



UNIVERSITAS INDONESIA

**ASSESSING THE IMPACT OF NET-EXPORT AND OTHER
VARIABLES ON EMPLOYMENT CREATION IN INDONESIA**

TESIS

**Hikmatul Afifah Darojah
NPM. 0706180760**

**FACULTY OF ECONOMICS
MASTER OF PLANNING AND PUBLIC POLICY
ECONOMIC GLOBALIZATION
UNIVERSITY OF INDONESIA
JANUARY, 2009**



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A thesis submitted in partial fulfillment of the requirements for the degree of Master
of Economics in Planning and Public Policy
University of Indonesia

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Student Register Number : 0706180760
Document : Thesis
Title of Thesis : Assessing the Impact of Net-Export and Other
Variables on Employment Creation in Indonesia
Date : 12 January 2009
Advisor/Supervisor : Kiki Verico, MA

Depok, 12 January 2009


Hikmatul Afifah Darojah

ENDORSEMENT

This thesis is proposed by : Hikmatul Afifah Darojah
Name : Hikmatul Afifah Darojah
Student Register Number : 0706180760
Program : Master of Planning and Public Policy
Title of Thesis : Assessing the Impact of Net-Export and Other
Variables on Employment Creation in Indonesia

It has been defended to board of examiners and submitted in partial fulfillment of the requirements for the degree of Master of Economics in Master of Planning and Public Policy, Faculty of Economy, University of Indonesia.

BOARD OF EXAMINERS

Supervisor : Kiki Verico, M.A. (.....)

Examiner : Prof. Dr. Priyono Tjiptoherijanto (.....)

Examiner : Dr. Telisa A. Falianty (.....)

Stipulated in :

Date :

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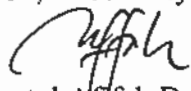
I would like to thank to the only Almighty Allah, because of His blessing, I could complete this research that be entitled of: "Assessing the Impact of Net-Export on Employment Creation in Indonesia"

This research is a partial fulfillment of the requirements for the degree of Master of Economics in International Trade Policy Program, Faculty of Economics University of Indonesia. With the completion of this research, I would like to express my gratitude to the following people who made this research possible:

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Last but not least, I believe that this research is still imperfect. Therefore, suggestions and critics are welcomed to enhance this work.

Depok, 12 January 2009



Hikmatul Afifah Darojah

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ABSTRACT

Name : Hikmatul Afifah Darojah
Study Program : Master of Planning and Public Policy
Title : Assessing the Impact of Net-Export and Other Variables on Employment Creation in Indonesia

A number of previous studies have assessed the impact of trade on employment either in developed countries or in developing countries, because the impact of trade on employment is a central issue in the context of international political economy. Study in this context becomes important since there is a huge problem related to jobless due to external shock triggering by US sub-prime mortgage. However, this study does not expect to solve the problems of rising unemployment. It aims at progressing study of the impact of trade on employment in Indonesia.

The objective of this research is to assess the impact of net-export on employment in aggregate level. Therefore, it will analyze other factors which influence demand of labor in Indonesia. Other factors which will be analyzed are variables of real exports, real imports, capital stock, real wages and real GDP. Furthermore, it will include variable of economic crisis in 1997/1998 as a dummy. The research covers period of the study during 1986 – 2007 and it uses OLS multiple regression.

Econometric model shows that in the period of 1986-2007, exports in term of net-exports (export minus import) have had significant impact on employment with elasticity of 0.03%. Other variables which give significant impact are real wages and real GDP with elasticity of 0.01% and 0.28%, respectively. Furthermore, variables capital stock is not significant in influence employment. In addition, Chow-test for dummy crisis is not significant during the period of the study.

This research finds that over the period of the study rising of net-exports supported more by capital intensive sectors rather than labor intensive sectors. Therefore, in attempt to create more employment, it is important to note that the idea of employment creation is not on the how much increase of net-export required to create jobs but on how much high elasticity of employment caused by net export.

Keywords: net export, employment, multiple regressions model

ABSTRAK

Nama : Hikmatul Afifah Darojah
Program Studi : Magister Perencanaan dan Kebijakan Publik
Judul : Meneliti Dampak Net-Ekspor dan Variable Lain pada Penciptaan Lapangan Kerja di Indonesia

Sudah banyak studi yang meneliti dampak perdagangan internasional pada lapangan kerja, baik di negara maju maupun di negara berkembang. Hal ini karena dampak perdagangan internasional terhadap pekerja adalah isu sentral dalam konteks ekonomi politik internasional. Penelitian dalam konteks ini menjadi penting sejak adanya masalah besar yang berhubungan dengan PHK (Pemutusan Hubungan Kerja) karena adanya *eksternal shock* yang dipicu oleh *US sub-prime mortgage*. Namun, penelitian ini tidak dimaksudkan untuk memecahkan masalah tersebut akan tetapi memberikan kontribusi terhadap kemajuan penelitian di bidang dampak ekspor terhadap penciptaan lapangan kerja di Indonesia.

Tujuan dari penelitian ini adalah untuk mengetahui dampak net-ekspor terhadap total lapangan kerja. Disamping itu, akan di analisa juga faktor lain yang mempengaruhi permintaan tenaga kerja di Indonesia. Faktor lain tersebut adalah variable ekspor riil, impor riil, capital stock, upah riil dan riil PDB. Variable krisis ekonomi pada tahun 1997/1998 akan dimasukkan ke dalam model penelitian sebagai dummy variable. Periode penelitian antara tahun 1986 sampai 2007 dan menggunakan *OLS multiple regression*.

Hasil ekonometrika menunjukkan bahwa selama periode 1986 sampai 2007, ekspor khususnya net-ekspor (ekspor dikurangi impor) mempunyai dampak yang nyata terhadap penciptaan lapangan kerja dengan tingkat elastisitas 0.03%. Variabel lain adalah upah riil dan riil PDB yang memberikan dampak positif terhadap penciptaan lapangan kerja dengan tingkat elastisitas masing-masing adalah 0.01% dan 0.28%. Variable lain adalah capital stock yang ternyata tidak nyata dalam mempengaruhi penciptaan lapangan kerja. Di samping itu, hasil uji Chow untuk krisis ekonomi 1997/1998 sebagai dummy variable ternyata menunjukkan hasil yang tidak significant.

Studi ini menemukan bahwa selama periode penelitian peningkatan net-ekspor lebih di dominasi oleh peran sektor kapital intensive daripada sektor yang berbasis labor intensive. Dengan demikian, dalam upaya untuk menciptakan lapangan kerja, sangat penting untuk dipahami bahwa ide penciptaan lapangan kerja pada dasarnya bukan pada berapa banyak peningkatan ekspor yang dibutuhkan untuk menciptakan kesempatan kerja tapi lebih pada berapa besar elastisitas net-export terhadap penciptaan lapangan kerja.

Keywords: net export, lapangan kerja, multiple regressions model

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CHAPTER 1

INTRODUCTION

1.1. Background

The impact of trade on employment is a central issue in the context of international political economy. A number of previous studies have assessed the impact of trade (export and import) on employment, either in developed countries or in developing countries. Greenaway, et.al (1999) studied the effects of trade on employment in the UK in a panel of labor demand framework on 167 manufacturing industries. He found that increases in trade volumes, both in terms of imports and exports, cause reduction in the level of derived labor demand. Pryor (1999) explored the impact of foreign trade on employment of the US unskilled workers and he found that foreign trade has not much impact on the employment of less skilled U.S. workers. James and Fujita (2000) examined employment on manufacturing export in Indonesia using Input-Output analysis for the period 1985 – 1995. They estimated their study into two sub periods, 1985 – 1990 and 1990 – 1995 and they found out that manufactured exports generated additional employment. Interestingly, the study pointed out that in the latter period although there were significant growth in production and in exports, employment creation was less impressive than in the former period. Verico (2007) pointed out that exports have been driven more by a rise in re-exports through the intra industry trade and the rise of FDI inflow.

In figure 1.1, high GDP growth rates have been supported by the share of exports in GDP. During 1986 – 2007, share of export in GDP relatively stable except in 1997 – 1999 and 2006 – 2007. In crisis time 1997 to 1999, GDP growth experienced slowdown due to severe financial crisis. However, exports experienced a blessing growth from Rupiahs depreciation. In 2007, high export was supported by rising commodity prices in the world market. Indonesia economic performance is dominated by domestic consumption and exports (Asian Development Bank, 2008). Hence, export plays a vital role in determining national economic growth.

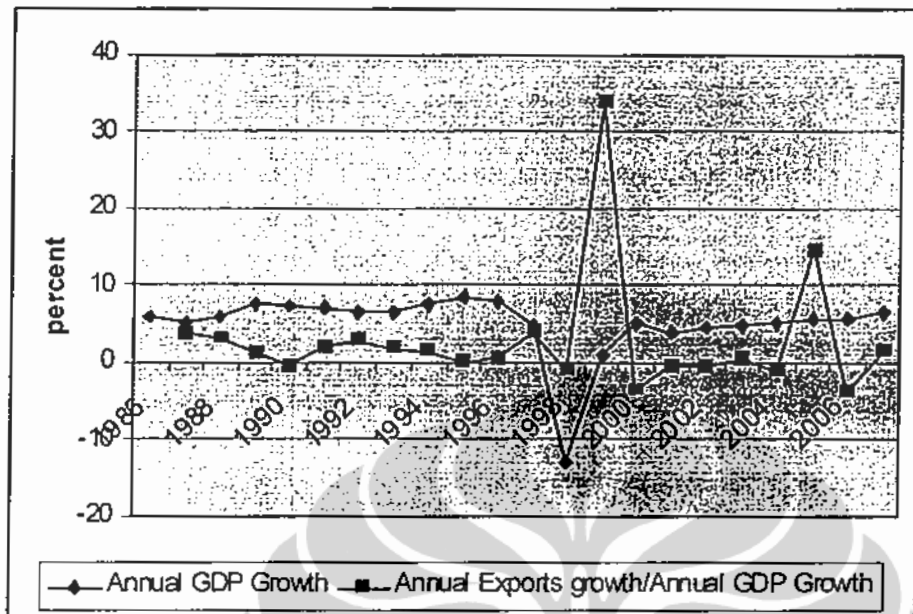


Figure 1.1 GDP Growth and share of exports in GDP, 1986-2007

Source : Constructed from IFS, *International Financial Statistics*, various issues

One important measure of the economics success is the creation of employment¹. However, the high achievement of export trade today has not given significant impact in creating jobs (James and Fujita, 2000). Net-export grows significant but employment grows slow. It can be seen from the comparison between increasing net-export and the number of employment as depicted in figure 1.2 and figure 1.3

Figure 1.2 and figure 1.3 show a comparison between real net-export and employment during 1986 – 2007

¹ William E. James and Natsuki Fujita, *Employment and Manufacturing Exports in Indonesia: An Input Output Analysis*, May 2000

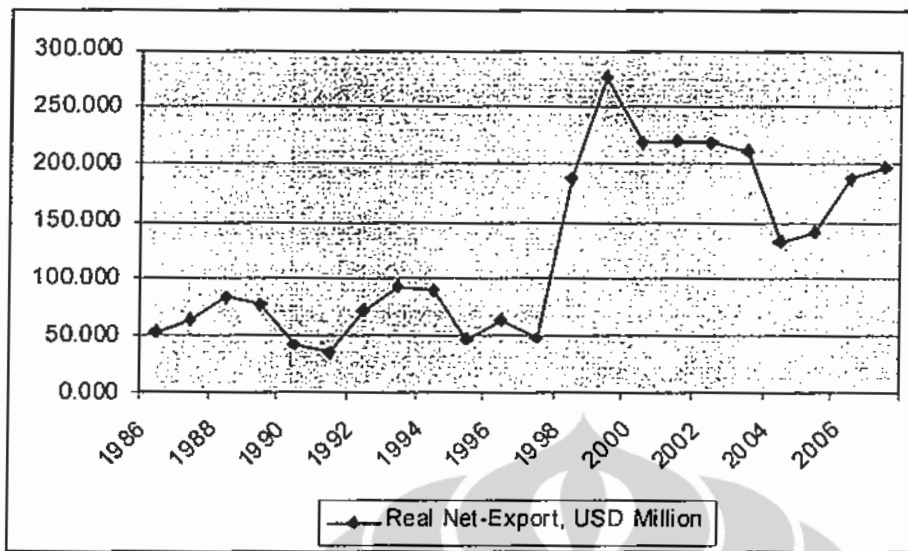


Figure 1.2. Real Net-Export, 1986 - 2007

Source: figured by author from Ministry of Trade and International Financial Statistics sources

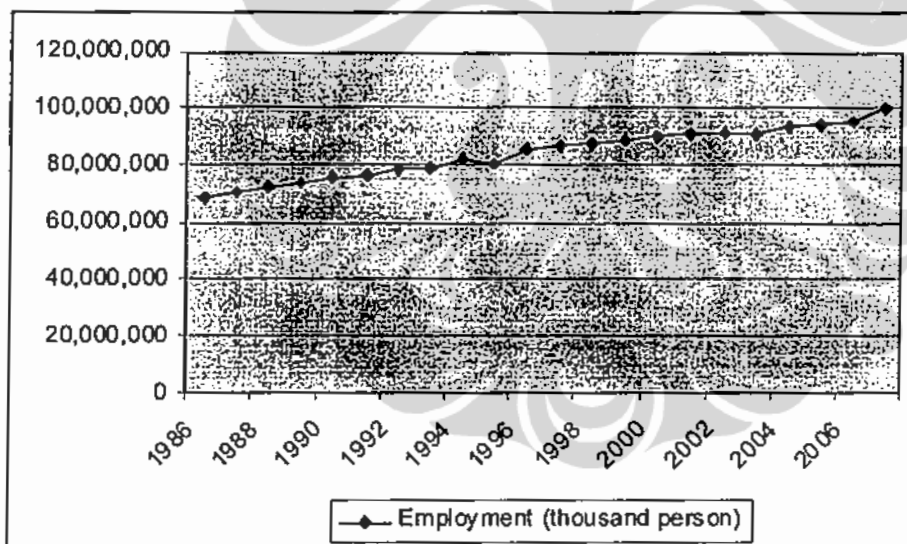


Figure 1.3. Employment, 1986 - 2007

Source: figured by author from National Statistical Agency (BPS) sources

Figure 1.2 shows real net export between 1986 and 2007. During 1986 – 1997, real net-export was going up and down from about 50 USD Million to 100 USD Million. Furthermore, over the period of 1997 - 1999, there was a sharp increase from 50 USD Million in 1997 to 186 USD

Million in 1998 and reached pick to 276 USD Million in 1999². The significant increased of export related to economic crisis which due to Rupiah depreciation made export price from Indonesia relatively cheaper in the world market. However in 1999 - 2000, there was rapid declined in real net-export from 276 USD Million in 1999 to 218 USD Million in 2000 and remained stable at about 120 USD Million during 2001 to 2003. After that, net export trend was declined further to 132 USD Million in 2004 before increased again to 197 USD Million in 2007.

During the same time period, employment rate developed slowly without significant changes (figure 1.3). The number of employment started to rise from 68,338,187 thousand persons in 1986 to 99,930,217 thousand persons in 2007³. There was only about 46 percent growth within 22 years.

Figure 1.4 shows unemployment in Indonesia during 1986 – 2007. After the 1997/1998 crisis unemployment rate experienced a dramatical rise higher than the rate before the crisis.

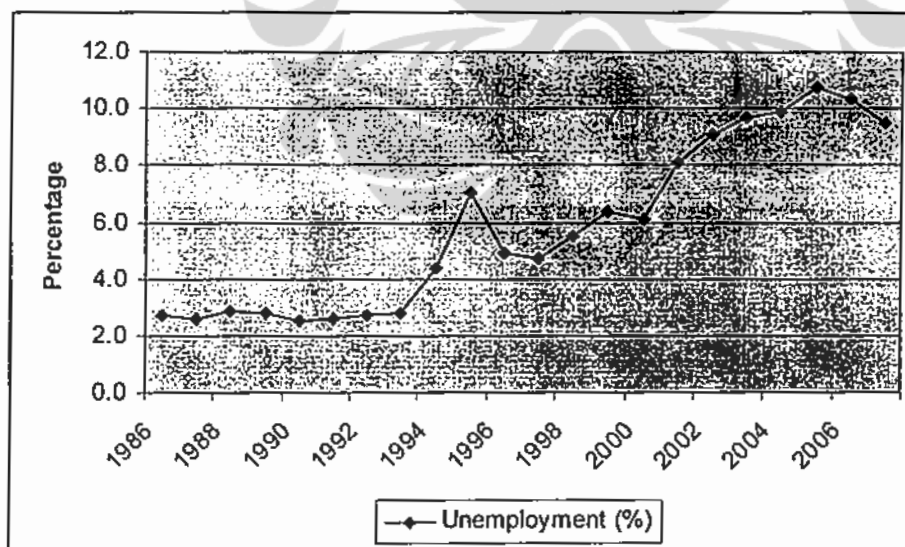


Figure 1.4 Unemployment, 1986-2007

Source : Figured by author from BPS sources

² International Financial Statistic, edition May 2008

³ Annex 5, source was from National Statistical Agency (BPS)

Before the crisis, the highest total unemployment recorded at about 7 percent in 1995 (about 6,000 thousand persons). After the crisis, it rose sharply and reached pick at about 10.8 percent in 2005 (about 11,000 thousand persons), although afterwards it dropped slightly to about 9.5 percent in 2007 (about 10,000 thousand persons)⁴. This fact should be an important signal for Government and be a challenge that a problem in creating employment is a critical issue.

This study is important because there is a rise concern related to unemployment and employment creation due to external shock of US subprime mortgage. However, it does not expect to solve the problems of rising unemployment. It aims at progressing study of the impact of export on employment in Indonesia.

1.2. RESEARCH OBJECTIVE

From background of the study explained above, this work addresses the impact of net export on employment in Indonesia. However, there are others variables beside net-exports which actually giving significant impact on deriving employment demand. These variables are consistent with previous study by Greenway,*et.al* (1999). Those variables are wages, capital stock and output (real GDP). That is why, this study will use those variables in examining employment demand framework. It is important to note that on previous study variables exports and imports were not in net-forms. However, in this study exports and imports were transformed into net-exports (exports minus imports) because during regression those variables experienced multicollinearity. In addition, variable capital stock was also contaminated by multicollinearity with variable output. Furthermore, for considering Indonesia condition the study also includes variable dummy of economic crisis 1997/1998. Thus, this research has five main objectives ;

- (1) To assess the impact of real net export on employment
- (2) To assess the impact of capital stock on employment

⁴For details see annex.5

- (3) To assess the impact of real wages on employment
- (4) To assess the impact of real GDP on employment; and
- (5) To observe how dummy variable of economic crisis in 1997/1998 affected the employment in Indonesia

1.3. HYPOTHESIS

Hypothesis 1: Employment is affected by real net export with positif relation

Hypothesis 2: Employment is affected by capital stock with positive relation

Hypothesis 3 : Employment is affected by real wages with positive relation

Hypothesis 4 : Employment is affected by real GDP with positive relation

Hypothesis 5: Employment is affected by the time of economic crisis in 1997/1998 with negative relation

1.4. RESEARCH METHODOLOGY

The impact of net export on employment in Indonesia was investigated using econometric approach which inspired from the model constructed by David Greenaway, et al (1999). The model is developed as a tool to understand the impact of exports on employment quantitatively. This study differs from previous study in several respects. First, it uses multiple regressions with time series approach using dummy variable of economic crisis. This approach is chosen in attempt to close with Indonesia condition. Second, this study deals with labor demand in aggregate level while previous study deals with labor demand elasticities in firm level (It is therefore concerned with firm reaction or firms characteristics).

The reason for choosing aggregate level because from policy framework, however, the central problem is to understand the behaviour of the aggregate labor demand rather than firms individual labor demand.

Research is started from 1986, when Indonesia applied deregulation policy from import substituting policy to export promotion strategy and it ended up in 2007 due to the availability of the data.

1.5. RESEARCH COVERAGE

The study only identifies and analyzes in macro scope and does not focus in technical scope. It covers the impact of net export on employment in aggregate level during 1986 – 2007 using time series regression approach. It used secondary data from National Statistic Agency (BPS), Ministry of Trade (CEIC data), Bank Indonesia, internet sources, and macro-economic related data from International Fund Statistics (IFS) such as GDP, GDP deflator, exports, imports, wages and employment.

1.6. ORGANIZATION OF THE THESIS

The remainder of the thesis set out as follows. In the next section, this study attempts to clarify the theoretical background which covers; production function theorem, Cobb-Douglass production function, Total Factor Productivity, Phillips Curve theorem, Factor endowment and the Heckscher Ohlin theory. It also covers concept and definition related to labor force in Indonesia, Forward and Backward linkage in the economy as well as several previous studies. Then, in section 3 discuss the overview of economic situation in Indonesia during 1986 – 2007 and discuss export performance and labor market condition during the period of the study. It covers; import substitution and export promotion (why developing countries move from import substitution to export promotion strategy), it also discuss the role of international trade in Indonesia economy, internal and external challenge of trade and labor force situation in Indonesia. Furthermore, in section 4 it discusses the data, an empirical strategy and detailed question which this study hopes to address. In section 5, it presents all the results and finish with some general conclusions.

Organization of this study is written as follows:

Chapter 1 Introduction

- 1.1. Background
- 1.2. Research objective
- 1.3. Hypothesis
- 1.4. Research methodology

	1.5. Research coverage
	1.6. Organization of the thesis
Chapter 2	Theoretical Background
	2.1. Factors of Production and Factor payments
	2.2. Cobb-Douglas Production Function
	2.3. Total Factor Productivity
	2.4. Phillips Curve Theorem
	2.5. Factor Endowments and the Heckscher – Ohlin Theory
	2.6. Concept and definition related to labor force in Indonesia
	2.7. Forward and Backward Linkage in the Economy
	2.8. Summary of Previous Study
Chapter 3	An overview of Trade and employment
	3.1. Import Substitution and Export Promotion
	3.2. The Role of International Trade in Indonesia Economy
	3.3. Internal and External Challenge of Trade
	3.4. Labor Force Situation in Indonesia
Chapter 4	Research Methodology
	4.1. Modelling employment effect
	4.2. Hypothesis
	4.3. Data description and data source
	4.4. Methodology
	4.5. Econometrics Test
Chapter 5	Result and Analysis
Chapter 6	Conclusion and Recommendation

CHAPTER 2

THEORETICAL BACKGROUND

2.1. Factors of Production and Factor Payments

Production of the economy refers to all transformation process in the economy in producing goods from input (labor and capital) to output (GDP). In the economies, firms compete to produce goods or services efficiently. They use input such as labor and capital. These inputs are defined as factors of production. The payments made to factors (wages and interest payments) are called factor payments (Dornbusch, 2004)

Factors of production actually include not only labors and capitals, but also raw materials and technology. But for research purpose, several studies usually use only labor and capital. In theory, the relationship of those factors of production (labors and capitals) to produce output is considered as production function. The relationship between input and output is very complex actually, however, this relationship is expressed in production function equation as follows:

$$Y = f(K, N) \dots\dots\dots (2.1)$$

Where, Y is output, K is capital stock and N is labor. Furthermore, factor payments refers to the payment paid to factors of production, in which labor payments equal the wage rate (w) times the number of labor utilized while capital payments equal the rental rate (r) times the amount of capital rented¹. These relationships can be expressed;

$$Y = (w \times N) + (r \times K) \dots\dots\dots (2.2)$$

Furthermore, production function theorem depicts the relationship between inputs and outputs in the economy.

¹ Dornbusch, R., Fischer, S., Startz, R. (2004) *Macroeconomics*, Mc Graw Hill, p.23

2.2. Cobb Douglass Production Function

Cobb Douglass Production Function theorem was introduced by Charles Cobb and Paul Douglas in 1928. This theory widely used to explain the relationship between capital, labor, total factor productivity and output. The production function equation written as follow:

$$Y = AK^{\alpha}N^{\beta} \dots\dots\dots(2.3)$$

Where:

- Y = Real GDP
- K = Capital input
- N = Labor input
- A = Total Factor Productivity
- α = Capital share
- β = Labor share

The production function measures the change in the supply-side performance or output growth (Y) on the basis of labor quantity (N), capital (K) and total factor productivity (A), whereas total factor productivity contains information about technology and allocative efficiency.

The increase in output generated by increased in labor is called MPN (Marginal Product of Labor), while the increase in output generated by increased in capital is called MPK (Marginal Product of Capital)⁶.

From the equation 2.3 stated above, more input means more output. In other words, the MPL and the MPK are both positive. The MPL and MPK have the necessary production function property of diminishing marginal returns; increases in L decrease the MPL and increases in K decrease the MPK (Dornbusch, 2004). As well, increases in total factor productivity (A) or the amount of the other input, increase the marginal product of an input; more capital makes labor more productive at the margin.

⁶ Dornbusch, R., Fischer, S., Startz, R.(2004) *Macroeconomics*, Mc Graw Hill, p.75

Capital share (α) and labor share (β) are the input elasticity of capital and labor. These values are constant and determined by the availability of technology in the economy. Input elasticity refers to percentage of output change as the effect of percentage of input change. Capital input elasticity and labor input elasticity are derived from:

$$L \text{ Elasticity} = (dQ/Q):(dL/L) = (dQ/dL).(L/Q) = \alpha \dots\dots\dots(2.4)$$

$$K. \text{ Elasticity} = (dQ/Q):(dK/K) = (dQ/dK).(K/Q) = \beta \dots\dots\dots(2.5)$$

Based on equations above, it is proven that regression coefficient of Cobb-Douglas production function is also considered as input elasticity.

Furthermore, if the sum of capital share and labor share is equal to one, the production function has constant return to scale. Constant Return to Scale refers to the increasing inputs caused in increasing output by the same proportion⁷. If increasing output less than the increasing input, it is called there are decreasing return to scale. And if output increases by more than the input proportion, there are increasing returns to scale. Constant Return to Scale (CRTS) can be written mathematically as follow;

1. $\alpha + \beta = 1$, the production function has *constant return to scale*
2. $\alpha + \beta > 1$, the production function has *increasing return to scale*
3. $\alpha + \beta < 1$, the production function has *decreasing return to scale*

Hajkova and Hurnik (2007), applying the Cobb-Douglas production function in their study and assume the parameter of α and β to be constant over time. They further stated that in theory, the factors of production are paid based on the value of marginal product. Therefore, $\delta Y/\delta L = w$ and $\delta Y/\delta K = r$, where w and r are wage rate and capital rental rate, respectively⁸. That is, the real wage (w) paid to labor is equal its marginal product (MPL) and the real rental price (r) paid to capital is equal its marginal product (MPK). Under the assumption of constant returns to scale in capital and labor, $rK + wL = Y$ and $\beta = rK/Y$, while $\alpha = wL/Y$.

⁷ For example, if input L and K are each increased by 10 percent, Y increase by 10 percent as well

⁸ See Hajkova and Hurnik (2004), "Cobb-Douglas Production Function; The Case of a Converging Economy", Czech Journal of Economics and Finance, no.9-10

2.3. Total Factor Productivity

Total Factor Productivity 'TFP' is a concept which measures productivity which contains information about technology and allocative efficiency. In production function theory, output grows through increases in inputs (capitals and labors) and through increases in productivity due to improved technology. In equation 2.3, total factor productivity is represented by 'A' where the amount by which output would increase as a result of improvements in methods of production with all inputs unchanged (Dornbusch, 2004).

If Total Factor Productivity (TFP) increase by 1 percent, hold all input unchanged, output would improve by 1 percent. Started from the production function $Y = AF(K,N)$, output changes if labor changes by ΔN , capital changes by ΔK , and technology changes by ΔA . The change in output would be written;

$$\frac{\Delta Y}{Y} = \alpha \frac{\Delta K}{K} + (1-\alpha) \frac{\Delta L}{L} + \frac{\Delta A}{A} \dots (2.6)$$

output growth = capital share x capital growth + labor share x labor growth + technical progress

In equation 2.6, $\Delta A/A$ or the growth rate of total factor productivity (TFP) is estimated indirectly because there is no data available. We have data for output, capital and labor. Thus, from these data we can estimate TFP growth by the equation;

$$\frac{\Delta A}{A} = \frac{\Delta Y}{Y} - \alpha \frac{\Delta K}{K} - (1-\alpha) \frac{\Delta L}{L} \dots (2.7)$$

$\Delta A/A$ or the growth rate of Total Factor Productivity (TFP) is the amount by which output would increase as a result of improvements in methods of production, with all input unchanged (Dornbusch, 2004). The growth of TFP is considered as a residual. It is also familiar with a residual Sollow.

TFP could be increased for several respects; it would come from the improvement of education, the improvement of production methods or progressing in technology. It can also come from government regulation.

2.4. Phillips Curve Theorem

Phillips Curve represents negative relationship between the rate of inflation and the rate of unemployment. It means that when unemployment is high, inflation is low and vice versa. When unemployment is high, wages increase slowly; and when unemployment is low, wages rise rapidly. This concept was introduced by A.W. Phillips in 1958 when he published his study about wage behaviour in the United Kingdom during 1861 - 1957⁹.

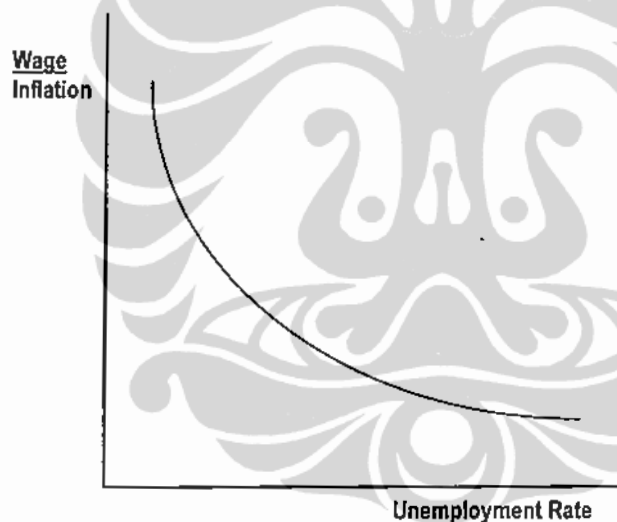


Figure 2.1. The Phillips Curve

Source : Dornbusch, R., 2004, p. 118

In figure 2.1, the Phillips curve shows that the rate of wage/inflation decreases with the unemployment rate. Suppose W_t is the wage this period, and W_{t+1} is the wage next period, the rate of wage inflation (g_w) is defined as;

⁹ Dornbusch, R., Fischer, S., Startz, R. (1998). *Macroeconomics*, Seventh edition, New York, Mc Graw Hill, 1998, p.117

$$g_w = \frac{W_{t+1} - W_t}{W_t} \dots\dots\dots(2.8)$$

With u^* refers to the natural rate of unemployment, the simple Phillips curve can be written as;

$$g_w = -\epsilon(u - u^*) \dots\dots\dots(2.9)$$

Where, ϵ measures the responsiveness of wages to unemployment. Equation 2.9 stated above explains that wages are falling when the unemployment rate exceeds the natural rate (or when $u > u^*$), and rising when unemployment is below the natural rate. The difference between unemployment and the natural rate, $u - u^*$, is called the *unemployment gap*¹⁰.

Phillips curve concept becomes a basis of macroeconomic policy analysis and its concept is commonly taken by policymakers to control unemployment and inflation within a monetary policy. Policymakers could tolerate a high rate of inflation for the sake of lowering unemployment or they could keep low inflation by sacrificing high unemployment. It is called the trade-off between inflation and unemployment.

However, several critics rose for this concept because there were many countries experienced high rate of inflation while at the same time having high unemployment as well. This condition is known as stagflation. Stagflation could happen because there are rational expectation and the NAIRU (non-accelerating inflation rate of unemployment). These concepts exist and explain between the short term and the long term Phillips curve. In the short term Phillips curve, policymakers face trade-off between inflation and unemployment; while in the long term, they face rational expectation and non-accelerating inflation rate of unemployment (NAIRU). Figure 2.2 describes the logic of stagflation.

¹⁰ See Dornbusch, R., Fischer, S., Starz, R. (1998). *Macroeconomics*, Seventh edition, New York, Mc Graw Hill, 1998, p.118

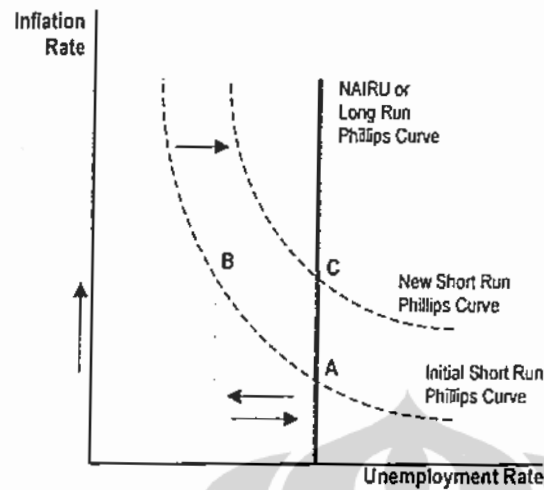


Figure 2.2. Short-Run and Long-Run Phillips Curve

Source : www.wikipedia.com

The long-run Phillips curve is represented by the vertical line while the short run Phillips curve is represented by the dashed line. The NAIRU theory says that when unemployment is at the long run (defined by vertical line), inflation is stable. However, in the short-run policymakers through expansionary policy will face trade off between inflation and unemployment which represented by 'initial short-run Phillips curve line'. Expansionary policy can reduce unemployment rate (with high inflation a trade-off) and unemployment rate moves from point A to point B. However, this expansionary policy will induce inflation expectations, moving the short-run curve from point B to C ('new short-run Phillips curve'). In sum, unemployment reduction by using expansionary policy will be temporary, and lead only to higher inflation in the long run. In the long run, unemployment will back to the natural rate of unemployment and there is no trade-off between inflation and unemployment¹¹

¹¹ See Mankiw, N.Gregory. (2006) Macroeconomics, Sixth edition, p.382

2.5. Factor Endowments and the Heckscher – Ohlin Theory

2.5.1. Factor Intensity and Factor Abundance Definition

The definition of factor intensity will be explained as follows; suppose there are two commodities; X and Y, and two factors; labor (L) and capital (K) and two nations; nations 1 and nations 2. Y is capital intensive if the capital-labor ratio (K/L) used in the production of Y is greater than (K/L) used in the production of X¹².

Factor abundance is defined into two ways; First, in terms of physical units; and second, in terms of relative factor prices. In terms of physical units, nation 2 is capital abundance if the ratio of total capital to total labor (TK/TL) in nations 2 exceeds nation 1¹³. In term of factor prices, nation 2 is capital abundant if the ratio of capital price (r) to labor price (w) is lower in nation 2 than in nation 1¹⁴.

2.5.2. Heckscher-Ohlin Theorem (Factor Endowment)

International trade theory has been developed by many economists. The first discussion is Heckscher – Ohlin theory. Heckscher – Ohlin theory was based on David Ricardo theory about comparative advantage. It predicts the pattern of trade between countries based on the characteristics of the countries. Heckscher – Ohlin theorem says that country will export the goods that its production requires the abundant factor of production and will import the goods that its production requires the scarce factor of production. For example, a country which has labor abundant will exports labor intensive goods and will imports capital intensive goods. On the other hand, a country which has capital abundant will export capital intensive goods and will import labor intensive goods (Salvatore, 2007)

A capital-abundant country is a country that is endowed with capital relative to the other country. This gives the country a benefit in producing the good which uses relatively more capital in the production

¹² Y is capital intensif if $(K/L)_y > (K/L)_x$

¹³ Nation 2 is capital abundant if $(TK/TL)_2 > (TK/TL)_1$

¹⁴ Nation 2 is capital abundant if $(r/w)_2 < (r/w)_1$

process of capital intensive good. The opposite also occurs in a labor-abundant country.

So, if these two countries are not trading, the price of the capital-intensive good in the capital-abundant country would decrease due to its extra supply relative to the price of the good in the other country. The same as in the labor-abundant country the price of the labor-intensive good would decrease relative to the price of that good in the capital-abundant country.

When trade is occurred, the firms in those two countries will move their products to the international markets that have higher price. So, the capital-abundant country will export the capital-intensive good because the price is higher in the other country. The same situation will occur in the labor abundant country. This country will also export the labor-intensive good. Trade flow will increase until the price equalized in the two markets. The H-O theorem says that the difference in resource endowments as determined by national abundancies is one reason that international trade is occurred.

2.5.3. Heckscher-Ohlin-Samuelson Theorem (Factor – Price Equalization and Income Distribution)

2.5.3.1. Factor Price Equalization

In 1970, Paul Samuelson proved factor prices equalization theorem which sometimes is called Heckscher – Ohlin – Samuelson theorem (H-O-S theorem). Factor-price equalization theorem says that when countries trade each other, the price of the good traded is equalized between countries. It leads to the equalization of the prices of the factors of production. For example, if goods sold to international market are equalized, it leads to the equalization of capital price and labor price in producing those goods. This means that free trade will equalize the wages of workers and the rents of capital between trading partners (Salvatore, 2007)

The theorem based on the assumption that the two countries share the same production technology and that markets are perfect competition. In

a perfect competition market factors are paid based on the output prices of the goods. When prices differ between countries, their wages and rents are also differ. However, when goods prices are equalized, like in free trade, the value of products is also equalized between countries and that is why wages rate and rental rates must also the same between those two countries. Thus, international trade reduces wage (w) and capital price (r) between two trading nations. The logic can be shown graphically in figure 2.3 below;

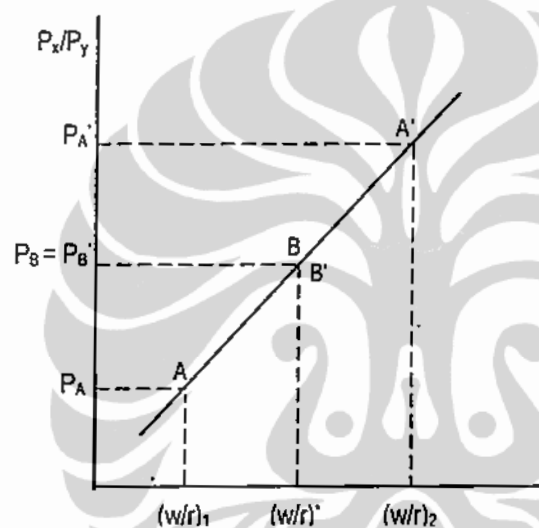


Figure 2.3. Relative Factor-Price Equalization.

Source : Salvatore, *International Economics* (2007), p.139

Figure 2.3 describe graphically how the wage (w) and capital price (r) equalized between the two trading nations after they trade each other. Suppose before trade, nation 1 is at point A and nation 2 is at point A'. Since they trade, $(w/r)_1$ rises and $(w/r)_2$ falls and this will continue until point B which is $(w/r)_1 = (w/r)_2 = (w/r)^*$. In other words, w rises and r falls in nations 1, while w falls and r rises in nation 2. The point is that international trade tends to equalize wage (w) and capital price (r) in the two trading nations (Salvatore, 2007)

2.5.3.2. Income Distribution (Stolper – Samuelson Theorem)

After trade, in nation 1 (the nation with cheap labor and expensive capital) real income of labor will rise while real income of capital owner will fall. On the other hand in nation 2 (the nation with expensive labor and cheap capital), the real income of labor will fall and real income of capital owner will rise. This is the point what the Stolper Samuelson theorem concludes. He postulated that an increase in the relative price of commodity raises the earnings of the factor utilized in the production of that commodity¹⁵.

Free trade will make the real return of a country's abundant factor to rise, while the real return of the country's scarce factor will fall. For example, if the US and Indonesia are two countries that trade each other, and if the US is capital-abundant while Indonesia is labor-abundant. Then, capital owners in the US will gain because of trade while workers there will lose (wage income will decline). But in Indonesia, workers will gain, while capital owners will lose.

When two countries trade each other, the price of exported goods will rise while the price of imported goods will fall. The high prices in the export products will make companies to expand their production. At the same time, the import-competing industries will suffer because of falling price of their products. They will reduce production to stop their losses.

Stolper – Samuelson theorem is also true for the case of imposing tariff. If country imposes tariff, the price of commodity protected by the tariff will rise. It leads to the rise of factor production used intensively in producing that commodity.

Critics addressed to Heckser – Ohlin – Samuelson theorem is that the simplifying assumption in the theory does not apply in the reality. For example; in fact, wage for employers (doctors, secretaries, mechanics, engineers, etc) in US is much higher than in, for example, Indonesia. The explanation is rest on the reason of technology differences, transportation

¹⁵ Salvatore, Dominick. (2007). *International Economics*, p.264

cost and trade barriers. Moreover, international market is actually operated under condition of imperfect competition.

2.5.4. Paradox Leontief

In 1953, Wassily Leontief conducted empirical test of the Heckscher-Ohlin by using 1947 US data and found that what the H-O model says did not hold in US export import. Since US was assumed as capital intensive nation relative to the rest of the world; then based on H-O theory, US was expected to export capital intensive commodities and imported labor intensive commodities.

However, Leontief found that the test result contradicted with what the Heckser-Ohlin model prediction. Leontief found that US import were more capital intensive than US export and this finding known as the Leontief paradox.

Following researchs explained that Leontief paradox could be happened because of several reasons;

1. The 1947 data was not a representative year
2. At that time, US tariff gave more protection to labor intensive industries
3. The exclusion of human capital from the calculations

2.6. Concept and Definition Related to Labor Force in Indonesia

Concept and definition related to labor force in Indonesia is important to be explained in order to construct one perception. The labor force concept in National Labor Force Survey (NLFS) 2007 is based on recommendations of International Labor Organization (ILO). There are two categories in population; (1) working age group; and (2) a non-working age group. Furthermore, working age group is divided into two categories; (1) those in the labor force; and (2) those out of the labor force. The definitions are explained in details as follows;

Working age population: persons of 15 years old and over

Labor Force: persons of 15 years old and over who, in the previous week, were working, temporarily absent from work but having jobs, and those who did not have work and were looking for work

Out of labor force: persons of 15 years old and over who are not categorized in labor force, for example; students, housekeepers, housewife, etc

Employment: a number of persons who works for pay for the duration at least one hour during the survey week.

Unemployment; consists of:

1. Person without work but looking for work
2. Person without work who have established a new business/firm
3. Person without work who were not looking for work, because they do not expect to find work
4. Persons who have made arrangements to start work at future starts.

Wages are the remuneration paid to an employee by an employer, including payment in cash and or in kind

Employment, furthermore are classified into seven categories;

1. Own business, those who does business independently
2. Employer assisted by temporary worker/unpaid worker, those who does business assisted by temporary workers/unpaid workers
3. Employer assisted by permanent workers, those who does business assisted by paid permanent workers (at least one worker)
4. Employee, those who works for institution or other person for pay
5. Casual employee in agriculture, those who works at his/her own risk without the assistance of employees in the agriculture sector. Agriculture sector covers food crops, farm crops, forestry, animal husbandry, and fishery
6. Casual employee not in agriculture, those who works at his/her own risk without the assistance of employees out of the agriculture sector. Non agriculture sector covers mining, manufacturing, electricity, construction, trade, transport, communication, financial service, housing, etc

7. Unpaid worker, those who work without pay in a business operated by the family, relatives or neighbours

Those seven classifications started to be constructed in 2001. Before 2001, casual employee in agriculture (number 5) was included in employee (number 4) and casual employee not in agriculture (number 6) was included in self employer (number 1).

Furthermore, according to Prof. M. Arsjad Anwar in Supriadi (2005), those 7 employment classification can be considered as formal sector (number 3 and 4), semi-formal sector (number 5 and 6) and informal sector (number 1, 2 and 7)¹⁶

Unlike in developed countries, labor market is dualistic in developing countries. There are formal sectors with high productivity and high wage but only absorb 30 % employment, while there are informal sectors with low productivity and low wage but able to absorb about 70% of employment.

Job Search and Frictional Unemployment.

Mankiw (2006) pointed out that first reason for unemployment problem is because it takes time to fit between the employment and jobs opportunity. Labor market in aggregate level assumes that in equilibrium number of employment and number of jobs opportunity in an economy are identic. Thus, if this assumption holds, losing a job does not mean become unemployment; labor or employer that quit from job will get a new job in a market wage immediately.

In reality, job seekers are not identic (each of job seekers have different skill and preference). For that reason, Searching job takes time because different job opportunity requires different skill and different wage. This kind of unemployment is called as **frictional unemployment**.

¹⁶ See Supriadi, Andri Yudhi, 2005, *Dampak Kenaikan Upah Minimum Terhadap Pekerjaan Formal di Perkotaan tahun 1998-2004*

Second reason is wage rigidity. A condition where wages fails in adjusting labor supply and labor demand in an equilibrium level. Wages is not flexible. Figure 2.4 shows real wage rigidity creates unemployment.

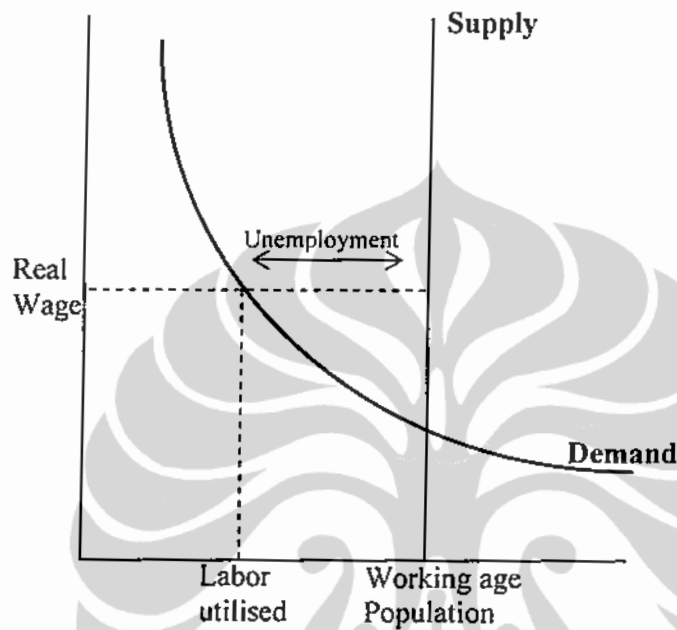


Figure 2.4. Real Wage Rigidity

Source : Figured by author from Mankiw, 2006

When real wage is at above equilibrium level, number of labor supply exceeds labor demand. Wage rigidity lessen employment opportunity and increases unemployment. This condition what is called **structural unemployment**¹⁷

2.7. Forward and Backward Linkages in the Economy

Hirschman (1958) in Powers (2004) described forward and backward linkages as a combination of intermediate inputs, monopolistic competition and transportation costs that creates spillover between industries. Forward linkages exist when increased production by upstream

¹⁷ Mankiw, N.Gregory, *Macroeconomics*, Sixth edition, 2006, p.161

firms provides positive externalities to downstream firms. These are defined as forward linkages because the effect of a change is transmitted to firms further along in the sequence of production.

Furthermore, Hirschman (1958) in Powers (2004) pointed out that backward linkages exist when increased production by downstream firms provides positive externalities to upstream firms. The linkages are said as backward because changes are transmitted back to a previous stage of production.

Suryahadi, *et.al* (2006) defined sectoral linkages in the economy into several types. Those linkages are production and distribution linkages. A production linkage occurs when a sector produces output which is then used as an intermediate input by another sector. For example is the linkage between farm producing food commodities and a food processing industry. From a farm's point of view, the linkages to seed and fertilizer producers are backward linkages. On the other hand, the linkages from the farm to food processing industries are forward linkages.

In addition, distribution linkage refers the mediator between two sectors. A farm can supply its harvest to a food-processing industry directly, or it can also sell its output to a buyer who then re-sells it to the food processing industry. In this case, a buyer acts as a distribution linkage. A distribution linkage provides two types of services. First, it provides location value added by transporting a good from one place to meet its demand in another place. Second, it provides time value added by sorting a good to meet its demand in the future (Suryahadi, *et.al.*, 2006)

Another linkage is consumption linkage. This linkage refers to the consumption demand from households for the output of a sector. This linkage works through the second effect of growth in the economy as a whole. This growth increases demand from household due to increasing income driven by growth. For example, new technology, let say computer, is introduced to the economy, which leads to the increase in productivity. Household supplying factor of production (labor) in the economy experience

increases in real income. Due to the increasing income, the household demand for goods increases (Suryahadi, *et.al.*, 2006)

2.8. Summary of Previous Study

Empirical works on the impact of trade on employment had been conducted by Greenaway, *et al* (1999) and James and Fujita (2000). Greenway, *et al* (1999) models the effects of trade on employment in the UK on a panel of 167 manufacturing industries. They find that increase in trade both in terms of exports and imports, cause reductions in the level of derived labor demand. Their findings consistent with the view that increased trade openness tends to increase the efficiency which means that with higher efficiency will result in high productivity with demand less labor.

James and Fujita (2000) estimate the employment effects of manufactured exports during the period of the study of 1985 – 1995. They estimate the employment effect of manufactured exports in two sub periods (1) 1985 – 1990 and (2) 1990 – 1995. Using Input-Output (I-O) table, they found out that in the later period, although there was rapid growth of production and exports, employment creation is far less strong than in the period of 1985 – 1990. Although light industrial exports continued to expand, they did not generated employment as much additional employment as in the past. Moreover, the distribution of employment effects changed dramatically between the two periods. In the former period, employment creation through manufactured exports was greatest in manufacturing but was also quite significant in primary and tertiary industries. However, in the latter period, primary employment creation was marginal and the largest gains were in services rather than in manufacturing. And in some light industrial sectors, particularly wood, it appears that reducing export growth led, via backward linkages, to reduced employment in the primary wood sector in the latter period.

CHAPTER 3

AN OVERVIEW OF TRADE AND EMPLOYMENT

3.1. Import Substitution and Export Promotion

Import substitution is a policy that reduces imports by imposing tariff to protect domestic production in the ground of substituting the imported goods by locally produced goods. Meanwhile, export promotion strategy refers to policy that do not discriminate imports for the sake of exports. Why most of developing countries move from import substitution to export promotion? Before answering the question, it is important to explain what the definition and crucial issues related to import substitution and export promotion.

In 1960s, most of developing countries experienced a slowdown in a price of primary export products. At that time, trade policy in many developing countries were influenced by the belief that the key to economic development was creation of manufacturing sector, and that the best way to strengthen that manufacturing sector was by protecting domestic manufacturing from international competition. Many developing countries tried to develop domestic industries by limiting imports of manufactured goods to strengthen manufacturing sector in domestic market¹. This belief relied on the infant industry argument.

Infant industry argument refers to the argument that developing countries have potential comparative advantage in manufacturing but new manufacturing industries in developing countries can not compete with manufacturing in developed countries that have had strong international market. To encourage domestic manufacturing to go strong, government should support that new domestic industry by using tariff or import quotas.

The point is that import substitution is a strategy to exchange product or intermediate goods that are usually being imported with supply from domestic resources. For those purpose, government imposing tariff barrier or quota and try to encourage domestic industry to establish their

¹ Krugman, Paul R and Obtsfeld, Maurice (2006), *International Economics; Theory and Policy*, Seventh edition, p.243

business. It is hoped that the infant industries will grow up and be able to compete in international market and generate economic development. Under the imports substitution strategy, policy makers accept protectionism as an instrument to promote industrialization.

However there are advantages and also disadvantages by applying this import substitution strategy. The advantages are on the existence of market for domestic supplier. For example, by applying import substitution strategy, domestic firms which produce intermediate inputs would have certainty market by supplying inputs for other manufacturings. Beside that advantage, it is also easier for developing countries to protect their own domestic market rather than to ask developed countries to lower trade barriers against their primary export products.

However, there is disadvantage of import substitution which often stated, is that, domestic industries tend to grow under the protection and thus, do not have incentive to become more efficient internationally.

Opposite from the import substitution strategy, export promotion strategy defined as a strategy that a country produces goods for international trade- demand and hence to increase exports. Export promotion strategy promotes only the industries that able to compete with foreign rivals. Because the goal is to trade abroad, there becomes competition. Exporters have to improve their technology, their quality products in order to compete with their rivals. They have to make research and development studies. Hence, the industries which still at the early establishment must be protected for a while (Balassa, 1989; in Yilmazkuday,n.d)

The main advantages of export oriented strategy (outward oriented strategy) are on the ability of this strategy to overcome the smallness of the domestic market and expand abroad. Furthermore, in theory of comparative advantage it is stated that a country must specialize in the production that uses the most factor of production. That is why, the industries grow in harmony with the country comparative advantage. If the country has advantage in labor then the export promotion strategy would be a means to the unemployment problem (Bruton, 1989; in Yilmazkuday, 2000)

Meanwhile, there are also disadvantages of this strategy: first, developing countries will face difficulty to start exporting industries because of competition from more efficient foreign industries. Second, developed countries usually applied doubled standard on their policy, for example, developed countries protect labor intensive industries in which developing countries have comparative advantage (Pahariya, NC, 2008)

As mentioned above, most of developing countries have started the economy by an import substitution strategy, and then they replaced the strategy into the export orientation. Srinivasan (1999) mentioned that the countries which applied import substitution strategy had to shift to export promotion strategy due to the economic crisis. After these shifts these countries had developed faster than the others.

However, there are problems usually following during shifting to an export promotion strategy. In order to increase export, those problems need to be reduced. Those problems are as follows (Yilmazkuday, n.d);

Structural changes in exchange rate is not enough to increase export. Some structural changes in the real sector are also important, for example improving productivity, improving technology, the appropriate allocation of resources and institutional rearrangements (Srinivasan, 1999)

Tariffs, as a means of protection, should be decreased in order to have an appropriate climate for trade. Reducing tariffs does not necessarily means to unprotected local producers. Using a flexible exchange rate, it is a new way of protection for the local producers.

Keesing (1967) and Bhagwati-Krueger (1973) in Panahariya (2008) mentioned that under the export oriented policy, international competition forces domestic entrepreneurs to close to the innovation and close to the learning process. Exporting firms must face competition in international market and it creates the survival of innovation exporters.

Grossman and Helpman (1991), Barro and Sala-I-Martin (1995), Romer (1992), and Edwards (1998) in Panahariya (2008) mentioned that countries which open up to international trade obtain greater capacity to

absorb advanced technologies and take advantage due to access to world markets.

3.2. The Role of International Trade in Indonesia Economy

International trade (export and import) and investment have significant role in a country economy. Salvatore (2004) stated that trade is an engine of growth. Trade requires investments, either foreign or domestic, to support manufactures in producing goods. Globalization forced Indonesia to change the policy from import substitution to export promotion. In 1980s, Indonesia has applied export promotion strategy. International trade and investment flows were much stronger than before. At that time, Indonesia was predicted as one of the Miracle economies in Asia. GDP growth reached more than 8 percent per year.

The history of the modern Indonesia economy started in 1945 under Soekarno's government. During the Soekarno era (the period between 1945 and 1965), the fiscal budget was financed by printing money. This policy created high inflation and economic stagnation. Inflation reached 1500% in 1965 followed by food scarcity and high unemployment¹⁹.

In the Soeharto era, economic policy was changed and most Indonesia people were familiar with the slogan of REPELITA²⁰. Economic recovery was generated by inviting private sectors. Government released the law of investment; *Undang – Undang Penanaman Modal Asing* (Foreign Investment) and *Undang – Undang Penanaman Modal Dalam Negeri* (Domestic Investment) in 1967 and 1968, respectively.

At that time, almost all sectors were permitted to private investment except the sectors which related to the public interest or public needs. It was to accommodate the UUD 45 article 33 which stated that sectors in which related to public needs must be owned by government²¹.

¹⁹ It used to explained by Hg.Suseno TW in Lutfi : *Analisa Pengaruh Foreign Direct Investment (FDI) dan Ekspor terhadap Pertumbuhan Ekonomi*, 1996-144

²⁰ REPELITA stands for development planning in five years. It was used as a direction for national development

²¹ Although there was possibility for foreign investors to participate in those sectors through joint venture system with government

These sectors include; ports, electricity, telecommunication, navigational system, aviation, drinking water (PDAM)²², train and mass communication.

The government encouraged domestic industries such as textile and clothing industries, paper industries, cement industries, food industries and beverage industries. Government supported these infant industries by erecting import barriers in order to protect them from foreign market competition. The government protected these industries by using import quotas or import tariffs until they were able to grow strong and faced international competition²³. This policy was applied on the reason that those protected industries would have an impact in the country economy (trickle-down effect). However, the trickle-down effect was not successful in the implementation and created a social gap.

At that time, the government budget was financed by income from the oil boom (petrodollar). The state played a central role in economic development which is commonly considered state centralism. During 1970s and early 1980s, economic growth increased rapidly (about 7 – 11 percent yearly) and reached 13.5 percent in 1982 (Asian Development Bank, 2005).

In the mid 1980s, the price of oil in the international market declined and Indonesia economic growth dropped sharply to only about 2.5 percent in 1985. The declining income from 'the oil boom' put intense pressure on the government budget. To finance the budget, the government altered policy and encouraged exports of non-oil and gas to compensate the budget deficit. The Indonesian government issued a deregulation policy and changed the policy from import substitution to export promotion²⁴. It also switched from a dominant agriculture sector to a dominant manufacturing industry sectors. Deregulation policy made trade simpler. This changed policy is commonly known as trade liberalization. The government reduced tariffs, changed protection from non-tariff barriers to tariff barriers, reduced

²² PDAM stands for *Perusahaan Daerah Air Minum*

²³ Import substitution policy was also applied by Germany and the United States in the 19th century as well as Japan until the 1970s. It is a historical fact that the world's three largest countries started their industrialization behind trade barriers (Salvatore, 2007)

²⁴ Import substitution refers to policy which applied by government to limit import from abroad to protect domestic industry while export promotion refers to policy which applied to encourage industrialization by exporting manufactured goods to developed countries.

taxes, removed import quotas, gave import license to more private companies, and opened the domestic market facing international competition. This policy was aimed at giving an incentive for domestic industry to import raw materials and capital goods for export purposes and to give incentive to new investors. The changing policy from import substitution to export promotion had much contribution to the GDP growth.

The following years, Indonesia was in excellent economic growth performance before finally the economic growth ended up in 1997 when Indonesia facing economic and financial crisis²⁵. Figure 3.1 shows Gross Domestic Product (2000 reference market prices) between 1986 and 2007. During 1986 to 1997, real GDP increased from about 7,000 billion rupiahs to about 15,000 billion rupiahs. In 1997, when financial crisis hit Indonesia economy, it decreased to about 13,000 billion rupiahs and started to increase again in 1998. In 2007, real GDP reached nearly 20,000 billion rupiahs.

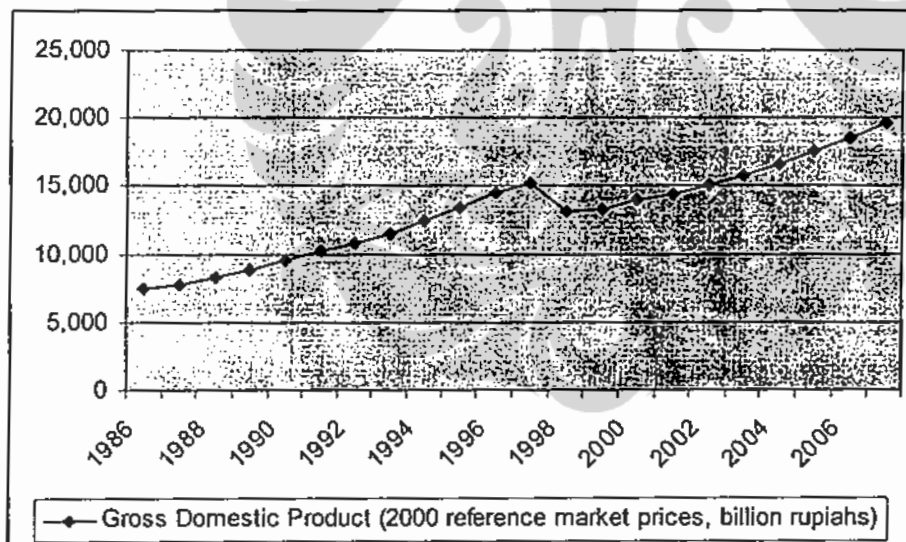


Figure 3.1 Growth of GDP, 1986 – 2007

Source: Figured by author based on IFS sources

During that time, real export and real import grew significantly as we can see in figure 3.2 as follows;

²⁵ This crisis was also remembered as the end of the Soeharto's government.

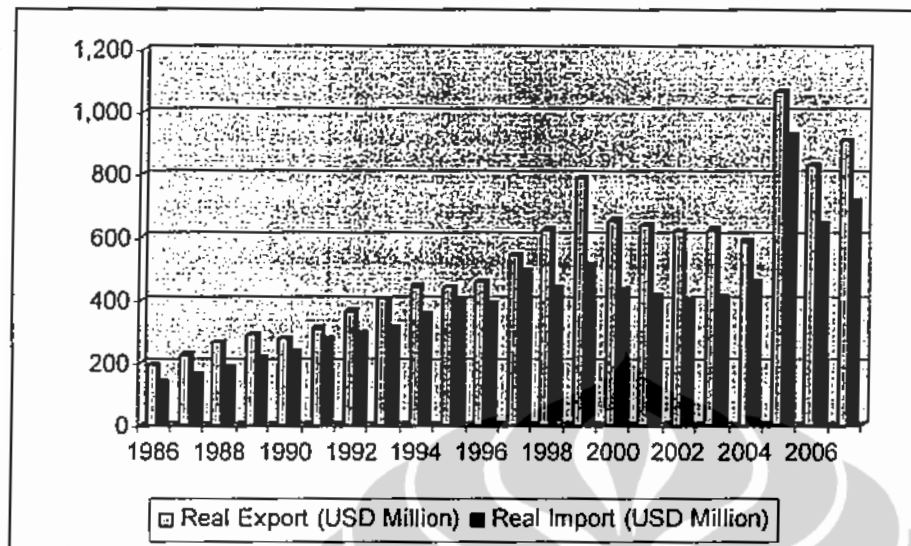


Figure 3.2 Real Export and Real Import, 1986 – 2007

Source : figured by author based on IFS sources

Real export increased from about USD 200 million in 1986 to nearly USD 800 million in 1999. After that, real export decreased significantly to about USD 600 million in 2004. However, in 2005/2006 it jumped to about USD 1,000 million. The increasing export was also followed by increasing import. From economic categories, the biggest import was presented as raw materials and intermediate input. Figure 3.3 shows annual GDP growth rate and total net export as percentage of GDP between 1986 and 2007 (as indicator of trade openness)

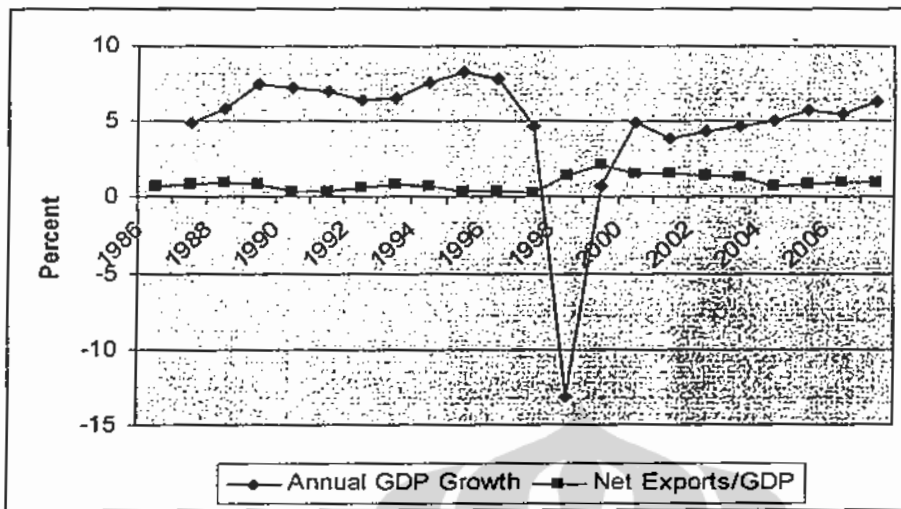


Figure 3.3 Annual GDP growth and share of net export in GDP, 1986–2007

Source: Figured by author based on IFS and Ministry of Trade Sources

Table 3.1 Annual GDP growth and net export as a percentage of GDP, 1986-2007

Year	GDP	GDP Growth Percent	Net Export	Net Exports/GDP Percent
1986	7425		53.00	0.71
1987	7790	4.9	62.97	0.81
1988	8241	5.8	82.93	1.01
1989	8855	7.5	75.83	0.86
1990	9496	7.2	41.26	0.43
1991	10156	7.0	34.92	0.34
1992	10812	6.5	71.84	0.66
1993	11515	6.5	93.33	0.81
1994	12383	7.5	89.41	0.72
1995	13401	8.2	46.45	0.35
1996	14449	7.8	63.17	0.44
1997	15128	4.7	48.21	0.32
1998	13142	-13.1	186.78	1.42
1999	13246	0.8	276.23	2.09
2000	13898	4.9	218.09	1.57
2001	14430	3.8	220.63	1.53
2002	15061	4.4	217.98	1.45
2003	15772	4.7	212.80	1.35
2004	16565	5.0	132.02	0.80
2005	17508	5.7	140.82	0.80
2006	18473	5.5	186.52	1.01
2007	19640	6.3	197.11	1.00

Source : from IFS and Ministry of Trade Sources

Before crisis, GDP growth recorded at about 8 percent and shown drastic downturn in 1997/1998 and started to be stable in 1999 following by high inflation during that time. Under tight monetary policy, government reduced inflation from 70% in 1998 to 2% in 1999. In 1999, economic growth recorded about 0.8% while share of net-export in GDP about 2.09%.

After the crisis, economic correction moved slowly and even the growth rate has not reached as high as before the crisis. On the contrary, net exports as a percentage of GDP have shown a rise (Figure 3.3).

The rise on net export implies that Indonesia has economy dependency on international trade or in other world it means that the economy is vulnerable to external shocks. This put a major challenge to long term economic sustainability.

Although export performance overall recorded sharply increase as percentage of GDP, but the contribution of export to GDP is mainly supported by increasing commodity price. World Bank (2004) reported that Indonesia export competitiveness has been declined due to internal and external burden.

3.3. Internal and External Challenge of Trade

After crisis, the declining export competitiveness happened in products in which Indonesia has comparative advantage traditionally, such as rubber, CPO and wood as well as in labor intensive industries such as furniture, textile, paper, apparel, clothing, etc. The high challenging emerges from the China competition.

World Bank (2004) reported the main factors for low export competitiveness in Indonesia are caused; **first**, competitiveness in Indonesia is low due to higher domestic transaction cost and higher domestic inflation relatively than inflation in partner countries; **second**, uncondusive business climate. This problem creates slow impact on export multiplier. Weiss (2005) stated that an export oriented strategy would attract foreign capital that would not come to the economy under an import substitution policy. He stated that rapid growth of exports is seen as providing stimulus to attract

high investment inflow, high profits, and high growth. However, if rapid growth of export is not supported by conducive business climate (infrastructure, regulation, communication, transportation) as in Indonesia case, process that stated by Weiss would not going happen.

Third, competition emerges from China and Vietnam. China and Vietnam are trade competitors for Indonesia because they produce and export related product such as textile, clothing and toys which expand faster than Indonesia.

Fourth, Indonesia has vulnerability in providing trade facilitation. Poor service in ports and poor infrastructure contribute to high transaction cost in doing business. Indonesia has relatively cheap rate in term of tariff exports. However, most of export products from Indonesia are transshipped through Singapore or Port Klang (Malaysia) because Jakarta International Container Terminal (JICT) in Indonesia is not efficient.

Exports and investments, either foreign or domestic, contribute in supporting economic development within a country. Foreign and domestic investments encourage industrialization which in turn rising output of the product and lead to the export which create value added and absorb labors. Figure 3.4 shows investment realization units/projects in Indonesia during 1986 and 2007. In the mid 1980s investment started to increase, it might due to various deregulation policy which released by government in encounter economy recovery at that time. Between 1986 and 1997, the number of investment, either foreign or domestic, rose significantly. Domestic investment units were higher than foreign investment units. It revealed that before 1996 domestic investments dominated Indonesia Economy. After 1997 crisis, there were rapid rise in the number of foreign investment unit while domestic investments were declined dramatically.

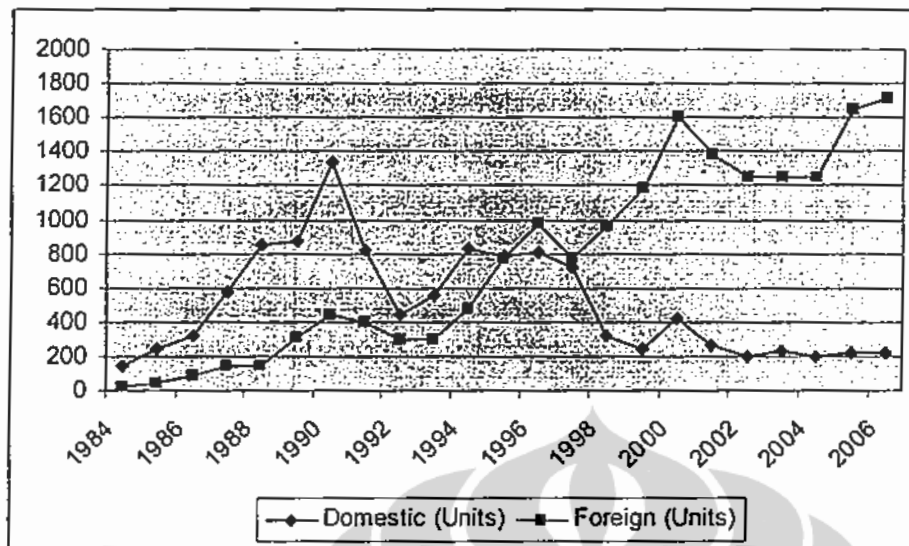


Figure 3.4 Investment Units, 1986 - 2007

Source: Figured by author based on CEIC sources and BKPM sources

However, there were a gap between investment realization units and investment application approved. Based on BKPM data during 1990 and 2007, a number of investment realization units were recorded at 53 percent for domestic investment and 44 percent for foreign investment²⁶. It revealed that there was reluctance from investors in doing business in Indonesia although actually business permit from government was already in hand. This fact is a signal that there are problems related with business climate in Indonesia. These problems are related to politics and social stabilities, corruption, inconsistency in regulation, country risk, poor performance in providing basic infrastructure, etc (Asian Development Bank, 2005)

Asian Development Bank (2005) indicated that there were several industries shifted their business from Indonesia to China or Vietnam due to condition of business climate in Indonesia.

²⁶ This was mentioned by Adhy Basar in his writing in Economic Review 2007. He is an Research Analyst for Business and Economic in Bank BUMN in Jakarta

3.4. Labor Force Situation in Indonesia

Unemployment is a severe problem in most developing countries including for Indonesia. It is due to the growth of employment opportunities that lesser than the growth of labor force. As a consequence, unemployment growth is being uncontrollable. Unemployment is related to the sense of dignity, participation, and contribution to society. In the political aspect, unemployment is concerned with social unrest, criminality and conflicts, which contribute to increase of transaction costs in doing businesses. Therefore, reducing unemployment rate is one of the government targets for increasing economic development by providing employment opportunities.

Theoretically, labor market is determined by supply side and demand side. In the supply side, it is interconnected with the population growth, the age structure of population, an education level of labor force and fertility rate. In the past time, for example, Indonesia government applied a policy of "Keluarga Berencana (KB)" in order to control population growth. In addition, to distribute the population which concentrated in Java, Indonesia government also conducted "Transmigration program"²⁷. However, although the two programs were successful to reduce population growth, but in the short run it was not efficient to control rapid increased of labor force.

In the demand side, economic growth usually generates employment absorption (reducing unemployment). One important measure of economic success is the creation of employment. Role of increased export plays a central contribution in this context. However, the connection between export and employment creation is not related automatically. In theory, the higher export growth will help employment creation. However, this theory is being debatable among the expert because high export growth can only be achieved through efficiency. It means rising production in manufacturing would have impact on rising output per person. Thus, it will result in rising capital and will compensate in declining labor. Therefore,

²⁷ KB and Transmigration were programs which received serious attention during Soeharto era but today, the two programs are not conducted anymore

the increased of export growth is not necessarily help employment creation effort and is not necessarily help in reducing unemployment.

In addition, in the effort to create job it is important to consider the characteristic of labor market in Indonesia. This was also suggested by Suryadarma, Suryahadi and Sumarto (2007). They mentioned the type of job created (employment creation) should match the skills and expectations of the unemployed²⁸. For giving past time characteristic of labor market and due to availability of data this study only displays labor market characteristic from 2004 to 2008.

First characteristic is education level. In table 3.4, education level is categorized into six levels which are;

- (1) Under Primary School
- (2) Primary School
- (3) Junior High School
- (4) Senior High School
- (5) Diploma I/II/III/Academy, and
- (6) University

Table 3.2 Unemployment by education level 2004 – 2008 (feb)

Education Level	2004	2005 Feb	2005 Nov	2006 Feb	2006 August	2007 Feb	2007 August	2008 Feb
(1)	1,004,296	1,012,711	937,985	849,425	781,920	666,066	532,820	528,195
(2)	2,275,281	2,540,977	2,729,915	2,675,459	2,589,699	2,753,548	2,179,792	2,179,792
(3)	2,690,912	2,680,810	3,151,231	2,860,007	2,730,045	2,643,062	2,264,198	2,166,619
(4)	3,695,504	3,911,502	5,106,915	4,047,016	4,156,708	3,745,035	4,070,553	3,369,959
(5)	237,251	322,836	308,522	297,185	278,074	330,316	397,191	519,867
(6)	348,107	385,418	395,538	375,601	395,554	409,890	566,588	626,202
Total	10,251,351	10,854,254	12,630,106	11,104,693	10,932,000	10,547,917	10,011,142	10,011,142

Source : National Labor Force Survey, BPS

²⁸ This argument was based on the finding that most of the unemployed is actually not come from the poor. They found that most of the unemployed in Indonesia are young and inexperienced.

Table 3.2 shows that the highest number of unemployment by education level is on level (4) **Senior High School**. From 2004 to 2008, the number of unemployment graduated from Senior High School is relatively stable about 3.6 millions unemployed with slightly increased to about 5.1 millions unemployed in 2005 and ended up at 3.3 millions in February, 2008. The following levels are (2) Primary School and (3) Junior High School. The two levels recorded almost the same number about 2 millions unemployed. Meanwhile, Level (5) Diploma and (6) University are the lesser number of unemployment. It reveals that most of Indonesia Labors which expecting jobs come from low educational background.

Second characteristic is the number of employment absorption by type of industry. Employment is categorized by nine main industries including;

- (1) Agriculture, Forestry, Hunting and Fishery;
- (2) Mining and Quarrying;
- (3) Manufacturing Industry;
- (4) Electricity, Gas and Water;
- (5) Construction;
- (6) Wholesale Trade, Retail Trade, Restaurants and Hotels;
- (7) Transportation, Storage and Communications;
- (8) Financing, Insurance, Real Estate and Business Services;
- (9) Community, Social and Personal Services

Table 3.3 Employment by Main Industry

Main Industry	2004	2005 Feb	2005 Nov	2006 Feb	2006 August	2007 Feb	2007 August	2008 Feb
(1)	40,608,019	41,814,197	41,309,776	42,323,190	40,136,242	42,608,760	41,206,474	42,689,635
(2)	1,034,716	808,842	904,194	947,097	923,591	1,020,807	994,614	1,062,309
(3)	11,070,498	11,652,406	11,952,985	11,578,141	11,890,170	12,094,067	12,368,729	12,440,141
(4)	228,297	186,801	194,642	207,102	228,018	247,059	174,884	207,909
(5)	4,540,102	4,417,087	4,565,454	4,373,950	4,697,354	4,397,132	5,252,581	4,733,679
(6)	19,119,156	18,896,902	17,909,147	18,555,057	19,215,660	19,425,270	20,554,650	20,684,041
(7)	5,480,527	5,552,525	5,652,841	5,467,308	5,663,956	5,575,499	5,958,811	6,013,947
(8)	1,125,056	1,042,786	1,141,852	1,153,292	1,346,044	1,252,195	1,399,940	1,440,042
(9)	10,515,665	10,576,572	10,327,496	10,571,965	11,355,900	10,962,352	12,019,984	12,778,154
Total	93,722,036	94,948,118	93,958,387	95,177,102	95,456,935	97,583,141	99,930,217	102,049,857

Source : National Labor Force Survey, BPS

Table 3.3 shows trend of sectoral capacity in absorbing employment during 2004 to 2008. Sector of (1) **Agriculture, Forestry, Hunting and Fishery** was recorded as the highest sector in terms of its capacity in absorbing employment. In terms of trend, the agriculture capacity in absorbing employment was remain stable with slightly increased about 40.6 million employed in 2004 to 42.6 million employed on February, 2008. The second sector is (6) **Wholesale Trade, Retail Trade, Restaurants and Hotels**. This sector absorbed about 19 million employed in 2004 and decreased to 17.9 million employed in 2005 before finally it rose to 20.6 million employed on February, 2008. The third sector was (3) **Manufacturing Industry**. It recorded about 11 million employed in 2004 and increased to about 12 million employed in 2007 and 2008. Meanwhile, (9) **Community, Social and Personal Services** ranks at number four with absorbtion capacity was about 10.5 million employed in 2004 and rose rapidly to about 12.7 on February, 2008.

It is important to consider that during the period of the study (1986 to 2007), there were significant jumps in the unemployment rate because BPS changed unemployment definition three times during that period due to

effort to fit with the concept recommended by the ILO. However, this changing had resulted biased trends of official data released by BPS²⁹.

First, before 1997, working age population was defined as persons of 10 years old and over while after 1997 it had been changed and defined as persons of 15 years old and over (Statistical yearbook of Indonesia, BPS; in Priyono, 2002).

Second, in 1994, BPS changed definition of time period for actively looking for work. Before 1994, a person was considered to be actively looking for work if he/she had actually looked for work during one week before the survey. After 1994, a person is considered to be actively looking for work if she/he had looked for work whenever the last time he/she actually looked for work as long as he/she is still expecting the job search result (Suryadarma, Suryahadi, Sumarto, 2005; p.1)

Third, in 2001 National Statistical Agency (BPS) added the definition of unemployment with three more categories which before 2001 these groups were not included. These groups are; (1) person without work who have established a new firm, (2) person without work who were not looking for work, because they do not expect to find work and (3) person who have made arrangements to start work on a future start (National Statistical Agency, 2007)

Those three changing in definition had resulted significant jumps and biased trend in unemployment rate during 1986 to 2007 as shown in figure 3.5 below. There was extraordinary jumped trend from 4.4 % in 1994 to 7.0 % in 1995. Meanwhile, another biased trend was in 2000 and 2001. Before 2001, the new three additional groups were considered out of labor force and not included the unemployment calculation. However, since 2001 these three groups were included in calculation and rose up the unemployment rate. In 2000 unemployment rate recorded at 6.1 % and rose-

²⁹ Suryadarma et.al had criticized this biased in their study. But they only mentioned two times. According to another resource in 2000 there was another definition changing which resulted in biased trends of Unemployment

up to 8.1 % in 2001. Thus, the unemployment rate trend becomes biased because of incomparable data.

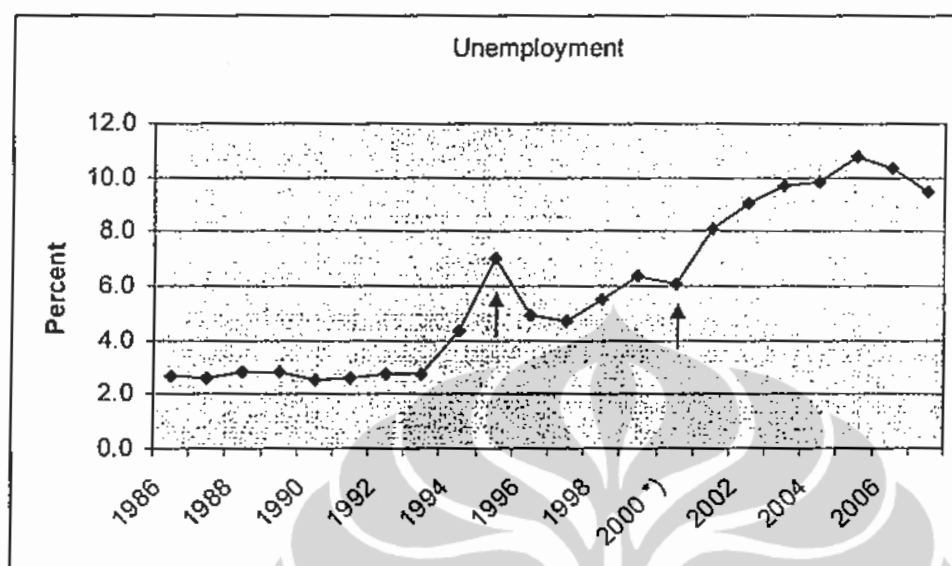


Figure 3.5 Unemployment Rate and Employment Rate in Indonesia, 1986 – 2007

Source: National Labor Force Survey BPS, figured by author

Table 3.4 Unemployment, Employment and Real GDP in Indonesia, 1986-2007

No		Unemployment (Thousand)	Percent (%)	Employment (Thousand)	Percent (%)	Real GDP (IDR Billion)
1	1986	1,819.2	2.7	65,655.0	97.3	7,424.6
2	1987	1,819.5	2.6	67,878.3	97.4	7,790.3
3	1988	2,041.3	2.8	69,828.2	97.2	8,240.6
4	1989	2,040.0	2.8	70,743.6	97.2	8,855.1
5	1990	1,914.7	2.5	73,437.0	97.5	9,496.4
6	1991	1,994.7	2.6	74,229.3	97.4	10,156.4
7	1992	2,142.3	2.7	76,214.4	97.3	10,812.5
8	1993	2,204.6	2.8	77,042.2	97.2	11,514.9
9	1994	3,654.4	4.4	80,042.3	95.6	12,383.1
10	1995*)	5,908.0	7.0	78,322.2	93.0	13,401.0
11	1996	4,286.7	4.9	83,900.1	95.1	14,448.7
12	1997	4,197.4	4.7	85,405.5	95.3	15,127.8
13	1998	5,062.5	5.5	87,672.4	94.5	13,142.0
14	1999	6,030.3	6.4	88,816.9	93.6	13,246.0
15	2000 *)	5,813.2	6.1	89,837.7	93.9	13,897.7
16	2001	8,005.1	8.1	90,807.4	91.9	14,429.8
17	2002	9,132.1	9.1	91,647.2	90.9	15,061.2
18	2003	9,939.3	9.7	92,810.8	90.3	15,771.7
19	2004	10,251.4	9.9	93,722.0	90.1	16,565.1
20	2005	11,376.8	10.8	94,453.3	89.3	17,508.1
21	2006	11,018.3	10.4	95,317.0	89.7	18,472.9
22	2007	10,279.5	9.5	98,756.7	90.6	19,639.7

Source: National Labor Force Survey, BPS

Furthermore, according to Suryadarma, Suryahadi and Sumarto (2007) Indonesia unemployment rate was far higher compared to Malaysia, Thailand and Korea. In 2003, Indonesia unemployment rate recorded at 9.7% while Malaysia, Thailand and Korea were only at 3.6%; 1.5%; and 3.6% respectively. It proofed that although in terms of statistic there was rapid reduction from 10.4 percent in 2006 to 9.5 percent in 2007, this unemployment reduction is considered higher than other Asian countries.



CHAPTER 4

RESEARCH METHODOLOGY

Chapter four explains the method that is used in the study. It contains sub chapters which explains about modeling employment effect, hypothesis, data description, data source, and methodology

4.1. Modelling Employment Effect

Econometric model is used to assess the impact of export growth on employment creation. The econometric model developed in this paper is basically inspired from the model which was developed by David Greenaway, Robert C. Hine, and Peter Wright (1999)¹.

There is uncertainty relation between export and employment. It is probably caused more by the econometrics problem rather than the theoretical problem. For econometrics observation, particularly for developing country like Indonesia, the observations are usually faced by the problem of data scarcity with long term period.

According to David Greenaway, Robert C. Hine, and Peter Wright (1999), the relation between export growth and employment can be expressed by assuming a Cobb-Douglas production function as follows;

$$Q_t = A' K_t^\alpha N_t^\beta \dots\dots\dots (4.1)$$

Where: .

Q = real Output

α = kapital share coefficient

K = kapital stock

β = labor share coefficient

N= units of labor utilised

γ = factor changing the efficiency of production process

A = efficiency parameter

A profit maximizing firm will employ labor and capital at such level that the marginal revenue product of labour equals the wage (w) and the marginal revenue product of capital equals its user cost (c). Solving this system to

¹ *An Empirical Assessment of the Impact of Trade on Employment in the United Kingdom*, European Journal of Political Economy ELSEVIER Vol. 15 (1999) 485 - 500

eliminate capital from the expression for firm output leads to the following expression:

$$Q_t = A^y \left[\frac{\alpha N_t}{\beta} \frac{W_t}{c} \right] N_t^\beta \dots\dots\dots (4.2)$$

Forming the Cobb-Douglas production function into linier form and taking logarithm equation (4.2) leads us to equation as;

$$\text{Log } Q_t = \text{Log } A + \alpha \text{Log } (W/c)_t + \beta \text{Log } N_t + e \dots\dots\dots (4.3)$$

Where;

$$A_t = e^{\delta_0 T} M_t^{\delta_1} X_t^{\delta_2}, \quad \delta_0, \delta_1, \delta_2 > 0 \dots\dots\dots (4.4)$$

Rearranging equation (4.3) and (4.4) allow us into following equation

$$\text{Log } N_t = \beta_0 + \beta_1 \text{Log } X_t - \beta_2 \text{Log } M_t + \beta_3 \text{Log } (W/c)_t + \beta_4 \text{Log } Q_t + e \dots\dots (4.5)$$

Greenaway, et.al used equation (4.5) to estimate labor demand framework and restricted the estimation only on the impact of manufacturing trade on manufacturing employment.

However, this study assesses the impact of total trade (total export and total import) on total employment. Thus, we adjust equation (4.5) into the aggregate level. Assuming Cobb-Douglass Production Function in the aggregate level leads us into equation;

$$Y_t = A^y K_t^\alpha N_t^\beta \dots\dots\dots (4.6)$$

$$f(K, N) = A K_t^\alpha N_t^\beta \dots\dots\dots (4.7)$$

Where Y_t is total GDP, A is total factor productivity (TFP), K is capital input and N is labor input. Under the assumption constant return to scale, it will derive to equation;

$$f(K,N) = A (MPK. K) + (MPN. N) \dots\dots\dots(4.8)$$

In theory, if the factor markets are competitive, the marginal product of each input equals its factor prices. Thus, the marginal product of capital (MPK) equals to real rental price of capital (r) and the marginal product of labor (MPL) equals to real wage (w). Hence, it leads to equation as follows;

$$Y = A (r. K) + (w. N) \dots\dots\dots(4.9)$$

According Greenaway, et.al (1999), the rate of technology adoption and increases in x-efficiency would be correlated with trade changes, therefore this study would adopt their hypothesized that parameter A in the production function varies with time in the following;

$$A_t = e^{\delta_0 T} M_t^{\delta_1} X_t^{\delta_2}, \quad \delta_0, \delta_1, \delta_2 > 0 \dots\dots\dots(4.10)$$

Taking logarithm and rearranging equation (4.9) and (4.10) allows into following equation;

$$\text{Log}Y_t = \beta_0 + \beta_1 \text{Log}X_t - \beta_2 \text{Log}M_t + \beta_3 \text{Log}(K)_t + \beta_4 \text{Log}W_t + \beta_5 \text{Log}N_t + e \dots\dots(4.11)$$

Furthermore, it is important to consider the 1997/1998 crisis into the equation. Dummy variables usually indicate the presence or absence of a "quality" or qualitative attribute. To quantify that attribute, it is done by constructing artificial variable that take on values of 1 and 0. 1 indicates the presence (or possession) of that attribute and 0 indicates the absence of that attribute³¹. Rearranging the model leads further to the following equation;

$$\text{Log}N_t = \beta_0 + \beta_1 \text{Log}X_t - \beta_2 \text{Log}M_t + \beta_3 \text{Log}(K)_t + \beta_4 \text{Log}W_t + \beta_5 \text{Log}Y_t + D_{\text{Crisis}} + e \dots\dots(4.12)$$

³¹ Gujarati, Damodar N., *Basic Econometrics*, 4th edition, Mc Graw Hill, New York, 2003, p. 298

This study will use equation (4.12) as the model and analyze the significance of each variable on employment impact, where;

- N : Total employment (thousand persons)
 X : Total export penetration, f.o.b (USD million)
 Total exports cover non-oil and gas and oil and gas exports
 M : Total import penetration, c.i.f (USD million)
 Total imports cover non-oil and gas and oil and gas imports
 K : Gross Fixed Kapital Stock (billion rupiahs)
 W : Average Minimum Wage (thousand rupiahs)
 Y : Gross Domestic Product (billion rupiahs)
 D_{Crisis} : Dummy Crisis
 e : error

4.2. Hypothesis

Hypothesis 1; Export has significant impact on employment with positive relation

Hypothesis 2; Import has significant impact on employment with negative relation

Hypothesis 3; Capital stock has significant impact on employment with positive relation

Hypothesis 4; Wage has significant impact on employment with positive relation

Hypothesis 5; GDP has significant impact on employment with positive relation

Hypothesis 6; Dummy crisis in 1997/1998 has significant impact on employment with negative relation

Expected Sign

No	Independent Variables	Expected sign
1.	Export and Import (X) and (M)	Positive (+) and Negative (-)
2.	Gross Fixed Capital Stock (K)	Positive (+)
3.	Wages (W)	Positive (+)
4.	Gross Domestic Product (Y)	Positive (+)
5.	Dummy Crisis (D97)	Negative (-)

4.3. Data Description and Data Sources

All the data is deflated from nominal into the real form. This study uses secondary data consists of real Gross Domestic Product (GDP), capital stock, wages, employment (number of worker utilized in the economy), exports and imports.

1. Variable Y (real GDP)

Variable Real GDP was derived from the ratio of nominal GDP and GDP deflator (2000 = 100).

$$\frac{\text{GDP nominal}}{\text{GDP real}} = \text{GDP deflator} \dots\dots\dots (4.13)$$

$$\text{GDP real} = \frac{\text{GDP nominal}}{\text{GDP deflator}} \dots\dots\dots (4.14)$$

Standard measurement used is IDR Billion. GDP data was accessed from International Monetary Fund (IFS).

2. Variable Kapital Stock (Kstock)

Variable Kapital Stock is derived from Pierre Van Der Eng (2005) 'Indonesia's new national accounts', Bulletin of Indonesian Economic Studies, 41 (2005) No. 2, pp.253-62, www.cbe.anu.edu.au. All the data of capital stock is already in 2000 reference market prices. Standart measurement is billion rupiahs.

3. Variable W (Wage)

Variable Wage is derived from average of minimum wage by province. Standard measurement is thousand rupiahs. Wage data was accessed from National Statistical Agency (BPS) and Ministry of Manpower and Transmigration.

$$\text{Real Wage} = \frac{\text{Nominal Wage}}{\text{Consumer Price Index (CPI}_{2000=100})} \dots\dots\dots (4.15)$$

4. Variable N (total employment)

Employment refers to the number of persons of 15 years old and over who worked for pay or assisted others in obtaining pay or profit for the duration at least one hour during the survey week³². In 1997, Indonesia was hit by severe economic crisis and in 1998 ILO changed the concept of employment from the number of persons of 10 years old to the number of persons of 15 years old and over who work for pay for the duration at least one hour during the survey week. Employment data was taken from National Statistical Agency (BPS). Standard measurement used is thousand persons

5. Variable X and M (Exports and Imports)

Export refers to total export, oil and gas plus non-oil and gas.

Import refers to total import, oil and gas plus non-oil and gas.

Data exports and imports are taken from International Fund Statistics (IFS). Standard measurement used is USD Million. It is also valuable to transform variable exports and imports nominal into exports and imports real.

4.4. Methodology

This study is conducted using multiple regression method with dummy variable (1997/1998 crisis). This method is addressed to prove quantitatively the impact of variables such as export and import (trade), capital stock, real GDP and economic crisis on employment in Indonesia during 1986 – 2007.

This work differs from previous study because it deals with aggregate level while previous study deals with firm level. A reason for choosing aggregate level because from policy framework the central problem is to understand the behaviour of the aggregate (total) labor demand rather than the behaviour of firm level.

³² The definition of 'employment' here is the same as the concept recommended by the ILO

Research is started from 1986, when Indonesia applied deregulation policy from import substituting policy to export promotion strategy and it ended up in 2007 due to the availability of the data.

The basic methodology of the analysis is similar to that Greenway,*et.al*(1999). However, in this study all the variables such as exports, imports, capital stock, real wages, real GDP and employments are in aggregate level.

Furthermore, it is important to be mentioned that there was problem in technical econometrics which deals with high correlation between variable exports and imports. Thus, to eliminate the problem, variable exports and imports were transformed into net export (export minus import). Another important problem which also needs to be mentioned related with econometrics matter is the dummy crisis in 1997/1998. Chow-test result shows that there was not structural change associated with employment during 1997/1998 crisis period. For the reason of unsignificance of chow test result, it would be explained in regression analysis in chapter 5.

To see whether the multiple regression models can be accepted as a fit model or whether the regression coefficient are significant or not, the model can be tested; **first**, testing the overall significance of the regression which covers the F test and the Adjusted R-squared; **second**, testing partial regression coefficient which can be seen from the value of t-statistic and its probability; and **third**, relaxing the assumption of the classical model (BLUE) which cover multicollinearity test, heteroskedasticity test and otokorelasi test (Gujarati, 2003)

4.5. Econometric Test

4.5.1. Testing the overall significance of a multiple regression

The overall significance of a multiple regression is consisted of F-test and coefficient determination (R^2). There is a close relationship between the F-test and the coefficient of determination R^2 used in the analysis of variance. F-test measures the overall significance of the estimated regression while the coefficient determination (R^2) measures the regression model in

representing the real data. This measures the variation of independent variables in explaining dependent variable. If $R^2 = 0$, this means that the independent variables have no impact on dependent variable. If $R^2 = 1$, this means that the model exactly specified. It implies that the higher the R^2 value the better the regressors in explaining the regressand.

4.5.1.1. The F-Test

The F- test measures the regression slope (coefficient) collectively. It estimates the significance of the regressors (independent variables) on the regressand (dependent variable) collectively (Gujarati, 2003)

The decision rule is;

$H_0: \beta_1 = \beta_2 \dots \beta_k = 0$ (all slope coefficients are simultaneously zero)

H_1 : Not all slope coefficients are simultaneously zero

The formula for F is;

$$F = \frac{ESS/df}{RSS/df} = \frac{R^2/(k-1)}{(1-R^2)/(n-k)} \dots \dots \dots (4.16)$$

If $F > F_{\alpha}(k-1, n-k)$, reject H_0 or in other words, at least one regression slope is significant statistically.

4.5.1.2. The Coefficient Determination (R^2)

According to Gujarati (2003) Coefficient Determination (R^2) measures the propotion or percentage of the total variation in Y explained by the regression model. R^2 measures how well the sample regression line fits the data. The higher the R^2 value the better the regressors in explaining the regressand with limitation between 0 and 1 ($0 \leq R^2 \leq 1$). According to Nachrowi (2006) R^2 is formulated as follow;

$$R^2 = ESS/TSS, \text{ or}$$

$$R^2 = 1 - RSS/TSS$$

Where; R^2 = Coefficient of determination

TSS = Total Sum of Squares

ESS = Explained Sum of Squares

RSS = Residual Sum of Squares

4.5.2. Testing Partial Regression Coefficient

After computing the regression coefficient collectively, it is compulsory to test the partial regression coefficient individually using t-test statistic. To calculate the t-test, the mechanism is as follows;

$H_0 = \beta_t = 0$, independent variable is not significant on dependent variable individually

$H_1 = \beta_t \neq 0$, independent variable is significant on dependent variable individually

A coefficient is said to be statistically significant if the value of the t-test statistic lies in the critical region (Null hypothesis is rejected). On the contrary, a coefficient is said to be statistically insignificant if the value of the test statistic lies in the acceptance region (Null hypothesis is not rejected)

Using E-views, t-test statistic is easy to detect. If the probability of (t-stat) is lower than $\alpha = 5\%$ or $\alpha = 10\%$ (probability ≤ 0.05 or probability ≤ 0.10), this means that we can reject the null hypothesis in which independent variables individually have effect on dependent variable. If the probability of (t-stat) is higher than $\alpha = 5\%$ (probability ≥ 0.05 or probability ≥ 0.10), we can accept the null hypothesis in which independent variables individually have no effect on dependent variable.

4.5.3. Testing the Assumption of the Classical Model

To estimate each of regression coefficients in a multiple regression model, it can be used Ordinary Least Square (OLS) method. Based on Gauss – Markov theorem, an estimator is said to be BLUE (Best Linear Unbiased Estimator) if the following requirement hold (Gujarati, 2003);

1. Zero mean value of disturbance u_i .

Technically, the conditional mean value of u_i is zero. Symbolically, it is written; $E(U_i|X_i) = 0$

2. No correlation between the disturbances.

Given any two X values, X_i and X_j ($i \neq j$), the correlation between any two u_i and u_j ($i \neq j$) is zero.

3. Homoscedasticity or equal variance of u_i .

Given the value of X , the variance of u_i is the same for all observations. That is, the conditional variances of u_i are identical.

4. Covariance between u_i and X_i , or $E(u_i X_i) = 0$.

This means that no correlation between u_i and X_i

5. The regression model is correctly specified.

There is no error or bias in the model used in empirical analysis. Some important questions that arise in the specification of the model such as; what variables should be included in the model? What is the functional form of the model? Is it linear in the parameters, the variables, or both? What are the probabilistic assumptions made about the Y_i , the X_i , and the U_i entering the model?

4.5.4. Diagnostic Test

4.5.4.1. Multicollinearity

Multicollinearity refers to the existence of linear relationships among some independent variables³³. Multicollinearity can be detected through characteristics such as; high R^2 or high adjusted R^2 (0.7 – 1.0), F-stat is significant, but the individual t-test is not significant.

High correlation between independent variables indicates that problem of multicollinearity exist. However, this indication is not always effective since sometimes low correlation between independent variables still contains problems of multicollinearity. Multicollinearity problems correlate with the number of observation. If the number of observation is high correlation between independent variables tend to be low.

If multicollinearity exists standard error coefficients in the regression tend to be high. It leads to the low of partial coefficient

³³Gujarati Damodar N., *Basic Econometrics*, 4th edition, Mc Graw Hill, New York, 2003, p. 242

regression (t-stat) whereas variable should be significant becomes not significant and moreover will lead to the wrong sign in the coefficient of variable.

However, according to Blanchard multicollinearity is not a serious problem in OLS because multicollinearity is related to deficiency matter which sometimes can not be avoided in empirical analysis³⁴. Moreover, as long as regression analysis is aimed for forecasting purpose, multicollinearity is not a serious problem because high R^2 indicates a better forecasting³⁵.

Using E-views, multicollinearity can be detected formally by Pairwise Correlation Matrix. If the coefficient correlation between two regressors in excess of 0.8, it is called that there is multicollinearity in the model. Another suggested indicator, if the pairwise correlation coefficient between two regressors (two independent variables) is higher than correlation coefficient of regressor with the regressand, then multicollinearity is a serious problem.

4.5.4.2. Homoskedasticity

Homoscedasticity refers to the condition that the variance of u_i is the same for all observations. That is, all residuals or errors have constant in variance. Thus, the condition where the variance is not constant is called as Heteroscedasticity. Heteroscedasticity can also arise as a result of the presence of outliers. An outlying observation is an observation that is much different (either very small or very large) within the sample. Thus, the rise of heteroscedasticity can be caused by the existence of an outlying observation. Using E-views, the existence of heteroskedasticity can be detected by White Heteroscedasticity test (WH test). It compares between value of $N \cdot R$ -squared with value of χ^2 . If value of $N \cdot R$ -squared $> \chi^2$ it means there is heteroscedasticity problem in the model, on the contrary, if the value of $N \cdot R$ -squared $< \chi^2$ it means there is not heteroscedasticity problem in the model.

³⁴ Blanchard in Gujarati, "Basic Econometrics", 4th edition, 2003, p.363

³⁵ Ibid, p.369

4.5.4.3. Autocorrelation

Autocorrelation is defined as correlation between members of series of observations ordered in time period of observation. The existence of autocorrelation in the model causes standard error in the model or standard error in coefficient regression becomes too low. It leads to the invalid of regression slope collectively (F-stat) and invalid of partial regression (t-stat) which those two regressions tend to be significant.

Autocorrelation can be tested using Durbin Watson Statistic (DW-test) and LM-test. According to Gujarati (2003), to determine the existence of autocorrelation can be relied on the equation of;

$$DW = 2(1 - \rho) \dots\dots\dots(4.17)$$

Where, DW refers to Durbin Watson statistic and ρ refers to autocorrelation coefficient. From equation (4.17) as stated above;

- If there is no autocorrelation, that is $\rho = 0$, then DW is expected to be about 2. The closer DW is to 2 the greater the evidence that there is no autocorrelation, either positive or negative.
- If there is perfect positive autocorrelation, that is $\rho = 1$, then $DW = 0$. The closer DW is to 0 the greater the evidence of positive serial correlation.
- If there is perfect negative autocorrelation, that is $\rho = -1$, then $DW = 4$. The closer DW is to 4 the greater the evidence of negative serial correlation.

The actual test procedure can be explained better with the aid of figure Durbin – Watson d statistic, which shows that the limit of d are 0 and 4. These can be established as follows;

Reject Ho Evidence of positive auto- correlation	Zone of indecision	Do not reject Ho or Ho* or both	Zone of indecision	Reject Ho* Evidence of negative auto- correlation
0	d_L	d_U 2 $4 - d_U$	$4 - d_L$	4

Autocorrelation could be detected using LM-test through comparing (N-p)*R-squared with χ^2 value. Hypothesis null for the autocorrelation is expressed as

$$H_0 : \rho_1 = \rho_2 = \dots = \rho_p = 0$$

If (N-p)*R-squared $> \chi^2$, it means there is autocorrelation problem in the model (H_0 is rejected).

If (N-p)*R-squared $< \chi^2$, it means autocorrelation is not the problem (H_0 is accepted).

LM-test is more powerfull because it can be used either for a large numbers of sample or a few numbers of sample (finite).

4.5.4.4. Normality-Test

After estimate the parameters β_1 , β_2 and β_3 using t-test under the assumption of BLUE property, it is important to find out the probability distribution of each parameters (how close β_1 is to the true β_1 or how close β_2 is to the true β_2)³⁶. In other words, the significance of each parameters using t-test would only be valuable if the residual is normally distributed. There are two methods which can be used to identify whether the residual normally distributed or not (1) Histogram Residual and (2) Jarque-Bera test. This study only uses Jarque Bera test to identify the residual distribution whether normally distributed or not.

Jarque Bera method is based on assumption of asymptotic sample. It uses Skewness coefficient (S) and Kurtosis coefficient (K) and be written as follows;

$$JB = n \left[\frac{S^2}{6} + \frac{(K-3)^2}{24} \right] \dots\dots\dots(4.18)$$

Where S = Skewness coefficient and K = Kurtosis coefficient

³⁶ Gujarati, Damodar N., *Basic Econometrics*, 4th edition, Mc Graw Hill, New York, 2003, p. 248- 271 and p. 107

If residual is normally distributed, Skewness coefficient $S = 0$ and $K = 3$. Thus, if residual is normally distributed, Jarque Bera statistic $JB = 0$. If probability of Jarque Bera statistic (JB) is high, hypothesis that residual is normally distributed is accepted because JB is close to 0. And if probability of Jarque Bera statistic is low, hypothesis that residual is normally distributed is rejected.

4.5.4.5. Chow Breakpoint-Test

Since this study covers period from 1986 – 2007, it is highly possible that there is structural change in 1997/1998 due to economic crisis. The existence of structural change makes value of the parameters of the model do not remain the same within the entire time period. It means that a long the period of the study, estimation of each parameter is not the same because structural change caused differences in the intercept and slope within the regression. To find out whether there is structural change or not in the model, we can use Chow-test through F-statistic parameter³⁷. The assumption of the Chow-test is:

1. $e_{1t} \approx N(0, \sigma^2)$ and $e_{2t} \approx N(0, \sigma^2)$. That is, the error terms in the subperiod regressions are normally distributed with the same (homoscedastic) variance σ^2 .
2. The two error terms u_{1t} and u_{2t} are independently distributed (Gujarati, 2003)

The mechanisms of the Chow test are as follows:

This study analyzes the impact of net export on employment during the period of 1986-2007. Over this period, it assumed that there was structural change in 1997/1998 due to economic crisis.

1. Regression model over the period of 1986 – 2007 is written as;

Period of 1986 – 2007 ($n_1 = 22$)

$$\text{Log}N_t = \beta_0 + \beta_1 \text{Log}X_t - \beta_2 \text{Log}M_t + \beta_3 \text{Log}(K)_t + \beta_4 \text{Log}W_t + \beta_5 \text{Log}Y_t + e \dots (4.19)$$

³⁷ There are other alternatives to find out the structural change in the model; Wald test and Cusum test

2. To find out the existence of structural change, period of the study is divided into two periods; 1986-1997 and 1998-2007. First period with number of observations $n_1 = 12$ (before the crisis) and second period with number of observations $n_2 = 10$ (after the crisis). Thus, we have two regressions.

Period of 1986 – 1997 ($n_2 = 12$)

$$\text{Log}N_t = \alpha_0 + \alpha_1 \text{Log}X_t + \alpha_2 \text{Log}M_t + \alpha_3 \text{Log}(K)_t + \alpha_4 \text{Log}W_t + \alpha_5 \text{Log}Y_t + e \dots (4.20)$$

Period of 1998 – 2007 ($n_3 = 10$)

$$\text{Log}N_t = \mu_0 + \mu_1 \text{Log}X_t + \mu_2 \text{Log}M_t + \mu_3 \text{Log}(K)_t + \mu_4 \text{Log}W_t + \mu_5 \text{Log}Y_t + e \dots (4.21)$$

Regression (4.19) assumes that there was no difference between the two time period (before and after the crisis) and therefore it regressed the relationship between net export and employment for the overall time periods consisting of 22 observations. In this case, the intercept and the slope coefficient were the same

If structural change was exist, it assumed that the regressions in the two time periods were different, that is why the intercept and the slope coefficients were different.

3. Estimate regression (4.19) and obtain RSS_1 (Residual Sum of Squares) with $\text{df} = (n_2 + n_3 - k)$, where k is the number of parameters estimated includes constant. RSS_1 is Restricted Residual of Sum Squares (RSS_R) because it assumes restriction that $\alpha_n = \mu_n$ that the period of regression are not different.
4. Estimate regression (4.20) and obtain RSS_2 with $\text{df} = (n_2 - k)$
5. Estimate regression (4.21) and obtain RSS_3 with $\text{df} = (n_3 - k)$
6. Add RSS_2 and RSS_3 to obtain the Unrestricted Residual Sum of Squares (RSS_{UR}), $\text{RSS}_{UR} = \text{RSS}_2 + \text{RSS}_3$ with $\text{df} = (n_2 + n_3 - 2k)$
7. According to Chow, the formula of Chow test is based on statistical F-test written as follows:

$$F = \frac{(\text{RSS}_R - \text{RSS}_{UR}) / k}{(\text{RSS}_{UR}) / (n_1 + n_2 - 2k)} \dots \dots \dots (4.22)$$

If there is no structural change, then the RSS_R and RSS_{UR} should not be statistically different. Therefore, if the computed F value in equation (4.22) exceeds the critical F value, we reject the hypothesis in which there is no structural change. On the contrary, if the computed F value does not exceed the critical F value, we do not reject the null hypothesis (no structural change)

In addition, it is valuable to mention that there are three possible logarithm models in the econometric;

1. Log-Log Model

$$\text{Log } Y_t = \beta_0 + \beta_1 \log X_1 \dots + \beta_i \log X_i$$

2. Lin-Log Model

$$Y_t = \beta_0 + \beta_1 \log X_1 \dots + \beta_i \log X_i$$

3. Log-Lin Model

$$\text{Log } Y_t = \beta_0 + \beta_1 X_1 \dots + \beta_i X_i$$

To find out the fit logarithm model, the study tries all the three possible models above; **First step** was to regres the three models; log-log, lin-log and log-lin model. This resulted in insignificant coefficient and multicollinearity between variables (particularly between variable export and variable import). **Second step** was to try the models with first difference form. This resulted in insignificant coefficient and disappointing model (R^2 and F-stat were not significant in addition most of regression coefficient were not significant as well. **Third step** was to transform export and import variables into net-export variable. Here the first step was retried. The result was satisfied. Research framework is depicted in figure 4.1

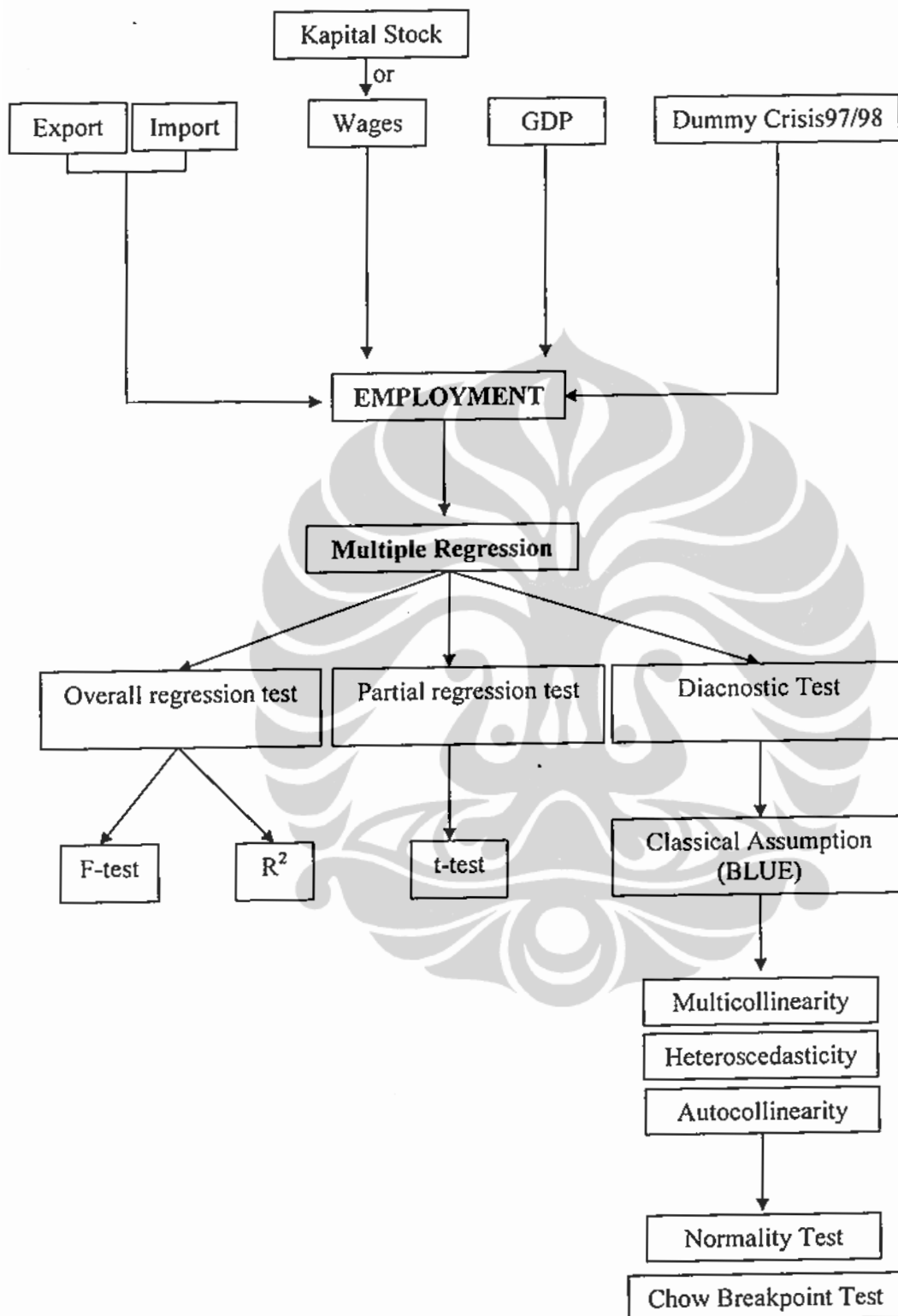


Figure 4.1. Research Framework

CHAPTER 5

RESULT AND ANALYSIS

5.1. Regression Result

Models are estimated using annual data of 1986 – 2007 periods. According to Gujarati (2003)¹, when we transform the Cobb-Douglas production function from the stochastic form (non-linear) into the logs form (linear), we obtain three log models; a log-log (double log), a lin-log and a log-lin model. In order to find the satisfy model, all the three models are tried one by one.

First step is to regres the log-log model, lin-log model and log-lin model. These three regressions come to the result of model which contains multicollinearity. Multicollinearity can be detected from indicator of adjusted R^2 , F-stat (overall significance of regression) and t-stat (individual partial regression). Multicollinearity exists when there are high R^2 and significant of F-stat but the regression coefficient are not significant

From table 5.1, shows the regression result of the three models. Probability (F-statistic) of the models; log-log, lin-log, and log-lin are 0,000 $\% \leq (\alpha = 1 \%)$. This implies that on the basis of F-test the regressors (independent variables) have a significant effect collectively on the regressand (dependent variable).

In addition, adjusted R^2 are more than 0.90. It can be said that independent variables such as export, import, capital stock, wages and Gross Domestic Product (GDP) have significant impact in explaining dependent variable (employment). However, several independent variables have no effect on employment individually because the probability (t-statistic) is more than $\alpha = 10\%$ ($\alpha \geq 0.1$). The model finds that although adjusted R^2 is very high and the overall measure of goodness of fit (F-stat) is significant, but individually, the probabilities of independent variables (t-statistic) are mostly not significant. Therefore, it can be concluded that all

¹See more detail in Gujarati Damodar N., *Basic Econometrics*, 4th edition, Mc Graw Hill, New York, 2003, p. 223-224

Furthermore, on figure 5.2 shows that the impact of the crisis on employment trend was moderate without significant structural change. Over the period 1997 – 1998, employment increased slightly from 87,049,756 thousand persons in 1997 to 87,672,449 thousand persons in 1998⁴⁵, an increased of 0.71 %. Thus, during the crisis there were 622,693 additional jobs. This provides evidence for not significance of chow test on dummy variable in crisis time⁴⁶. The explanation would be on the shift of workforce from formal sector into informal sector.

In addition, in figure 5.3 shows the significant structural jumped of unemployment during the period of the study, first is in 1994 and second is in 2001. Surprisingly, in the time period of crisis 1997/1998 actually there was no significant rose in unemployment. There are several reasons to explain this fact.

It has been mentioned in previous chapter that during the period of the study BPS changed unemployment definition due to the effort to fit with the concept recommended by the ILO. **The first changing is in 1994** where at that time BPS changed definition of time period for actively looking for work. Before 1994, a person was considered to be actively looking for work if he/she had actually looked for work during one week before the survey. After 1994, a person is considered to be actively looking for work if she/he had looked for work whenever the last time he/she actually looked for work as long as he/she is still expecting the job search result. This changing resulted in significant rose of unemployment rate⁴⁷.

The second changing was in 2001. BPS added the definition of unemployment with three more categories which before 2001 these groups were not included. These three groups are; (1) person without work who have established a new firm, (2) person without work who were not looking for work, because they do not expect to find work and (3) person who have made arrangements to start work on a future start. Before 2001, the new

⁴⁵ Data in 1997 and 1998 are in bold and underlined

⁴⁶ No significance on chow test proofs that there was no structural change on independent variable (employment)

⁴⁷ Suryadarma, Suryahadi, and Sumarto, 2005; p.1

three additional groups were considered out of labor force and not included the unemployment calculation. However, since 2001 these three groups were included in calculation and rose up the unemployment rate. Thus, the unemployment jumped in trend is likely due to incomparable data⁴⁸ and is not due to the losing of employment during the period of the study.

Third, the impact of the crisis on employment was not reflected on the reduction of employment and the rise of unemployment but in a shift of the workforce from formal sector to informal sector or from manufacturing into agricultural activities. This relevants with Smith, J.P. *et.al*(2000) who found out that the crisis has had a small impact on aggregate employment⁴⁹. He stated that employment in Indonesia appears to be flexible. In aggregate level, the impact of crisis on employment was not reflected on the rising an unemployment number but rather to a shift of workforce into agricultural sector and informal sector.

⁴⁸ Look at the arrow on figure 5.3

⁴⁹ Smith.J.P, Thomas, D., Frankenberg. E., Beegle.K., Graciela. T.,2000, *Wage, Employment and Economic Shock: Evidence from Indonesia*, www.jstor.org p.162-191. They used data from SAKERNAS and IFLS (BPS) and found out that the impact of economic crisis in 1997/1998 on total employment rates in Indonesia were relatively modest.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1. CONCLUSIONS

This study estimates the impact of export on employment covered the time period of 1986 – 2007. The study found out that;

- (1) The increase of net export has contributed to the increase of employment with employment elasticity of 0.03 %. The explanation for low of employment elasticity is caused by a huge number of exports which supported more by capital intensive industries which usually high export oriented, high technology and capital demand but demand less labor. That is why the problem of employment creation is not in the how much increase of net export required to create jobs but in the how much high elasticity of employment. Thus, it is important to point out that in order to improve the employment elasticity, the necessary of backward and forward linkage is important to consider within the trade policy context.
- (2) Rising wages would generate employment with elasticity 0.01 %. In aggregate level, rising wage gives impact on employment and reducing unemployment. (Phillips curve idea)
- (3) Gross Domestic Product is significant on employment creation with employment elasticity of 0.28 %. It can be concluded that around 0.72 % of economic growth between 1986 and 2007 can be attributed to gain in productivity, while about 0.28 % resulted from increased of total employment.
- (4) Economic crisis in 1997/1998 did not affect on employment. This result is unexpected with the hypothesis which assumed that economic crisis would have negative impact on employment. This result explains that the impact of the crisis on employment was not reflected on the reduction of employment or on the rise of unemployment but in a shift of the workforce from formal sector to informal sector or from manufacturing into agricultural activities.

6.2. RECOMMENDATIONS

It was examined that net-export, GDP and wages altogether have positive impact on employment (*ceteris paribus*). However, the problem of employment creation is not in the how much increase of those variables; net export, real wage and GDP; required to create jobs but in the how much high elasticity of employment associated with those variables. Therefore, policy implication and recommendation to create employment would be on the attempt to higher-up the elasticity of those variables, particularly for net export. The elasticity of real-net export can be increased by strengthening domestic industries, either small/ medium and light industry. The role of government is important to encourage partnership between export-oriented producers and domestic suppliers. It is hoped to create high backward and forward linkage within the economy and further create more employment opportunity.

Wage policy becomes critical issues recently. It was examined that rising wage give positive impact on employment in aggregate level. Economic growth generates additional wage for labor and leads to inflation. If additional wage increase faster than inflation, real wage increases. Thus, economic growth stimulates increasing wage and it further leads to create additional employment. In the normal condition, wage is set by market mechanism. If economic grows, it demand more labors. Thus in the normal condition, economic growth generates employment and rising wage. However, in the crisis time economic is slowdown and high wage would burden a business sector. That is why, government have important role in this matter through wage policy.

Finally, the study points up some potential recommendation for future study. For specific purposes, an important area for further research is to assess the impact of export in certain categories or certain product. It would be usefull to disaggregate the export into categories for example by sub sectors or by main industries to find out specific sectors which has the highest contribution in employment creation.

It would also valuable to see the impact of the import tariff or export tariff on employment, for example; it is well known that there is an increased on

import in textile product entering Indonesia. It would be usefull to assess more specific on employment effect of increased import within textile industries.



REFERENCES

- Barro, R.J. and X. Sala-I-Martin (1995). *Economic Growth*, Mcgraw Hill
- Bruton H. (1989). Import Substitution. *Handbook of Development Economics* II:1601-1644
- Bruton Henry J. (1998). A Reconsideration of Import Substitution. *Journal of Economic Literature* XXXVI: 903-936
- Basar, Adhy. (2007). Kebijakan Investasi Baru untuk Pertumbuhan Ekonomi. *Economic Riview No. 208*
- Chishti, S. (1981). *Exports and Employment in India*, Economic and Political Weekly, Vol. 16. No. 42/43 pp. 1710 – 1714
- Gujarati, Damodar N. (2003). *Basic Econometrics*, International Edition, Fourth Edition, Mc Graw Hill, New York.
- Greenaway, David., Hine, Robert C., and Wright, P. (1999). *An Empirical Assessment of the Impact of Trade on Employment in the United Kingdom*, European Journal of The Political Economy
- Hajkova and Hurnik.(2007). "Cobb-Douglas Production Function: The Case of a Converging Economy," Czech Journal of Economics and Finance, 57, no. 9-10
- Hirschman, Albert O.(1958). *Strategy of economic development*, New Haven, Connecticut and London: Yale University Press
- James, William E., and Fujita, Natsuki. (2000). *Employment and Manufacturing Exports in Indonesia : An Input-Output Analysis*, The International Centre for the Study of East Asian Development, Kitakyushu
- Krugman, Paul L., and Obstfeld, Maurice. (2006). *International Economics, Theory and Policy*, Sixth Edition, Addison Wesley, Boston.
- Kuncoro, A.,(2002), *International Trade, Productivity and Competitiveness: The Case of the Indonesian Manufacturing Sector*, International Development Research Centre, Ottawa, ON, Canada
- Pahariya, N.C. (2008). *Import Substitution and Export Promotion as Development Strategies*, CUTS Centre for International Trade, Economics and Environment

- Pindyck, Robert S., and Rubinfeld, Daniel L. (2005). *Microeconomics*, Sixth Edition, Pearson, Prentice Hall, New Jersey.
- Pryor, Frederic L. (1999). *The Impact of Foreign Trade on the Employment of Unskilled U.S. Workers: Some New Evidence*, www.jstor.org
- Powers, William M.(2004). *Forward and Backward Linkages and the Location of International Production*, Department of Economics, University of Michigan
- Priyono, Edy.(2002). *Situasi Ketenagakerjaan Indonesia dan Tinjauan Kritis terhadap Kebijakan Upah Minimum*, Jurnal Analisis Sosial vol.7.
- Salvatore, Dominick. (2007). *International Economics*, Ninth Edition, Addison Wesley, Boston.
- Smith, J.P., Thomas.D., Frankenberg, E., Beegle, K., Teruel, G. (2002). *Wages, Employment and Economic Shocks: Evidence from Indonesia*, Journal of Population Economics Vol.15. No.1. pp. 161 - 193
- Srinivasan T.N. and Bhagwati J. (1999). *Outward-Oriented and Development: Are Revisionist Right?* Yale University, Center Discussion Paper 806
- Suryadarma, Daniel.,Suryahadi, Asep, and Sumarto, Sudarno. (2005). *The Measurement and Trends of Unemployment in Indonesia: The Issue of Discouraged Workers*, Smeru Working Paper
- Suryahadi, A., Suryadarma, D., Sumarto, S., and Molyneaux, J. (2006). *Agricultural Demand Linkages and Growth Multiplier in Rural Indonesia*, Smeru Research Institute
- Suryadarma, Daniel.,Suryahadi, Asep, and Sumarto, Sudarno. (2007). *Reducing Unemployment in Indonesia: Results from a Growth-Employment Elasticity Model*, Smeru Working Paper
- National Statistical Agency (2002), *Statistical Yearbook of Indonesia*
- National Statistical Agency (2003), *Statistical Yearbook of Indonesia*
- National Statistical Agency (2004), *Statistical Yearbook of Indonesia*
- National Statistical Agency (2005), *Statistical Yearbook of Indonesia*
- National Statistical Agency (2006), *Statistical Yearbook of Indonesia*
- National Statistical Agency (2007), *Statistical Yearbook of Indonesia*
- National Statistical Agency (2007), *Labor Force Situation in Indonesia*

Nachrowi, Nachrowi D., Usman H.,(2006), *Ekonometrika Untuk Analisis Ekonomi dan Keuangan*, Lembaga Penerbit Fakultas Ekonomi Universitas Indonesia

Verico, Kiki. (2007). *The Impact of ASEAN's Intra Trade to FDI Inflows from Non-Member States: The Cases of Indonesia, Malaysia and Thailand 1987 – 2006*, *Economic and Finance in Indonesia(EFI)*, Vol 55 No.3-2007 p.253 – 280

Yilmazkuday, H. (n.d). *Export Promotion vs Import Substitution*

Internet sources;

www.jstor.org

www.elsevier.org

www.cbe.anu.edu.au

www.google.com

www.wb.org

www.adb.org

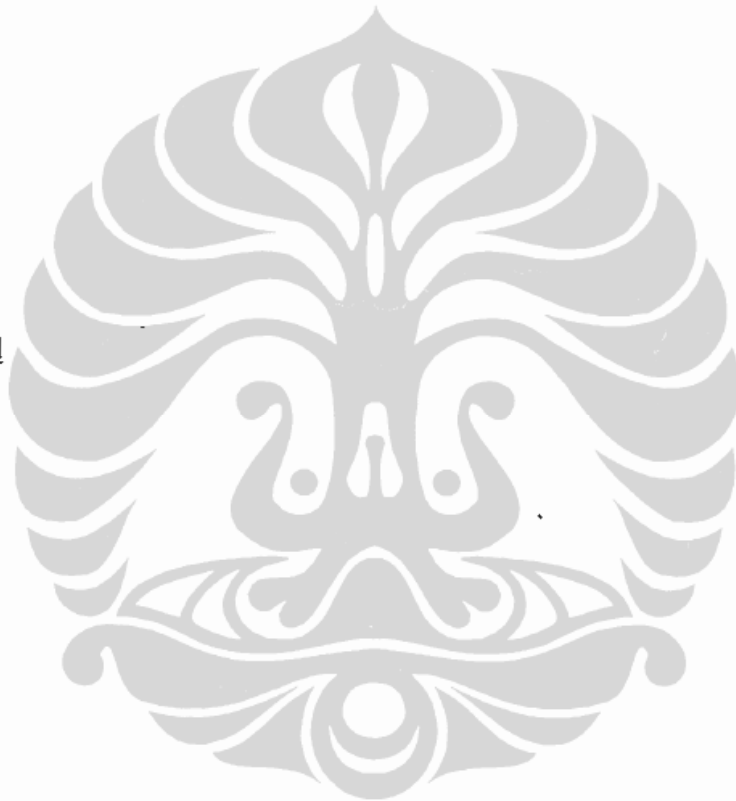
www.ilo.org

www.bps.go.id

www.bi.go.id

www.depdag.go.id

www.depnakertrans.go.id



REGRESSION RESULT OF LOG-LOG MODEL, LIN-LOG MODEL AND LOG-LIN MODEL

Log-Log Model

Dependent Variable: LOGN

Method: Least Squares

Date: 12/23/08 Time: 07:55

Sample: 1986 2007

Included observations: 22

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGRX	0.137976	0.058347	2.364758	0.0310
LOGRM	-0.094481	0.046410	-2.035791	0.0587
LOGKSTOCK	0.014075	0.070613	0.199324	0.8445
LOGRW	0.007190	0.005615	1.280397	0.2187
LOGRY	0.239922	0.083573	2.870798	0.0111
C	15.43357	0.415939	37.10539	0.0000
R-squared	0.985668	Mean dependent var	18.24309	
Adjusted R-squared	0.981189	S.D. dependent var	0.108076	
S.E. of regression	0.014823	Akaike info criterion	-5.358265	
Sum squared resid	0.003516	Schwarz criterion	-5.060708	
Log likelihood	64.94092	F-statistic	220.0716	
Durbin-Watson stat	1.866679	Prob(F-statistic)	0.000000	

Lin-Log Model

Dependent Variable: N

Method: Least Squares

Date: 12/23/08 Time: 07:57

Sample: 1986 2007

Included observations: 22

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGRX	14910862	5637587.	2.644901	0.0177
LOGRM	-10382749	4492218.	-2.311275	0.0345
LOGKSTOCK	-4607443.	6637111.	-0.694194	0.4975
LOGRW	845237.5	471665.3	1.792028	0.0921
LOGRY	26239684	8638587.	3.037497	0.0078
C	-1.32E+08	34231991	-3.854426	0.0014
R-squared	0.982372	Mean dependent var	84191366	
Adjusted R-squared	0.976864	S.D. dependent var	8948195.	
S.E. of regression	1361073.	Akaike info criterion	31.31245	
Sum squared resid	2.96E+13	Schwarz criterion	31.61000	
Log likelihood	-338.4369	F-statistic	178.3339	
Durbin-Watson stat	1.798055	Prob(F-statistic)	0.000000	

ANNEX 1 (CONTINUED)

Log-Lin Model

Dependent Variable: LOGN

Method: Least Squares

Date: 12/23/08 Time: 07:58

Sample: 1986 2007

Included observations: 22

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RX	9.62E-05	0.000103	0.933123	0.3646
RM	-0.000121	9.63E-05	-1.256398	0.2270
KSTOCK	7.78E-08	2.77E-08	2.809357	0.0126
RW	-5.33E-06	1.18E-05	-0.450001	0.6587
RY	9.55E-06	4.57E-06	2.088169	0.0531
C	17.92569	0.036103	496.5108	0.0000
R-squared	0.981480	Mean dependent var	18.24309	
Adjusted R-squared	0.975692	S.D. dependent var	0.108076	
S.E. of regression	0.016850	Akaike info criterion	-5.101918	
Sum squared resid	0.004543	Schwarz criterion	-4.804360	
Log likelihood	62.12109	F-statistic	169.5838	
Durbin-Watson stat	1.747583	Prob(F-statistic)	0.000000	

FIRST DIFFERENCE FORM MODEL

Dependent Variable: D(LOGN)

Method: Least Squares

Date: 12/23/08 Time: 08:02

Sample(adjusted): 1987 2007

Included observations: 21 after adjusting endpoints

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGRX)	0.028885	0.078017	0.370241	0.7164
D(LOGRM)	-0.026859	0.063194	-0.425029	0.6768
D(LOGKSTOCK)	0.028011	0.143638	0.195014	0.8480
D(LOGRW)	0.014566	0.002284	6.378127	0.0000
D(LOGRY)	0.043694	0.101182	0.431837	0.6720
C	0.010954	0.008766	1.249549	0.2306
R-squared	0.368843	Mean dependent var	0.018095	
Adjusted R-squared	0.158458	S.D. dependent var	0.019452	
S.E. of regression	0.017844	Akaike info criterion	-4.979328	
Sum squared resid	0.004776	Schwarz criterion	-4.680893	
Log likelihood	58.28294	F-statistic	1.753177	
Durbin-Watson stat	2.426186	Prob(F-statistic)	0.183317	

TRANSFORMED INTO NET EXPORT

Dependent Variable: LOGN

Method: Least Squares

Date: 12/23/08 Time: 08:04

Sample: 1986 2007

Included observations: 22

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGRNETX	0.028082	0.010161	2.763711	0.0133
LOGKSTOCK	0.033595	0.057160	0.587739	0.5644
LOGRW	0.007023	0.004871	1.441745	0.1675
LOGRY	0.235133	0.069182	3.398772	0.0034
C	15.35745	0.283341	54.20129	0.0000
R-squared	0.987045	Mean dependent var	18.24309	
Adjusted R-squared	0.983996	S.D. dependent var	0.108076	
S.E. of regression	0.013672	Akaike info criterion	-5.550183	
Sum squared resid	0.003178	Schwarz criterion	-5.302219	
Log likelihood	66.05201	F-statistic	323.7999	
Durbin-Watson stat	1.648465	Prob(F-statistic)	0.000000	

REDUCED FORM MODEL

Dependent Variable: LOGN

Method: Least Squares

Date: 12/23/08 Time: 08:06

Sample: 1986 2007

Included observations: 22

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGRNETX	0.031549	0.006082	5.187645	0.0001
LOGRW	0.008336	0.003408	2.445945	0.0250
LOGRY	0.276947	0.024153	11.46647	0.0000
C	15.43098	0.211018	73.12630	0.0000
R-squared	0.986692	Mean dependent var	18.24309	
Adjusted R-squared	0.984475	S.D. dependent var	0.108076	
S.E. of regression	0.013466	Akaike info criterion	-5.614272	
Sum squared resid	0.003264	Schwarz criterion	-5.415901	
Log likelihood	66.75700	F-statistic	444.8734	
Durbin-Watson stat	1.637800	Prob(F-statistic)	0.000000	

White Heteroskedasticity Test:

F-statistic	2.948273	Probability	0.041758
Obs*R-squared	11.90507	Probability	0.064120

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.116423	Probability	0.890846
Obs*R-squared	0.315570	Probability	0.854033

Chow Breakpoint Test: 1997

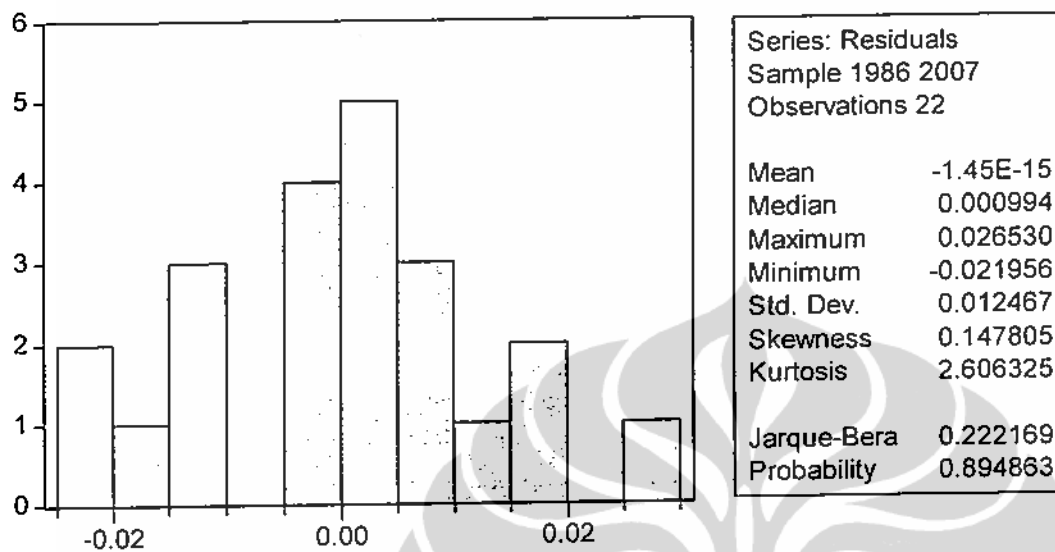
F-statistic	0.706801	Probability	0.600469
Log likelihood ratio	4.046671	Probability	0.399726

Chow Breakpoint Test: 1998

F-statistic	0.762520	Probability	0.566791
Log likelihood ratio	4.336150	Probability	0.362420

ANNEX 4 (CONTINUED)

Normality Test (No Outlier Data)



Population of 15 years old and over based on activities, 1986 - 2007
(thousand)

Activities	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995*)	1996	1997
Population 15+	101,534.0	104,473.1	107,374.3	110,162.5	113,540.9	115,586.4	118,155.9	120,756.4	125,298.4	128,806.3	131,878.0	135,070.4
Labor Force	67,474.2	69,697.8	71,869.5	72,783.6	75,351.7	76,224.0	78,356.7	79,246.8	83,696.7	84,230.2	88,186.8	89,602.9
Employment	65,655.0	67,878.3	69,828.2	70,743.6	73,437.0	74,229.3	76,214.4	77,042.2	80,042.3	78,322.2	83,900.1	85,405.5
Unemployment	97.3	97.4	97.2	97.2	97.5	97.4	97.3	97.2	95.6	93.0	95.1	95.3
Not in Labor Force	34,059.8	34,775.3	35,504.8	37,378.9	38,189.2	39,362.4	39,799.2	41,509.6	41,601.7	44,576.1	43,691.2	45,467.5
Students	9,178.6	9,866.8	10,525.7	10,716.5	10,170.0	9,938.7	9,701.1	10,064.0	9,815.4	10,109.7	10,794.9	10,814.4
Housekeepers	17,325.9	17,388.6	17,078.7	17,978.6	19,706.2	20,775.7	21,041.6	21,876.9	22,143.8	27,578.3	23,987.8	25,896.0
Others	50.9	50.0	48.1	48.1	51.6	52.8	52.9	52.7	53.2	61.9	54.9	57.0
Labor Force Participation Rate	66.5	66.7	66.9	66.1	66.4	65.9	66.3	65.6	66.8	65.4	66.9	66.3
Unemployment Rate	2.7	2.6	2.8	2.8	2.5	2.6	2.7	2.8	4.4	7.0	4.9	4.7
Underemployment Rate	-	-	-	-	-	-	-	-	-	-	-	-
Involuntary	-	-	-	-	-	-	-	-	-	-	-	-
Voluntary	-	-	-	-	-	-	-	-	-	-	-	-
Sources: Sakernas, BPS	Note : *) Without Maluku province											
											29,632.3	28,049.6
											2,077.3	10,672.1
											27,555.0	17,377.5

Population of 15 years old and over based on activities, 1986 - 2007
(thousand)

Activities	1998	1999	2000 *	2001	2002	2003	2004	2005		2006		2007	
								Feb	Nov	Feb	August	Feb	Aggs
Population 15+	138,556.2	141,096.4	141,170.8	144,033.9	148,729.9	151,406.3	153,923.6	155,549.7	158,491.4	159,257.7	160,811.5	162,352.0	164,118.3
Labor Force	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Employment	92,737.9	94,847.2	95,651.0	98,812.5	100,779.3	102,750.1	103,973.4	105,802.4	105,857.7	106,281.8	106,388.9	108,131.1	109,941.4
Unemployment	66.9	67.2	67.8	68.6	67.8	67.9	67.5	68.0	66.8	66.7	66.2	66.6	67.0
Not in Labor Force	87,672.4	88,816.9	89,837.7	90,807.4	91,647.2	92,810.8	93,722.0	94,948.1	93,958.4	95,177.1	95,456.9	97,583.1	99,930.2
Students	5,062.5	6,030.3	5,813.2	8,005.1	9,132.1	9,939.3	10,251.4	10,854.3	11,899.3	11,104.7	10,932.0	10,547.9	10,011.1
Housekeepers	45,821.3	46,249.2	45,519.8	45,221.4	47,950.7	48,656.2	49,950.3	49,747.4	52,633.7	52,975.9	54,422.6	54,221.0	54,177.0
Others	11,273.7	10,934.7	10,763.5	10,899.2	11,238.8	11,481.8	11,577.2	12,919.5	13,581.9	13,978.3	13,530.2	14,320.5	13,777.4
Labor Force Participation Rate	25,266.9	25,857.6	25,275.2	26,461.7	28,724.1	29,727.2	30,877.3	29,245.0	30,619.5	30,806.0	31,978.0	31,133.1	31,989.0
Unemployment Rate	9,280.7	9,456.9	9,481.2	7,860.5	7,987.8	7,447.2	7,495.8	7,582.9	8,432.3	8,191.6	8,914.4	8,767.4	8,410.5
Underemployment Rate	20.3	20.4	20.8	17.4	16.7	15.3	15.0	15.2	16.0	15.5	16.4	16.2	15.5
Involuntary	66.9	67.2	67.8	68.6	67.8	67.9	67.5	68.0	66.8	66.7	66.2	66.6	67.0
Voluntary	31,929.3	31,371.1	28,467.1	27,736.5	28,868.6	29,534.6	27,947.3	29,642.1	28,901.1	29,924.6	29,100.7	30,239.0	30,370.2
Sources: Sakernas, BPS	8,564.7	11,976.1	12,423.5	11,200.7	12,002.8	13,240.9	13,418.1	14,319.4	13,897.2	14,210.4	13,774.9	14,914.5	14,898.2
Note : *) Without Maluku province	23,364.6	19,395.0	16,043.6	16,535.8	16,865.7	16,293.7	14,529.2	15,322.8	15,003.9	15,714.3	15,325.9	15,324.5	15,472.0