13
1.4 Research Questions	17
1.5 Research Objectives	18
1.6 The Scope of the Study	19
1.7 Expected Contributions of the Study	19
1.8 Organization of the Thesis	20

2	REVIEW OF THE LITERATURES	21
2.0	Introduction	21
2.1	Economies of Scale	21
2.2	Wage and Labor Productivity	24
2.3	Agglomeration Economies	25
2.4	Specialization and Concentration	27
2.5	Previous Studies in Indonesia	34
2.6	Conclusions	37
3	THEORETICAL FRAMEWORK	46
3.0	Introduction	46
3.1	Industrial Location Theory	47
3.1.1	The Location Theory	47
	(1) Johann-Heinrich von Thunen (1850-1973)	47
	(2) Alfred Weber (1868-1958)	52
3.1.2	Central Place Theory	57
	(1) Walter Christaller (1893-1969)	57
	(2) August Losch	58
	(3) Melvin Greenhut's Cost and Demand Factors	59
3.1.3	Growth Pole Theory	60
	(1) Francois Perroux	60
3.2	Agglomeration and Externality Economies	64
3.2.1	Static Externality	65
3.2.2	Dynamic Externality	69
3.3	Conclusions	69

4	DESCRIPTION OF THE DATA, VARIABLES AND METHODOLOGY	71
4.0	Introduction	71
4.1	Data and Variable Specification	71
4.1.1	The Data	71
4.1.2	Variable Specification	75
4.2	Methodology	83
4.2.1	The Pattern of Manufacturing Industry	83
	(1) Contribution Analysis	83
	(2) The Theil index	84
	(3) Location Quotient Index	86
4.2.2	Model Specifications	87
4.2.3	Estimation Techniques	90
	(1) Panel Unit Root Test	91
	(2) Panel Data Estimations	93
4.3	Conclusions	97
5	RESULTS AND DISCUSSIONS	98
5.0	Introduction	98
5.1	Java at Glance	98
5.2	An Overview of Economic Growth in Java	100
5.3	An Overview of Manufacturing Industry in Java	101
5.4	Samples Size Selection	108
5.5	Analysis of Industrial Areas	109

5.5.1 Contribution Analysis	110
5.5.2 The Theil Index	121
5.5.3 Location Quotient Index	128
5.6 Specialization and Concentration	132
5.6.1 Regional Specialization	133
5.6.2 Geographical Concentration	136
5.7 Panel Data Estimation Results	141
5.7.1 The Descriptive Statistics	141
5.7.2 Testing of Functional Form	143
5.7.3 Panel Unit Root Tests	151
5.7.4 Pooled Least Squares	153
5.7.5 Fixed Effect	154
5.7.6 Random Effect	157
5.7.7 Heteroskedasticity and Serial Correlation	159
5.8 Discussions	167
5.9 Conclusions	178
6 SUMMARY AND IMPLICATION	181
6.0 Introduction	181
6.1 Summary of the Findings	181
6.2 Limitations and Suggestions	184
6.3 Economic Implications	186
6.4 Conclusions	188

References	189
Appendix 1: Description of Manufacturing	200
Appendix 2: Distribution of Manufacturing in Java, 1998-2007	201
Appendix 3: Share of Manufacturing Output and the Treshold	204
Appendix 4: Location Quotient Index	208
Appendix 5: The Theil Index	209
Appendix 6: Threshold of Localization	212
Appendix 7: Herfindahl- Hirschman Index of Concentration	213
Appendix 8: Krugman Dissimilarity Index of Concentration	219
Appendix 9: Panel Unit Root Tests	225
Appendix 10: Pooled, Fixed, and Random Effects in Log-Linear Model	236
Appendix 11: Heteroscedasticity Test	241
Appendix 12: Cochrane-Orcutt for Serial Autocorrelation	242
Appendix 13: The Transformed Model for Serial Autocorrelation	
Corrected	247
Curriculum Vitae	249

LIST OF TABLES

Table 1.1: The Location of Indonesian Manufacturing Industry (Number of establishment and percentage)	15
Table 2.1: Summary of the Empirical Studies related to Geographical Concentration	38
Table 4.1: Name of Regency in Java	72
Table 4.2: The Classification of Manufacturing Industry	74
Table 4.3: Description of Explanatory Variables	79
Table 5.1: The Number of City, Municipality, Land Area, and Population in Java Island, 2008	100
Table 5.2: The Provincial Economic Growth in Java Java 2004-2008 (%)	101
Table 5.3: The Growth and Contribution of Manufacturing sub-sectors	103
Table 5.4: The Distribution of Three-Digits Manufacturing in Java	106
Table 5.5: The Distribution of Manufacturing Firm in Java	107
Table 5.6: Sample of Study considered, based on 0.5% of Threshold	109
Table 5.7: Regency with High Manufacturing Employment in Java	112
Table 5.8: Regency with High Manufacturing Value Added in Java	112
Table 5.9: Regency based on Cut-off point method, 1998 and 2007	117
Table 5.10: The Agglomeration level in Java, 1998 and 2007	120
Table 5.11: The Theil Index based on Regency, 1998-2007	122
Table 5.12: The Theil Index for Inequality within Regency, 1998-2007	125
Table 5.13: The Theil Index's Hypothesis Testing	127
Table 5.14: Location Quotient Index for Regencies in Java, 1998-2007	129

Table 5.15: Classifications of Regency in Java based on LQ Index	130
Table 5.16: Statistical Measure of Specialization in Java, 1998-2007	134
Table 5.17: The Herfindahl index of Concentration Higher than 0.6 points	138
Table 5.18: The Krugman index of Concentration Lower than 0.6 points	140
Table 5.19: Descriptive Statistics of Variables	142
Table 5.20: Functional Testing Form for the Linear Model:HHI	146
Table 5.21: Functional Testing Form for the Log-Linear Model:LnHHI	147
Table 5.22: Functional Testing Form for the Linear Model:KDI	149
Table 5.23: Functional Testing Form for the Log-Linear Model:LnKDI	150
Table 5.24: Panel Unit Root Test - Augmented Dickey-Fuller (ADF)	152
Table 5.25: The Pooled Least Squares Estimation Results	154
Table 5.26: Fixed Effect Estimation Results	156
Table 5.27: Random Effect Estimation Results	158
Table 5.28: The Heteroskedasticity Test Results	160
Table 5.29: The Cochrane-Orcutt Iteration Results	165
Table 5.30a: The Transformed Model for Autocorrelation Correction for Herfindahl Index Model	166
Table 5.30b: The Transformed Model for Autocorrelation Correction for Krugman Index Model	167
Table 5.31: Summary of Pooled, Fixed, and Random Effects Method in the Panel Data Estimation	168
Table 5.32: The Determinant Model of Manufacturing Concentration: Dependent: LnHHI	170

LIST OF FIGURES

Figure 1.1: Sectoral contribution to Indonesian Gross Domestic Product (GDP) at Constant Prices 2000	2
Figure 1.2: The six Indonesian Economic Corridors	4
Figure 1.3: Percentage of Agricultural and Manufacturing sectors to Indonesia Gross Domestic Products at constant price 2000	13
Figure 3.1: The von Thunen's model	50
Figure 3.2: The Weber 'least-cost' approach	55
Figure 3.3: Loschian Demand Curve and Cone	59
Figure 5.1: The Map of Java Island	99
Figure 5.2: The Manufacturing Growth during 1967-2008	102
Figure 5.3: The Distribution of Manufacturing Industry in Java based on Employment, 1998 and 2007	113
Figure 5.4: The Distribution of Manufacturing Industry in Java based on Value Added for 1998 and 2007	114
Figure 5.5: The Illustration of Cut-off point Method	117
Figure 5.6: The Trend of Total Theil Index: Java, 1998-2007	123
Figure 5.7: The Trend of Theil index between Regency, 1998-2007	124
Figure 5.8: The Trend of Theil index within Regency, 1998-2007	126
Figure 5.9: The Herfindahl Index of Specialization in Java	135
Figure 5.10: The Krugman Index of Specialization in Java	135
Figure 5.11: Durbin-Watson d -statistic	161

CHAPTER ONE

INTRODUCTION

1.1 Background

Developing countries give special emphasis on the development of manufacturing sector because manufacturing is considered as a leading sector that could encourage the development of other sectors, such as the service and agriculture sectors (Arsyad, 1999). Thus, it is not surprising that the role of the manufacturing is becoming more important in encouraging the development of a country's economy (Arifin, 2003).

In order to accelerate the economic growth rate of a country, the process of transformation in economic activity from the primary sector, which is based on agriculture, to a modern secondary sector, which is based on manufacturing, is believed to be one of the many strategies that can be undertaken by developing countries, particularly for Indonesia. This is reinforced by the realization of long-term economic growth in the developed countries that show these countries prosper because of a high level of industrial sector compared to those that relies on agricultural sector (Arsyad, 1999). For example, Japan, Canada, Germany, United Kingdom, and the United States of America have succeeded in improving their economies through the industrialization processes.

Based on those arguments, Tambunan (2001) concluded that, *first* the economy of developed countries were generally more industrialized than the economies of developing countries; *second*, industrialization was regarded as the

The contents of
the thesis is for
internal user
only

REFERENCES

- Aiginger, K., Boeheim, M., Gugler, K., Pfaffermayr, M., & Wolfmayr-Schnitzer, Y. (1999). Specialization and (geographic) concentration of European manufacturing. *WIFO-Austrian Institute of Economic Research*, July.
- Aiginger, K., & Davies, S. W. (2004). Industrial specialization and geographic concentration two side of the same coin? Not for European Union. *Journal of Applied Economics*, 7(2), 231-248.
- Aiginger, K., & Rossi-Hansberg, E. (2006). Specialization and concentration: a note on theory and evidence. *Empirica*, 33, 255–266 <http://www.princeton.edu/~erossi/SpecCon.pdf> retrieved on April 23, 2009.
- Akgungor, S. (2006). Geographic concentrations in Turkey's manufacturing industry: Identifying Regional High point Clusters. *European Planning Studies*, 14(2), 169-197.
- Allen, B. T. (1968). Market concentration and wage increases: U.S. manufacturing, 1947-1964. *Industrial and Labor Relations Review*, 21(3), 353-366.
- Amiti, M. (1997). Specialisation patterns in Europe. *CEP Discussion Paper*, No. 363.
- Amiti, M. (1999). Specialisation patterns in Europe. *Weltwirtschaftliches Archiv*, 135, 573-593.
- Arifin, Z. (2003). Dinamika spasial industry manufaktur di Jawa Barat, Tahun 1990-1999. *Jurnal Ekonomi Pembangunan Kajian Ekonomi Negara Berkembang*, 111 – 121.
- Arsyad, L. (1999). *Pengantar perencanaan dan pembangunan ekonomi daerah*. Yogyakarta: BPFPE Press.
- Baltagi, B. H. (2005). *Econometrics analysis of panel data (3rd Ed.)*. England: John Willey and Sons.
- Baltagi, B. H. (2008). *Econometrics (4th Ed.)*. Springer.
- Baltagi, B. H., & Kao, C. (2000). Nonstationary panels, cointegration in panels and dynamics panels: A survey. *Center for Policy Research, Working Paper*, No. 16.

- Baldwin, J.R., Beckstead, D., Brown, W.M, & Rigby, D.L. (2008). Agglomeration and the geography of localization economies in Canada. *Regional Studies*, 42(1), 117-132.
- Baldwin, J.R., & Gorecki, P.K. (1994). Concentration and mobility statistics in Canada's manufacturing sector. *The Journal of Industrial Economics*, 42 (1), 93-103.
- Banerjee, A. (1999). Panel data unit roots and cointegration: An overview. *Oxford Bulletin of Economics and Statistics*, Special Issue, 0305-9049.
- Belman, D., & Heywood, J. S. (1990). Market structure and worker quality. *Journal of Industrial Economics*, 36(2), 155-168.
- Bertinelli, L., & Decrop, J. (2005). Geographical agglomeration: Ellison and Glaeser's inde applied to the case of Belgian manufacturing industry. *Regional Studies*, 39(5), 567-583.
- Black, D., & Henderson, V. (1999). Spatial evolution of population and industry in the United States. *The American Economic Review*, 89(2), 321-327.
- Blanchflower, D. (1986). Wages and concentration in British manufacturing. *Applied Economics*, 18, 1025-1038.
- Bostic, R. W., Gans, J. S., & Stern, C. (1997). Urban productivity and factor growth in the late Nineteenth century. *Journal of Urban Economics*, 41, 38-55.
- Box, G.E.P., & Cox, D.R. (1964). An analysis of transformations. *Journal of the Royal Statistical Society*, B26, 211-243.
- Breusch, T. S. (1978). Testing for autocorrelation in dynamic linear models. *Australian Economic Paper*, 17, 334-355.
- Breusch, T. S., & Pagan, A. R. (1979). Simple test for heteroscedasticity and random coefficient variation. *Econometrica (The Econometric Society)*, 47(5), 1287-1294.
- Brülhart, M. (1995). Industrial specialization in the European Union: A test of the new trade theory. *Trinity Economic Papers*, No. 5.
- Brülhart, M. (2001). Evolving geographical concentration of European manufacturing industries. *Weltwirtschaftliches Archiv*, 137(2), 215-243.
- Capello, R. (2007). *Regional economics*. New York: Rutledge, Taylor & Francis Group.

- Cochrane, D., & Orcutt, G. (1949). Application of least squares regression to relationships containing auto-correlated error terms. *Journal of American Statistical Association*, 44(245), 32-61.
- Coughlin, C. C., & Segev, E. (2000). Location determinants of new foreign-owned manufacturing plants. *Journal of Regional Science*, 40(2), 323-351.
- Chaudhary, M. A., (1989). Modeling industrial growth and agglomeration economies in the manufacturing sector in Pakistan. *The Pakistan Development Review*, 28(4), 981-991.
- Chow, C. G. (1960). Tests of equality between sets of coefficients in two linear regressions. *Econometrica*, 28(3), 591-605.
- Dalum, B., Laursen, K., & Villumsen, G. (1996). The long term development of OECD Export specialization patterns: De-specialization and "Stickiness". *DRUID & IKE Group*, Department of Business Studies, Aalborg University.
- Davidson, R., & MacKinnon, J.G. (1981). Several tests for model specification in the presence of alternative hypotheses. *Econometrica*, 49(3), 781-793.
- Davidson, R., & MacKinnon, J.G. (1985). Testing linear and log-linear regressions against Box-Cox alternatives. *The Canadian Journal of Economics/Revue canadienne d'Economique*, 18(3), 449-517.
- Dhanani, S. (2000). Indonesia: strategy for manufacturing competitiveness. Jakarta: UNDP/UNIDO Project No. NC/INS/99/004. http://www.unido.org/fileadmin/user_media/Publications/Pub_free/Indonesia_strategy_for_manufacturing_competitiveness.pdf retrieved on July 15, 2011.
- Dominicis, L., Arbia, G., & de-Groot, H. L. F. (2007). The spatial distribution of economic activities in Italy. *Tinbergen Institute Discussion Paper*, 094/3. <http://www.tinbergen.nl/discussionpapers/07094.pdf> retrieved on March 22, 2009.
- Deichmann, U., Lall, S. V., Redding, S. J., & Venables, A. J. (2008). Industrial location in developing countries. *The World Bank Research Observer*, May.
- Durbin, J., & Watson, G.S. (1951). Testing for serial correlation in least-squares regressions. *Biometrika*, 38, 159-171.

- Ellison, G., & Glaeser, E. L. (1997). Geographic concentration in U.S. manufacturing industries: a dartboard approach. *The Journal of Political Economy*, 105(5), 889-927.
- Enright, M. (1990). The determinants of geographic concentration industries. *Working Paper*, 93-052, Division of Research, Harvard Business School.
- Falcioglu, P., & Akgungor, S. (2008). Regional specialization and industrial concentration patterns in the Turkish manufacturing industry: an assessment for the 1980–2000 period. *European Planning Studies*, 16(2), 303-323.
- Fisher, R.A. (1932). *Statistical methods for research workers*, 4th ed. Oliver and Boyd, Edinburgh.
- Freeman, R., & Medoff, J. (1981). The impact of percentage organized on union and nonunion wages. *Review of Economics and Statistics*, 63, 561-583.
- Fujita, M., Krugman, P. R., & Venables, A. J. (1999). *The spatial economy: Cities, Regions, and International Trade*. Cambridge, MA: MIT Press.
- Geppert, K., Gornig, M., and Werwatz, A. (2008). Economics growth of agglomerations and geographic concentration of industries: evidence for West Germany. *Regional Studies*, 42(3), 413-421.
- Glasson, J. (1974). *An Introduction to Regional Planning*. Rotterdam: Rotterdam University Press.
- Glaeser, E. L., Kallal, H. D., Scheinkman, J. A., & Shleifer, A. (1992). Growth in Cities, *Journal of Political Economy*, 100(6), 1126-1152.
- Glejser, H. (1969). A new test for Heteroscedasticity. *Journal of the American Statistical Association*, 64, 316-323.
- Godfrey, L.G (1978). Testing against general autoregressive and moving average error models when the regressor includes lagged dependent variables. *Econometrica*, 46, 1293-1302.
- Godfrey, L.G., & Wickens, M.R. (1981). Testing linear and log-linear regressions for functional form. *The Review of Economics Studies*, 48(3), 487-496.
- Goschin, Z., Constantin, D. L., Roman, M., & Ileanu, B. (2009). Regional specialization and geographic concentration of industries in Romania. *South-Eastern Europe Journal of Economics*, 1, 99-113.
- Graham, D. J. (2009). Identifying urbanization and localization externalities in manufacturing and service industries. *Papers in Regional Science*, 88(1), 63-84.

- Granger, C.W.J. & Engle, R.F. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica*, 55(2).
- Greenhut, M.L. (1956). *Plant location in theory and practice*. University of North Carolina Press.
- Greenhut, M. L. (1960). Size of markets versus transport costs in industrial location surveys and theory. *The Journal of Industrial Economics*, 8(2), 172-184.
- Gujarati, D. (2004). *Basic Econometric (4th Ed.)*. New York: McGraw-Hill Company.
- Gujarati, D.N., & Porter, D.C. (2009). *Basic Econometrics (5th Ed.)*. New York: McGraw-Hill Company.
- Haaland, J. I., Kind, H. J., Midelfart-Knarvik, K. H., & Torstensson, J. (1999). What determines the economic geography of Europe?. *CEPR Discussion Paper*, No. 2072.
- Hallet, M. (2000). Regional specialisation and concentration in the EU. *Economic Papers*, 141, 1-29.
- Hanson, G. (1996). Localization economies, vertical organization, and trade. *American Economic Review*, 86(5), 1266-1278.
- Hanson, G. (1997). Increasing returns, trade and the regional structure of wages. *The Economic Journal*, 107, 113-133.
- Hanson, G. (2000). *Market potential, increasing returns, and geographic concentration*. Mimeo: University of Michigan.
- Hausman, J. A. (1978). Specification Tests in Econometrics. *Econometrica*, 46 (6), 1251–1271.
- Henderson, J.V. (1986). Efficiency of resource usage and city size. *Journal of Urban Economy*, 19,47-70.
- Henderson, V., Kuncoro, A., & Turner, M. (1995). Industrial development in Cities. *The Journal of Political Economy*, 103(5), 1067-1090.
- Hidayati, A., & Kuncoro, M. (2005). Konsentrasi geografis industry manufaktur di greater Jakarta dan Bandung periode 1980-2000: menuju satu daerah aglomerasi?. Universitas Gajah Mada, Yogyakarta. *Jurnal sosiosains*, 18(2).

- Holmes, T. J., & Stevens, J. J. (2003). Spatial Distribution of Economic Activities in North America. NBER and the Board of Governors of the Federal Reserve System.
- Hua, Z., & Wei, Z. (2007). Geographical agglomeration of Chinese manufacturing industries. *Chinese Journal of Population, Resource and Environment*, 5(2).
http://dsp-psd.pwgsc.gc.ca/collection_2008/statcan/11-622-M/11-622-MIE2008018.pdf retrieved on March 22, 2009.
- Hoover, E. M. (1937). The location of the shoe industry in the United States. *The Quarterly Journal of Economics*, 47(2), 254-276.
- Hsiao, C. (2003). *Analysis of panel data (2nd Ed.)* Cambridge: Cambridge University Press.
- Im, K. S., Pesaran, M. H., & Shin, Y. (1995). Testing for unit roots in heterogeneous panels. Mimeo, University of Cambridge.
- Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115, 53-74.
- Isard, W. (1949). The general theory of location and space-economy. *The Quarterly Journal of Economics*, 63(4), 476-506.
- Isard, W. (1956). *Location and space economy*. Wiley.
- Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. *Journal of Econometrics*, 90, 1-44.
- Kim, S. (1995). Expansion of markets and the geographic distribution of economic activities: the trends in US regional manufacturing structure, 1860-1987. *Quarterly Journal of Economics*, 110, 881-908.
- Kim, Y., Barkley, D. L., & Henry, M. S. (2000). Industry characteristics linked to establishment concentrations in non metropolitan areas. *Journal of Regional Science*, 40(2), 231-259.
- Klier, T. H. (1998). Geographic concentration in U.S. manufacturing: evidence from the U.S. auto supplier industry. http://www.chicagofed.org/publications/workingpapers/papers/wp98_17.pdf retrieved on March 22, 2009.
- Kuncoro, M. (2000). *Metode Kuantitatif Teori dan Aplikasi untuk Bisnis dan Ekonomi*. Yogyakarta: UPP AMP YKPN.
- Kuncoro, M. (2002). *Analisis Spasial dan Regional: Studi Aglomerasi dan Kluster Industri Indoensia*. Yogyakarta: UPP AMP YKPN.

- Krugman, P. (1991). Increasing return and economic geography. *Journal of Political Economy*, 99, 484-499.
- Krugman, P. (1993). First nature, second nature, and metropolitan location. *Journal of Regional Science*, 33(2), 129-44.
- Landiyanto, E. A. (2003). Konsentrasi spasial industri manufaktur: tinjauan empiris di Kota Surabaya.
<http://ideas.repec.org/p/wpa/wuwpur/0501006.html> retrieved on April 24, 2009.
- Landiyanto, E. A. (2005). Spesialisasi dan konsentrasi spasial pada sector industry manufaktur di Jawa Timur.
- Levin, A., & Lin, C. (1992). Unit root tests in panel data: asymptotic and finite-sample properties. Mimeo, University of California, SanDiego.
- Levin, A., Lin, C., & Chu, C.S.J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics*, 108, 1-24.
- Linda, V.G. (1994). Industrial agglomeration and factor market segmentation with empirical application for Indonesia. *PhD Thesis*. Cornell University. Published UMI order number 9501228. Michigan.
- List, J.A. (2001). US county-level determinants of inbound FDI: evidence from two-step modified count data model. *International Journal of Industrial Organization*, 19, 953-973.
- Long, J. E., & Link, A. N. (1983). The impact of market structure on wages, fringe benefits, and turnover. *Industrial and Labor Relations Review*, 36(2), 239-250.
- Losch, A. (1954). *The economic of location*. New Haven, Conn: Yale University Press.
- Lu., J., & Tao, Z. (2006). Determinants of industrial agglomeration: Recent evidence from China.
<http://www.ccwe.org.cn/ccweold/papers/Jiang-Yong%20Lu/China'sindustrialagglomerationbyLuandTao.pdf>.
 retrieved on March 24, 2009.
- Lu., J., & Tao, Z. (2009). Trends and determinants of China industrial agglomeration. *Journal of Urban Economics*, 65, 167-180.
- MacKinnon, J.G., White, H., & Davidson, R. (1983). Tests for model specification in the presence of alternative hypotheses. *Journal of Econometrics*, 21, 53-70.

- Maddala, G.S. (1992). *Introduction to econometrics (2nd Ed.)*. New York: Macmillan Publishing Company.
- Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple tests. *Oxford Bulletin of Economics and Statistics*, Special Issue, 0305-9049.
- Markusen, A. (1996). Sticky places in slippery space: A typology of industrial districts. *Economic Geography*, 72(3), 293.
- Marshal, A. (1890). *Principles of Economics*. London: Macmillan.
- Ministry of Industry. (2011). *Industry fact and figure*. Jakarta: Public Communication centre the Ministry of Industry.
- Mellow, W. (1982). Employer size and wages. *Review of Economics and Statistics*, 64, 495-501.
- Midelfart-Knarvik, K. H., Overman, H., Redding, S., & Venables, A. (2000). The location of European industry. *Economic Papers*, 142, 1-67.
- Miller, R. E. (1998). *Regional and interregional input-output analysis*. In: Isard, W. (Ed.), *Methods of Interregional and Regional Analysis*. Ashgate, Aldershot, UK, pp. 41-133.
- McCann, P. (2001). *Urban and regional economics*. New York: Oxford University Press.
- McDonald, J. F. (1997). *Fundamentals of Urban Economics*. New Jersey: Prentice Hall.
- Montgomery, M. R. (1988). How Large is too Large? Implication of the City Size Literature for Population Policy and Research. *Economic Development and Cultural Change*, 36: 691-720.
- Nickell, S., Vainiomaki, J., & Wadhvani, S. (1994). Wages and product market power. *Economica*, 61, 457-73.
- O'Sullivan, P. (1981). *Geographical economics*. London: The Macmillan Press.
- Overman, H., Redding, S., & Venables, A.J. (2001). The economic geography of trade, production, and income: A survey of empirics. Centre for Economic Performance, London School of Economics and Political Science.
- Paluzie., E., Pons, J., & Tirado, D.A (2001). Regional integration and specialization patterns in Spain. *Regional Studies*, 35(4), 285-296.

- Park, R.E. (1966). Estimation with Heteroscedastic error terms. *Econometrica*, 34(4), 888.
- Perroux, F. (1950). Economic space: theory and applications. *The Quarterly Journal of Economics*, 64(1), 89-104.
- Quah, D. (1994). Exploiting cross-section variations for unit root inference in dynamic panels. *Economics Letters*, 44(1-2), 9-19.
- Romer, P. (1986). Increasing return and long-run growth. *Journal of Political Economy*, 94(5), 1002-10037.
- Sadono, S. (1976). *Pengantar Teori Makroekonomi*, Lembaga Penerbit Fakultas Ekonomi Universitas Indonesia, Jakarta.
- Sanjaya (2009). Langkah-langkah model panel data, <http://forum-ekonometrika.blogspot.com/2009/05/langkah2-model-panel-data.html>. retrieved on March 24, 2009.
- Sawyer, M. C. (1971). Concentration in British manufacturing industry. *Oxford Economic Papers*, New Series, 23(3), 352-383.
- Schmidt, C.M., & Zimmerman, K.F. (1991). Work characteristics, firm size and wages. *Review of Economics and Statistics*, 73(4), 705-710.
- Smit, M.R. (1999). Concentration, labor quality and wages in the South African Manufacturing sector. *South African Journal of Economics*, 67(2), June 1999: 127-142.
- Stock, J. H., & Watson, M. W. (2008). *Introduction to econometrics: brief edition*. United States of America: Pearson Education.
- Suharto, (2002). Disparitas dan pola spesialisasi tenaga kerja industri regional 1993-1996 dan prospek pelaksanaan otonomi. *Jurnal Ekonomi Pembangunan: Kajian Ekonomi Negara Berkembang*, 33-44.
- Suedekum, J. (2006). Concentration and specialization trends in Germany since re-unification. *Regional Studies*, 40(8), 861-873.
- Suria, F.R. (2004). Analisis konsentrasi lokasi industri manufaktur di Jawa Timur (studi tahun 1998-2003). *Skripsi (SI)*. Fakultas Ekonomi Universitas Brawijaya. Malang.
- Tambunan, T. (2001). *Industrialisasi di Negara Sedang Berkembang Kasus Indonesia*. Jakarta: Ghalia Indonesia.
- Tambunan, T. (2006). The development of industry and industrialization plicy in Indonesia since the New Governance era to the post-crisis period.

[http://www.kadin-indonesia.or.id/en/doc/opini/THE_DEVELOPMENT_OF_INDUSTRY & INDUSTRIALIZATION_%20POLICY_IN_INDONESIA%20SINCE%20THE%20NEW%20GOVERNANCE%20ERA%20TO%20THE%20POST-CRISIS%20PERIOD.pdf](http://www.kadin-indonesia.or.id/en/doc/opini/THE_DEVELOPMENT_OF_INDUSTRY&INDUSTRIALIZATION_%20POLICY_IN_INDONESIA%20SINCE%20THE%20NEW%20GOVERNANCE%20ERA%20TO%20THE%20POST-CRISIS%20PERIOD.pdf) retrieved on July 15, 2011

- Tarigan, R. (2004). *Ekonomi Regional, Teori dan Aplikasi*. Jakarta: Bumi Aksara.
- Tohmo, T., Littunen, H., & Tanninen, H. (2006). Backward and forward linkages, specialization and concentration in Finnish manufacturing in the period 1995-1999. *European Journal of Spatial Development*. [http://www.nordregio.se/EJSD/-ISSN 1650-9544](http://www.nordregio.se/EJSD/-ISSN%201650-9544) retrieved on March 17, 2007.
- Tongsheng, Z., & Guohui, G. (2006). Geographic concentration in China's manufacturing. http://www.cjpre.cn/uploads/060612_zhangtsh.pdf. retrieved on March 20, 2007.
- Traistaru, I., & Iara, A. (2002). European integration, regional specialization and location of industrial activity in accession countries: data and measurement. *PHAREACE Project*, P98-1117-R, Bonn.
- Traistaru, I., & Martincus, C. V. (2003). Determinants of manufacturing concentration patterns in Mercosur. *ERSA Conference Papers*, No. ersa03p19.
- Traistaru, I., Nijkamp, P., & Longhi, S. (2003). Determinants of manufacturing location in EU accession Countries. *ERSA Conference Papers (Jyväskylä: European Regional Science Association)*.
- Tubagus, F., Haryo, A., & Titik, A. (2000). The economic crisis and the manufacturing industry: the role of industrial networks. *CSIS Working Paper Series*, WPE 053.
- Vogiatzoglou, K. (2006). Agglomeration or Dispersion? Industrial Specialization and Geographic Concentration in NAFTA. *Journal of International Economic Studies*, 20, 89-102.
- Von-Schütz, U., & Stierle, M. H. (2003). Regional specialisation and sectoral concentration: an empirical analysis for the enlarged EU. *Paper to be presented at the European Regional Science Association 2003 Congress*, August 27 – 30, 2003, Jyväskylä, Finland.
- Wang, Y., & Wei, H. (2008). Industry characteristics, spatial competition and industrial concentration – evidence from China. *China Economic Journal*, 1(2), 177–190.

- Verbeek, M. (2004). *A guide to modern econometrics, 2nd ed.* New York: John Wiley & Sons.
- Weiss, L.W. (1966). Concentration and labor earnings. *American Economic Review*, 56(1), 96-117.
- White, H. (1980). A heteroskedasticity consistent covariance matrix estimator and a direct test of heteroskedasticity. *Econometrica*, 48, 817-818.
- Wieser, R. (2004). Specialization and concentration the Europe: The impact of EU enlargement. *Working Paper*, number 01/2004.
- Winarno, W.W. (2009). *Analisis Ekonometrika dan Statistika dengan EViews*. Yogyakarta: UPP STIM YKPN.
- Wooldridge, J. M. (2000). *Introductory econometrics: A modern approach, 2nd Ed.* United States of America: South-Western College Publishing.
- Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. Cambridge: The MIT Press.
- Wooldridge, J. M. (2009). *Introductory econometrics: A modern approach, 4th Ed.* United States of America: South-Western College Publishing.
- Yati, K. & Yanfitri, (2010). Dinamika industry manufaktur dan respon terhadap siklus bisnis. *Buletin Ekonomi Moneter dan Perbankan*, 135-168.