

## CHAPTER 3

### RESEARCH METHODOLOGY

In order to produce a comprehensive analysis, the data need to be primary and secondary. In addition, there was a collection of reference material even from domestic and abroad. The data and information obtained will be do analysis both of qualitative and quantitative, as follow:

#### 3.1 Data Source

The data was used in this research are:

1. The data of trade from Ministry of Trade (MOT), Statistic Central Bureau (BPS), World Integrated Trade Solution (WITS), COMTRADE, and other sources which related with this research including electronic source.
2. The data in GTAP based on countries aggregation data provided in GTAP aggregation database. Bilateral trade data come from various sources namely COMTRADE of UN, GTI (Global Trade Information) from individual country, aggregate of bilateral trade (IMF, FAO, World Bank) and trade estimation system/TESSY (used to estimate the gap in bilateral trade). Domestic data base comprise Input Output of each region, the others will be include into rest of the world. The data for this research can be seen on appendix 7 – 11 that shows the data on commodity aggregation, region, trade balance export, trade balance import, and tariff. All data based entirely in 2003

#### 3.2 Index Analysis and General Trade Analysis Project (GTAP)

The method was used in this research are:

1. Descriptive Analysis where is using table to provide description about trade performance, market share, tariff policy in main export products. There some of the general equation used can be seen below.

##### a. Revealed Comparative Advantage Index (RCA)

Comparative advantage is the term used to describe the tendency for countries to export those commodities which they are relatively adept at producing, vis-à-vis the rest of the world. In other words, if a country can produce a good at lower

relative cost than other countries, then with trade, that country should devote more of its scarce resource to the production of that particular good. Through trade, that country can obtain other goods at a lower price (opportunity cost), in exchange for the good in which it has a comparative advantage (Serin & Civan, 2008).

In the literature several techniques are used to measure the weak and strong sectors of a country. One of the most widely used methods involves the concept of “revealed comparative advantage” developed by Balassa (1965). Balassa index (RCA) basically measures normalized export shares, with respect to the exports of the same industry in group of reference countries (Serin & Civan, 2008)

The RCA index has assumption in which can interpreted if smaller and or than 1 or closing 0 it means the comparative is weak, otherwise if bigger and or than 1 it means the comparative more strong or good for the commodity. The equation is:

$$RCA = \frac{X_{iw}^k}{X_{iw}} \div \frac{X_{jw}^k}{X_{jw}}$$

Where:

X is Export, k is Commodity, i and j is Exporter Country and w is World.

#### **b. Bilateral Trade Intensity Index (TII)**

This index is to calculate whether the trade performance two countries when compared with the export performance to the world to greater or smaller than they should. It is define as the share of one country’s exports going to a partner divide by the share of the world export going to the partner. The criteria were used in TII is if the trade intensity index equal 1, trade partners are trading with each other in the same intensity as they are trading with the world as a whole, whereas values above (below) one indicates trade between the countries is at a level above (below) their average levels of trade with the rest of the world (Christopher Edmonds, 2006). The equation is:

$$TII = \frac{X_{ij}^k}{X_{wj}} \div \frac{X_{iw}^k}{X_{ww}}$$

Where:

X is Export, k is Commodity, i is Exporter Countries, j is Importer Countries, and w is the world.

**c. Trade Specialisation Index (TSI)**

This index is describing about competitiveness bilateral both countries, through their comparative (Bender and Li, 2002). The criteria were used in TSI is result of index positive it means both countries have competitiveness on International Trade meanwhile result of index negative it means both countries have no competitiveness on International Trade. The equation is:

$$TSI = \frac{X_{ij}^k - M_{ij}^k}{X_{ij}^k + M_{ij}^k}$$

Where:

X is export, M is Import, k is commodity, i is exporter countries, and j is Importer Countries.

**d. Intra-Industry Trade Index (IIT)**

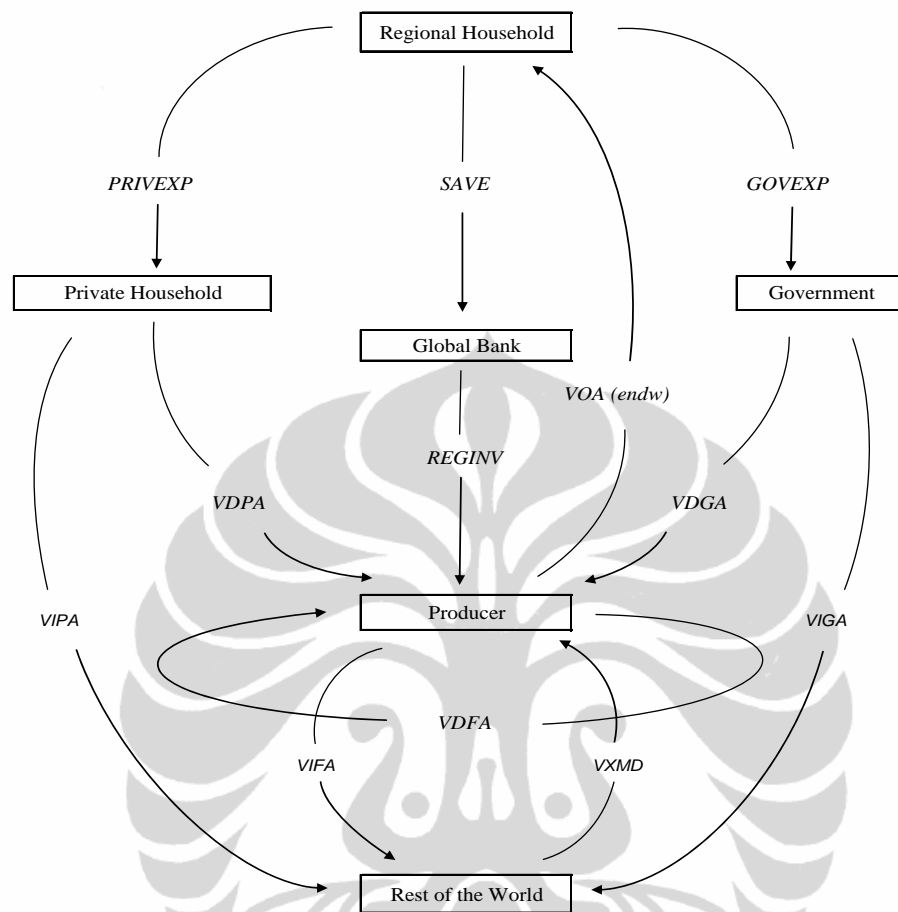
This index is description trade performance between two countries for certain products. Intra Industry exchange produces extra gains from International trade over and above those associated with comparative advantage because it allows a country to take advantage of larger markets. By engaging in IIT, a country can simultaneously reduce the number of products it produces while increasing the variety of goods available to domestic consumers. The IIT index ranges between zero and one, with larger values indicating a greater level of trade between firms in the same industry. Higher IIT ratios suggest that net gain from specialization in different products are being exploited and that the participating country is increasing its integration into the world economy (Hoekman, Bernard, English and Matoo, 2003). The equation is:

$$IIT = 1 - \frac{\sum_{k=1}^n |X_{ij}^k - M_{ij}^k|}{\sum_{k=1}^n X_{ij}^k + M_{ij}^k}$$

Where:

X is Export, M is Import, k is Commodity, i is Exporter Countries, j is Importer Countries.

2. General Equilibrium Analysis to predict the impact of liberalization in agriculture sector, manufacture sector, and service sector against the performance of trade and economy Indonesia and partner countries. Hertel and Tsigas (1997) explain that GTAP is General Equilibrium Model where are often used in Free Trade Simulation, the model can provide information about global macroeconomic change, than GTAP consist of accounting relationship, price linkage, producer behavior, household behavior, global investment and global transportation. The basic accounting relationships and price linkage are shown in figures below.

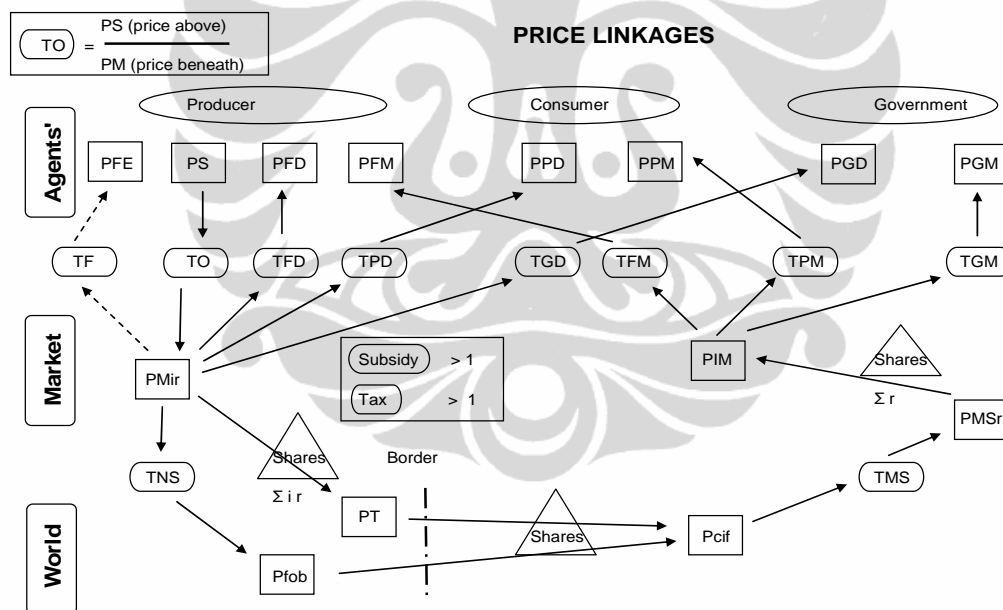


Source: GTAP Ver. 6.2, Hertel, 2003

Figure 3 *Multi region Open Economy without Government intervention*

In figure 3 describes the circular flow condition in a multi region open economy, which distinguishes the close economy is additional region of the Rest of the World (ROW) which is a source of import to region and export destination as well as that described by  $VXMD = \text{Value of Exports at Market price by Destination}$  from the ROW to the Producer. So in a multi region open economy there is 6 Region namely the Regional Household, Private Household, Government, Producer, Rest of the World (ROW), and the Global Bank as a liaison in the case of payment. In the figure 3 described for the first assumed that regional households have other sources of income (in describing the plot of  $VOA (endw) = \text{Value of output at agent price}$  to the Regional Households from the seller of goods for further, combines by the company to become finished goods ( illustrated with line  $VDFA = \text{Value of Domestic purchase}$

by Firms at Agents' prices), then after achieve the income, Regional Households use of income by way of spending some of the region Private Households (illustrated by PRIVEXP flow), some of the region of Government (represented by line GOVEXP) and the rest of the tube in Global Bank (represented by flow SAVE). Next Private Household (illustrated with line VDPA = Value of Domestic purchase by Private households at Agents 'price), Government Household (illustrated with line VDGA = Value of Domestic purchase by households at Government Agents' price), and Global Bank (represented by line REGINV) spent on the producer, but because there are regions Rest of the World is Private Household (pictured with VIPA = Value of Import at Private Agent) and Government Household (portrayed by VIGA = Value of Import at Government Agent), and Producer (described by VIFA = Value of Import at Firm Agent) to spend on the Rest of the World (ROW).



Source: GTAP Ver. 6.2, Hertel 2003

Figure 4 Price Linkage

In figure 4 are describes the relationship that price on the GTAP version 6.2 year 2003. In the GTAP, where as price is divided into the three level namely Agent Level, Market Level, and the World Level, which is the functions is divide into three sectors for Producer, Consumer, and Government. In GTAP the relationship price

there were 10 policies that can be used to analyze the export and import policies. The 10 policies are

TO (*tax on output (or income) of nonsavings*), TF (*tax on endowment, demanded by firms*), TFD (*tax on domestic tradeable, demanded by firms*), TFM (*tax on imported tradeable, demanded by firms*), TPD (*tax on domestic tradeable, demanded by private*), TPM (*tax on imported tradeable, demanded by private*), TGD (*tax on domestic tradeable, demanded by government*), TGM (*tax on imported tradeable, demanded by government*), TXS (*tax on exports of tradeable commodity  $i$  from source  $r$  to destination  $s$  (levied in region  $s$ )*), TMS (*tax on imports of tradeable commodity  $i$  from source  $r$  to destination  $s$  (levied in region  $s$ )*), TX (*the variable export tax on exports of tradeable commodity  $i$  from region  $r$  destination generic*), TM (*the variable import tax (levy) on imports of tradeable commodity  $i$  in region  $r$  source generic*).

Next structure in GTAP is Producer Behavior, it can be seen on appendix 3 with the assumption cost minimizing behavior, separability (nested) is the manner in which the firm combines individual inputs to produce its output, depends largely on the assumptions that we make about separability in production, Price and sector output based on zero profits condition, import demand use Armington CES function that differentiated by import origin, (Hertel, 1998).

Next, Household Behavior according to equation on appendix 4 the assumption from this structure are regional household receive all income in one region, and then final demand is based on aggregate utility function which consist: composite private consumption ( $u_p$ ), composite government consumption ( $u_g$ ), and saving ( $q_{save}$ ). The relation in the constant share, and then Public goods and private goods could be separated, and then public goods preference could be used to develop public utility function, then regional household and government household use Cobb Douglas (CD) function, whereas private household use Constant Difference Elasticity (CDE), and the last government and private household use composite Armington in "Border" (Hertel, 1998).

Global Investment structure, in GTAP by Hertel (1998) mention there are two global sectors namely global banking sector and global transportation sector. Global banking is intermediates between global saving and investment. It creates a composite investment good (*GLOBINV*), base on a portfolio of net regional investment (gross investment less depreciation), and offers this to regional households in order to satisfy their savings demand. Therefore, all savers face a common price for this savings commodity (*PSAVE*). A consistency check on the accounting relationships described up to this point involve separately computing the supply of the composite investment good and the demand for aggregate savings. If (1) all other markets are in equilibrium, (2) all firms earn zero profits (including the global transport sector), and (3) all households are on their budget constraint, then global investment must equal global savings by virtue of Walras' law. Finally, the value of the beginning of period capital stock,  $VKB(r)$ , is update by regional investment,  $REGINV(r)$ , less depreciation,  $VDEP(r)$ . This yields the value of ending capital stocks,  $VKE(r)$ . This relationship is shown at appendix 5 table 2.7.

Global Transportation is last structure in GTAP, all this explanation refer to appendix 6 where is the equation about the global shipping industry. In addition to the global bank, another global activity is required in this model in order to intermediate between the supply of, and demand for, international transport services. These service are provided via a Cobb-Douglas production function that demands as inputs, services exports from each region. lacking the data to link exports of transport service with specific routes, we simply combine these services into a single composite international transport good, the value of which is  $VT = QT * PT$ . The equation in appendix 6 is represent the percentage change equation for the composite price index was given in equation (7), in equation (61) the conditional demands for the input to the shipping service sector, assuming that the share of each region in the global industry is constant, that is, Cobb-Douglas technology. Therefore, this equation includes an expansion effect ( $qt$ ) and a substitution effect, whereby the elasticity of substitution is assumed to be unitary. The last two equations (62) and (26) refer to uses of the composite international shipping service. It assumed that this



composite is employed in fixed proportions with the volume of particular good shipped along a particular route (Hertel, 1998)

To analyze of impact of trade liberalization between Indonesia and Turkey, the author using software Run GTAP Version 6.2 year 2003 which is the author used aggregation and few detail data with sector aggregation classify commodity sector into 10 major sector (Oil, Steel, Machinery, Electronic, Vehicle, CulturePearl, Plastic, Food, Other Manufacture, and Services) and regional classify countries into 6 regions (Indonesia, Turkey, Rest of ASEAN, NAFTA, EU, and Rest of the World) and then the author will do tariff reduction simulations in two simulation type where as First Simulation (0%) is full liberalization (overnite liberalization), Second Simulation (-50%) is gradually over five year. In this simulation the author analyzes a change of Trade Balance, Welfare, and Labor Demand. Some of equation that is relevant to the results shown in the general equilibrium model in GTAP (Global Trade Analysis Project) (Hertel, 1998) for the research is as follow:

### 1. Trade Balance

This equation is indicate a change of Trade Balance where caused by 1)  $VXW$  : Export Change, 2)  $vxwfob$  : FOB Price Change, 3)  $VIW$  : Export Change base on price CIF, 4)  $viwcif$  : CIF Price Change, and 5)  $i, r$  : Region or Country. In GTAP, the equation is:

$$DTBALi(i,r) = [VXW(i,r) / 100] * vxwfob(i,r) - [VIW(i,r) / 100] * viwcif(i,r)$$

### 2. Welfare

This equation is indicate a change in welfare was caused by: 1)  $INCOMEEV$ : regional revenue change, and 2)  $yev$  : Household revenue change. In GTAP, the equation is:

$$EV(r) = [INCOMEEV(r) / 100] * yev(r)$$

### 3. Labor Demand

This equation indicate a change of input production demand, one of which is Labor caused by: 1)  $qfe$  : changes in demand factors of production ownership or raw material related, 2)  $afe$  : change in price factor of production, 3)  $qva$  : change in demand factor of production composite, 4)  $ESUBVA$  : elasticity of substitution of

factor of production base on value added, 5) pfe : change in price and demand factor of production domestic, and 6) pva : change in value added industry. In GTAP, the equation is:

$$qfe(i,j,r) = -afe(i,j,r) + qva(j,r) - ESUBVA(j) * [pfe(i,j,r) - afe(i,j,r) - pva(j,r)]$$

### 3.3 Descriptive Analysis

To analysis non-tariff barrier between Indonesia and Turkey to provide description about what else prohibit beside the tariff (non Tariff). The author will used descriptive analysis to explain non-tariff barriers in trade liberalization between Indonesia and Turkey.

