Graduate School of Development Studies

Trade Liberalization and Indonesian Agricultural Products:

The Importance of *Special Products* and *Special Safeguard Mechanism*

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Dedication

This work is dedicated to my beloved family (Papa, Mama, Remmy, and Marco), and my dear Ogie for all the support and encouragement given to the me

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List of Acronyms

SP	Special Products
SSM	Special Safeguard Mechanism
WTO	World Trade Organization
FAO	Food and Agriculture Organization
SDT	Special and Differential Treatment
UR	Uruguay Round
AoA	Agreement on Agriculture
GATT	General Agreements on Tariff and Trade
EU	European Union
US	United States
UNCTAD	United Nations Conference on Trade and Development
IMF	International Monetary Fund
BULOG	Badan Urusan Logistik
IPS	Inter Press Service
SSG	Special Safeguard
DDA	Doha Development Agenda
ICTSD	International Centre for Trade and Sustainable Development
CBS	Centre Bureau of Statistics
OECD	Organization for Economic Cooperation and Development
TOT	Terms of Trade
GMO	Genetically Modified Organism
URAA	Uruguay Round Agreement on Agriculture

Abstract

The discussion of Special Products and Special Safeguard Mechanism in the current WTO Doha Negotiation is seen to be very important for developing countries. The key aspects on these instruments lies on the selection of SP and its treatment, along with the specific modalities for new SSM which includes product coverage, possible trigger mechanisms, and remedies. Indicators that are based on the criteria of food security, livelihood security, and rural development on a self-designation basis are being built by members especially by the G-33 developing countries group. In this context, it is important for each developing country undertake a process of internal reflection and consultations in order to identify its SP products based on the indicators proposed.

This paper aims to see which agricultural products in Indonesia to be selected as SP by looking at the indicators of self-sufficiency and import penetration, along with price as livelihood security indicators and export as competitiveness indicator, besides the formal criteria of SP which are food security, livelihood security, and rural development. From the result, there are six main products that should be included as SP. They are: rice, soybeans, sugar, maize, cassava, and groundnut. Adding to this, by using a model of Two Stage Least Square (2SLS), the results suggested that policy regarding import regulation in Indonesia such as import tariff is seen to be beneficial in increasing production in the rice sector, thus restrain the negative effect of declining food self-sufficiency in Indonesia through production. Therefore, SP and SSM can play a role in increasing the performance of agricultural sector in Indonesia.

Keywords

Special Products, WTO, trade liberalization

Chapter 1
Introduction

1.1 Background of the Study

Since the establishment of the World Trade Organization (WTO) in January 1st, 1995, member countries are committed to adopt all the agreed provisions on the new trading system under the principles of non-discrimination and transparency. The idea was to have a fairer trading system and also to promote trade liberalization among member countries by reducing or eliminating all trade distorting policies. As the result of the Uruguay Round (UR) which was conducted in 1986 to 1995, the WTO has also implemented the Agreement on Agriculture (AoA), where agriculture as the major sector for most countries was subjected to this trade liberalization. Under this agreement, member countries must gradually reduce or eliminate all kinds of protection which include subsidies, tariff, and non-tariff barriers of all agricultural products.[1]

The Uruguay Round was a unique round because for the first time it included agriculture as trade commodities which are being arranged likewise as industrial products. It was a new era of trade liberalization in agriculture sector where before it had been mainly exempted from the disciplines of the General Agreement on Tariffs and Trade (GATT)[2]. However, during the implementation of the UR, many studies suggested that the AoA was imbalanced in many ways. According to Khor (2006), the AoA has been implemented in such way as to enable developed countries to continue high levels of protection, whilst many developing countries have liberalized and their farmers are facing severe and often damaging competition from imports artificially cheap through subsidies. Subsidies continue to grow in developed countries making the price depressed and thus affect the low income countries that depend mostly on this sector. Subsidies of all kinds reported to the WTO total more than $200 billion per year, or roughly one-sixth of the $1.2 trillion total value added in the agricultural sector worldwide (CBO report, 2006). Few countries that dominate these subsidies are the EU, US, and Japan. Other forms of tariff barriers such as tariff peaks and tariff escalation regulation along with the non-tariff barriers such as sanitary and phyto-sanitary requirements also limits the market access for developing countries.

Today, a new round of multilateral trade negotiation is being held. After almost ten years of the UR implementation, the talks of a new multilateral trading system starts in 2001 to set new modalities on further and more balanced commitments. This new round was launched in the Fourth Ministerial Meeting of the WTO in Doha, known as the "Doha Round". One

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[1] Information on the Agreement on Agriculture (AoA) can be accessed through *http://www.wto.org*

[2] GATT is an early agreement on trade and tariff before the WTO. The WTO took over this agreement.

of the main goals of this round is to increase market access through substantial tariff reduction for a further trade liberalization with a view that open economic policy will increase people's welfare. Market Access is considered as the most important pillar of the negotiation compared to export subsidies and domestic support because it is seen to be the most contributing elements of trade liberalization. A recent EC newsletter on agricultural trade policy (European Commission 2006) draws on a USDA study (2001) which reports that market access contributes 54 percent of the impact of global liberalization, while domestic support by 32 percent and export subsidies by 10 percent. This is also aligned with the results by the World Bank that estimates market access barriers contributes 93 percent and an OECD (2006) study that puts it at 79 percent.

However, given the fact that many of developing countries experienced a draw back in the previous round, this round has also evolved into a discussion that focuses more on development issues, which are the concern of developing countries, least-developed countries, and low income countries by adopting what so called "trade not just for trade, but trade for development". The Doha agenda is therefore also known as the Doha Development Agenda (DDA). One of the main elements of this agenda is to give prioritization on the implementation of the Special and Differential Treatment (SDT) for developing countries through more flexibilities given such as a lesser amount or none at all tariff reduction, and also a longer implementation period. The key challenge for negotiators is then to identify an approach in defining and treating flexibilities that will lead to this felicitous outcome, and avoid unintended sharp losses that can arise from seemingly modest amounts of flexibility (Jean, Laborde and Martin, 2006).

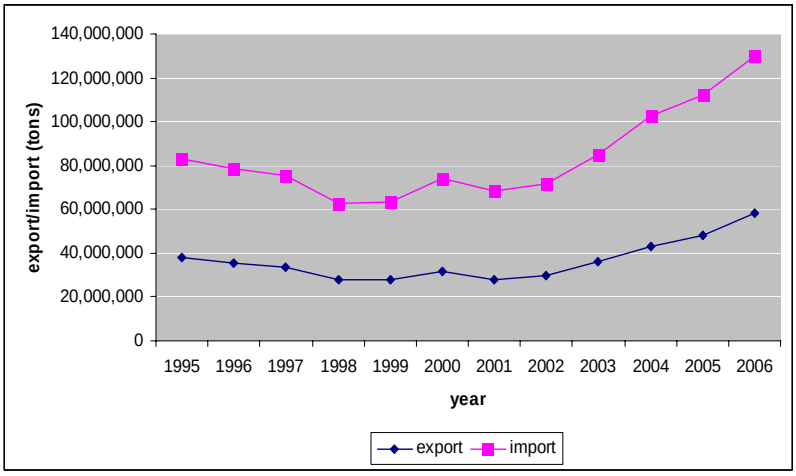
Until this moment, the Doha Round has not achieved any consensus yet with deadlocks in many areas of the negotiation. Agriculture sector had become the most important and controversial issue in this round where most of developing countries rely on. The controversy on the level of flexibilities for developing countries especially in the agriculture sector comes into the center of the problem. The debate became more intense when in the 5th WTO Ministerial Meeting in Cancun in 2003; developing countries form a coalition under the name of G-33[3] countries which proposed a Special and Differential Treatment (SDT) with higher flexibilities for some agricultural products that are essential for developing countries' food security, livelihood security and rural development. These products are known as the Special Products (SP). Along with SP, they also proposed the Special Safeguard Mechanism (SSM) - the special mechanism to counter the negative effect of trade liberalization

[3] Antigua and Barbuda, Barbados, Belize, Benin, Bolivia, Botswana, China, Cote d'Ivoire, Congo, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, India, Indonesia, Jamaica, Kenya, Korea, Madagascar, Mauritius, Mongolia, Mozambique, Nicaragua, Nigeria, Pakistan, Panama, The Philippines, Peru, Saint Kitts, Saint Lucia, Saint Vincent and the Grenadines, Senegal, Sri Lanka, Suriname, Tanzania, Trinidad and Tobago, Turkey, Uganda, Venezuela, Zambia, Zimbabwe.

such as import surges or price depression, to be treated for all products including products designated as SP.

SP and SSM is seen to be very important for developing countries because they see that the indication of further ambitious tariff reduction in the new round can harm their agriculture sector and their farmers since the previous result of the Uruguay Round was a dissatisfaction. Many studies have shown that the implementation of the Uruguay Round Agreement on Agriculture (URAA) has brought a negative effect to developing countries. A report by the Third World Network (2006) gave an illustration on the impact of trade liberalization on developing countries by showing some results from several case studies. Most of them indicate that imports had climbed in recent years as a result of the country's obligations under the WTO's Agreement on Agriculture. As a consequence, there is a significant drop in household income of farmers as a result of the fall in the commodity prices due to the increased inflow of cheap import products. A report by UNCTAD (2008) shows that after WTO was launched, there is a significant rise in import for developing countries which are not balanced by their export (see Figure 1.1).

Figure 1.1
Import and Export of Agricultural Product for Developing Countries



Source: UNCTAD Handbook of Statistics, 2008

According to Espinosa et al (2005), while it is widely recognized that developing countries as a whole would benefit from freer agricultural trade, some fear that most of the new opportunities in the Doha Round would be captured by a few middle-income countries and large food exporters. Lower income countries would gain only little and might even lose from further liberalization. Furthermore, they point out that many of lower income countries still have large rural populations composed of small and resource poor farmers with limited access to infrastructure and few employment alternatives. Thus, these countries are concerned that domestic rural populations employed in import-competing sectors might be negatively affected by further trade liberalization, becoming increasingly vulnerable to market instability and import surges may occur as tariff barriers are removed.

Given this situation, developing countries demand for both SP and SSM to protect their market. While SP gives an exception for tariff reduction, SSM allows a country to impose import restriction in times of injury. They see that with these flexibilities, it will give them some policy space in adapting the free trade. Additionally, tariff policy is also seen to be the only effective tool that most of developing countries can use in protecting their market. Not only because under the AoA subsidies are restricted, but also because of the limited resources that they have in giving such incentives.

Trade Liberalization in Indonesia

As a member of the WTO, Indonesia has also implemented the WTO commitment since 1995. Indonesia had a radical reformation on their trade liberalization and agriculture reform starting by eliminating the subsidy on fertilizer in 1998, followed by opening its rice market by allowing import for general importers and not monopolized by the National Logistic Agency (BULOG). The Indonesian government has also liberalized other commodities such as maize, soybeans, and sugar. In 2003, there are about 83 percent of the total agricultural tariff lines[4] with the rates of 0-10 percent; about 15 percent in the range of 15-20 percent; about 0.5 percent with the range of 15-30 percent, and only 1 percent have the rate above 30-34 percent (Indonesian Ministry of Finance, 2003). This aggressive action on the trade liberalization and agriculture reform was also speed up by the financial recovery program under the International Monetary Funds (IMF). Both the WTO and IMF have induced the free trade market for Indonesia.

Similar to the experience of other developing countries, there has also been a growing concern on the impact of trade liberalization in the WTO framework to Indonesian agriculture production, price, employment, and farmer's income. The fear of the negative impact of liberalizing their market has also been proved in some studies. Based on the report of Kafil Yamin, an IPS agency (2002), Indonesian farmers – including poultry, rice, and maize have been affected by cheap imports on different occasions in recent years. The impacts can be felt through the price which became much cheaper after trade liberalization where it can harm the majority of Indonesian producers who are poor and operating on an average of less than 0.5 Ha of fields (Suparmoko, 2002).

Besides price, the impact can also be seen in the performance of export and the level of import dependency. According to Sawit and Rusastra (2005), Indonesia has also experience a negative effect from trade liberalization which can be seen in the increasing import from developed countries, declining export performance, and an increasing foreign debt making it hard to alleviate poverty. Since price is depressing and imports are entering domestic market, domestic production will also be affected because farmers lose their incentives to produce. This can be seen in the figures of some Indonesian agricultural products such as rice and soybeans. Based on the FAO statistics report,

[4] Tariff line is a single item in a country's tariff schedule.

Indonesian rice production declined from 32.3 million tons in 1995-1997 to 31.66 million tons in 1998-2001, and soybeans production also decreased from 1.56 million tons in 1990-1997 to 0.9 million tons in 1998-2007. These figures showed that Indonesian agricultural sector may be negatively affected by trade liberalization.

Although opening up market may fulfill the food gap and improve food access for the poor who are net buyers in the short run, the mid term and long term effect may be different. The high level of dependence, the shift to cash crop production and the exposure to international market volatility may bring a negative effect for food security. This will also affect the livelihood security and eventually will hinder the rural development. Therefore, government needs to intervene the market by giving protection through import arrangement. The Special Products (SP) with its Special Safeguard Mechanism (SSM) proposed by the G-33 developing countries are then hoped to be an effective tools to protect Indonesian agricultural products that are important for food security, livelihood security, and rural development. It will give an incentive and time for farmers to produce more and be independent from the imported products.

1.2 Statement of research problem and working hypothesis

There are many studies that have shown that trade liberalization can bring negative impacts for local market in developing countries including Indonesia. The negative effect, such as import surges, may have multiple effects starting from the rural producer's income to the national food security. Although many economists agree that aggregate welfare increases as trade liberalized, but trade is a complex policy issue. When a nation as a whole gains from freer trade, the gains are aggregate and counted as a net gains. Indonesian economy may grow rapidly over the last few years along with its well performance in their agriculture sector, but for some sub-sector or products they are not performing adequately. Some products may face an unfair competition, while other products are not. The concern comes to the products that are strategically important for Indonesia which under the SP criteria are products that are essential for food security, livelihood security, and rural development. Moreover, products that are included in these criteria and suffer a loss from trade liberalization are the ones that are vulnerable and needs protection.

Although the proposal of SP and SSM are being brought into the negotiation table, until this moment there isn't any agreement yet on this issue. Problems concerning the importance of SP, how to select them, and how to treat them are still in debate. Regardless of the discussion of the academic position of Special Product, the selection process is being conducted by each developing country with different simulations in order to choose the products considered as SP. Indonesia too has started the SP selection process by adopting the temporary agreed indicators with different simulations and methods (e.g. Simatupang, 2003; Sawit, 2005; and Hutabarat et al., 2005). As the negotiation developed by time, finding the best way of choosing SP is still required.

Bringing all into account, I find that there should be another perspective on selecting the Special Products. Besides fulfilling the three criteria of food

security, livelihood security and rural development; products that should be included as SP are the ones that are majorly damaged by trade liberalization. By looking at the additional indicators such as import dependency, self-sufficiency, price, and export performance; I will have a different view on selecting the Special Products. These additional indicators will then contribute to the argument that SP is important for the selected products. If the preposition of SP and SSM is accepted, the treatment for those products are exempted or given more flexibilities from a higher tariff reduction. Therefore, SP and SSM will be expected to restrain this negative effect for the selected products.

1.3 Objectives of the Study and research questions

Motivated by the background describe above, the main research question is twofold: (i) *What agricultural products should be prioritized as Special Products (SP)* and (ii) *Can SP and SSM restrain the negative effect of trade liberalization?*

In order to answer the main questions, there are several supporting questions required, they are:

1. What are the impacts of trade liberalization on import dependency, self-sufficiency, price and export on each of the proposed *Special Products*?
2. Based on the analysis in no.1, what are the products that should be included as *Special Products*?
3. What is the relationship between production and import to see how SP and SSM can play a role?

1.4 Significance of the Study

Since agricultural sector is very important for Indonesia, it is imperative that agriculture sub-sectors critical for food security, livelihood security, and rural development should be treated differently. Therefore, SP should be required for developing countries like Indonesia. It is also important to have recourse to Special Safeguard Mechanisms (SSM) when faced with import price and volume shocks, which can affect a large part of the rural population. In the current position, policy makers in Indonesia are in the process of selecting these products from the criteria of food security, livelihood security and rural development. This paper aims to do a further analysis on the import dependency, self-sufficiency, price and export performance of these products respect to trade liberalization from the past experience in order to support the arguments that *special products* is needed for them. It will also suggest that both SP and SSM can play an important role in both food security and livelihood security by looking at the significance of trade liberalization in affecting production through import.

1.5 Scope and Limitation of the Study

It is generally known that trade liberalization would have opposing effects between producers and consumers. For instance, a decline in price due to liberalization enables consumers to pay less and for producers to receive less.

In this trade-off situation, net social gain to a country due to policy change is computed by comparing consumer surplus and producer surplus. However, in this paper I will limit my analysis by focusing only on the impact of trade liberalization from the producer's side, i.e. rural producers. This is to take into consideration that around 45% of the Indonesian population is engaged in the rural sector, and are vulnerable to trade liberalization. Further study on the impact of trade liberalization from the consumer's side can be carried out in the future. And since I want to focus on the impact of trade liberalization in the framework of WTO, other form of trade agreements are not conducted here.

1.6 Organization of the Paper

The paper will be constructed into 5 parts in addition to the introduction. The second part is the overview of trade liberalization and Indonesia's agricultural sector. In this part I will describe about the agricultural negotiation so far and its elements. A description of Indonesia's agricultural sector is also given in this part. Continue by the third and fourth parts that will give an explanation of the theoretical framework, literature review, and methodology used. Followed by the result and analysis in the fifth part and concluded in the sixth part.

Chapter 2
Trade Liberalization under the WTO and Indonesian Agricultural Sector

2.1 Agricultural Negotiation under the WTO

2.1.1 From Uruguay Round to Doha Round

The WTO Uruguay Round in 1995 which is known as the first stage of trade negotiation was the start of agriculture liberalization. Agricultural sector was treated like industrial products where members of the WTO agreed to reduce tariff, export subsidies, and domestic subsidies under the Agreement on Agriculture (AoA). The agreement covers three pillars, namely: i) Export competition regarding volume and value-based cuts with agreed ceiling budget; ii) Domestic Support which is categories (boxes) of support tied to trade-distorting nature; and iii) Market Access covering agreed tariffication and Special Safe Guard (SSG). The agreement also covers the start of the new negotiation on further commitment on agriculture in the year of 2000. This next step of negotiation round was then launched in the 4th WTO Ministerial Meeting in Doha, in November 2001.

In this second stage of the negotiation, a new set of modalities are constructed which is known as the Doha Development Agenda (DDA). The meeting has born a declaration that member countries shall reduce trade distorting subsidies and adopt the new schedule of tariff reduction. Under export competition pillars, the objective of DDA is reduction, with a view to phasing out, of all forms of export subsidies. While in domestic support pillars, the objective is substantial reductions in trade-distorting support. And lastly, in the market access pillars, ministers agreed to have substantial improvements in market access. Table 2.1 shows the average tariff reduction in both Uruguay Round and the proposed agenda in the Doha Round.

Meanwhile, align with the AoA, mandate to improve the Special and Differential Treatment (SDT) for developing countries are also taking into account. Paragraph 13 of the Doha Declaration again emphasizes on the special and differential treatment for developing countries as an integral part of the negotiation in agriculture. This round is a special round especially for developing countries, because it places development issues at the heart of the negotiation since many countries felt the lack of its importance in the Uruguay Round.

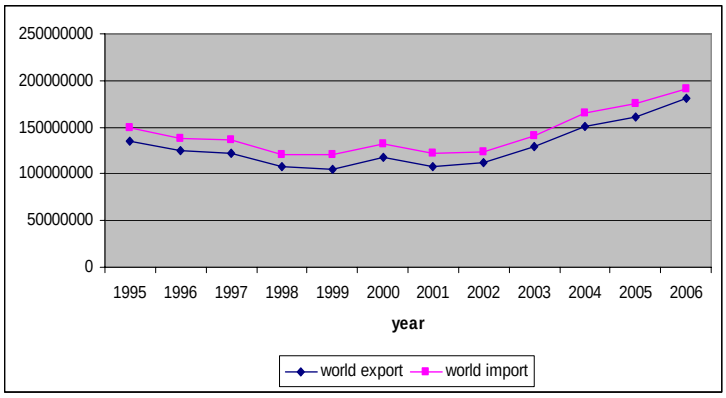
Table 2.1
Average Tariff Reduction Schedule

	Developed Countries	Developing Countries
Uruguay Round	-36%	-24%
Proposed agricultural tariff reduction	-54%	-36%

Source: WTO document

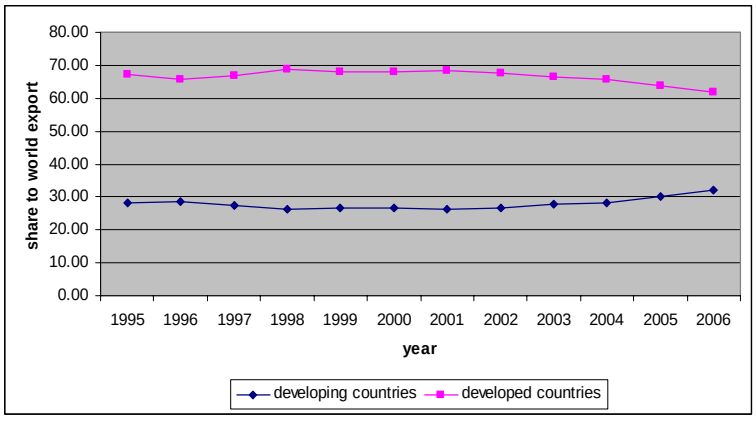
After the implementation of the AoA under Uruguay Round, there has been a significant rise of trade in the world agriculture market. The global trade in agricultural products in the year of 2000 has increased compare to 1990s (Figure 2.1). Taking rice for example, the world trade of rice is accounted for 12 million metric tons in 1990, and in 2000 it became 23 million metric tons (FAO, 2003), or increase about 92 percent in 10 years. The international rice trade is predicted to increase further on an average of 2 percent per year. Both developed and developing countries expand their trade. Developing countries experienced a rise in both import and export from 1995 to 2006. Their export has grown 52.8 percent from 1995 to 2006 however their import grows in a higher level which is 58.8 percent (Figure 2.2 and Figure 2.3). Meanwhile, exports for developed countries have been growing higher than their imports which are 23.3 percent and 13.1 percent respectively (UNCTAD, 2008). From Figure 2.3, we can see that the share of imports from developing countries has increased over the past years compare to developed countries which is decreasing.

Figure 2.1
World Import and Export of Agricultural Products



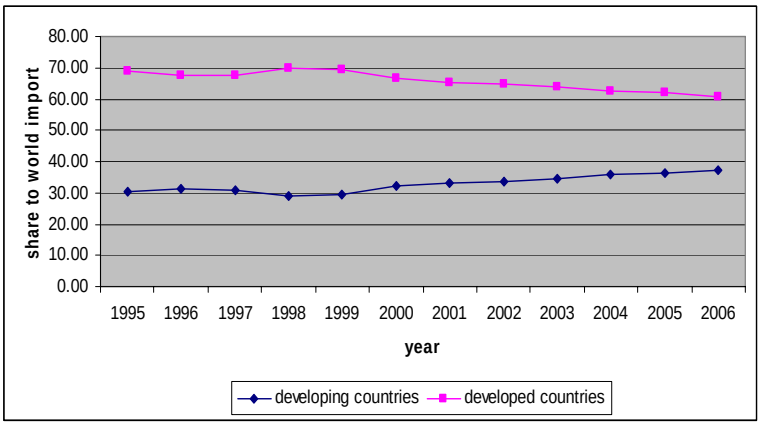
Source: UNCTAD Handbook of Statistics, 2008

Figure 2.2
Share of Export for Agricultural Product



Source: UNCTAD Handbook of Statistics, 2008

Figure 2.3
Share of Import for Agricultural Product



Source: UNCTAD Handbook of Statistics, 2008

The gains from trade liberalization are differed among members, and in a global view, it differs between developed and developing countries. There is a different level of playing field between developing and developed countries, where developed countries tend to have the ability and tools to protect themselves from the negative impact of trade liberalization while increasing their export since global markets are now widely open. Practice of unfair trade such as domestic subsidies and export subsidies also continue to exist. Developed countries continue to give subsidies up to 80 percent of their agricultural value. This shows that the previous Agreement on Agriculture seems to be weak in bordering the subsidies. In contrast, most developing countries have had little or no subsidies due to their lack of resources. Furthermore, they are now prohibited from having subsidies beyond the *de minimis* level (the maximum level of allowed subsidies) which is 10 percent of the total agriculture value. Besides that, developing countries are also being faced by different form of non-tariff barriers that they could not hinder such as standardization and patent issue. Meanwhile, opening up their markets to cheap and mostly subsidized foreign imports may be harmful for the livelihoods of their small farmers. Eventually, the practice of the trading system has made agriculture sector become a highly commercial products and that trade practice has neglect the fact that agriculture in most of developing countries carry out largely on small farms and household farms.

Based on this situation, developing countries call for real and higher flexibilities. On the 5th WTO Ministerial Meeting in Cancun in 2003, developing countries under the G-33 group collect their voice and demand a higher flexibility for products that are essentially important for developing countries' food security, livelihood security, and rural development. They demanded the Special Products (SP) to be implemented along with its Special Safeguard Mechanism (SSM). While SP should provide targeted protection for specific products which would not survive under competitive conditions but are crucial for food security, livelihood security and rural development; SSM would allow countries to protect import-competing sector against import

surges and/or price depressions. Both of these practices are seen to be important for developing country's survival in the free trade market.

2.1.2 Special Products (SP) and Special Safeguard Mechanism (SSM)

The decision adopted in Paragraph 41 of the Doha Work Program by the General Council in August 1, 2004, sees the important of adopting Special Products (SP) and Special Safeguard Mechanism (SSM). This decision was based upon a consensus of the member countries which stated that "*developing member countries will have the flexibility to designate an appropriate number of products as Special products, based on criteria of food security, livelihood security, and rural development. These products will be eligible for more flexible treatment…".* It recognizes the need to pursue agricultural policies that support food security and development goals for developing countries. Products that are seen to be vulnerable for the nation's food security, livelihood security and rural development should be treated differently. According to that paragraph, these products should be subject to more flexible treatment in the tariff negotiations such as a lower tariff reduction and a longer implementation period. At the WTO Ministerial Conference in Hong Kong in December 2005, members agreed that developing countries will have the right to self-designate an appropriate number of SP but should be guided by indicators of food security, livelihood security, and rural development. Meanwhile, the Special Safeguard Mechanism (SSM) is a measure for the products that have a significant economic and social relevant for the country such as SP and that SSM is used to counter the effect of the import surge at any given time it occur, and also to protect them from drastic reductions of the international prices or market disorders, or to guard them from the unfair trade practices. The SSM will give developing countries the possibility of raising tariff beyond the bound levels [5] to protect their agricultural sector.

Today, the discussion continued on the mechanism and criteria of selecting these Special Products along with its treatment (policy space). The strongest proponents of Special Products suggest that Special Products should be neither subjected to any new tariff rate quota commitment nor tariff capping, with a lesser tariff reduction or none at all, and all Special Products should have recourse to the SSM. Indicators of selecting SP are now being formulated by members which is derived from the three criteria mentioned above (food security, livelihood security and rural development) such as the share in nutritional or calorie intake, proportion of domestic production to consumption, share in total agriculture employment, and share in production or income. Appendix 1 shows the proposed indicators of selecting SP by Food and Agricultural Organization (FAO), International Centre for Trade and Sustainable Development (ICTSD), and the G-33 countries. The discussion has also focused on the limitation on the specific number or proportion of

[5] Bound tariff is the maximum tariff allowed.

tariff lines to be selected as SP. Existing proposals range from five individual tariff lines proposed by the US to 20 percent of all agricultural tariff lines which is proposed by the G33 countries. Meanwhile the Chair of the Agriculture Special Sessions in the WTO suggested that the appropriate number of SP tariff lines would be between 5 to 8 percent of agricultural tariff lines. This discussion still continues without any agreement yet.

Meanwhile, on the treatment of SP, the G-33 underscored and reiterated that maintaining a "non commitment tier" (zero cut treatment) must remain a fundamental aspect for SP. It said this is consistent with the Doha Mandate of providing maximum flexibility to developing countries to address their food security, livelihood security, and rural development. Although it may not be applied for all the selected Special Products, the G-33 has come along with the "graded approach" that may be a solution for all. They proposed that half of the SP are to be exempted from tariff cuts, 25% would have 5% cut and another 25% would have 10% cut. However, G-33 countries are opened to further discussion on these numbers.

While the discussion on SP lies on how to define SP and its treatment, SSM debate focuses on the product coverage, trigger mechanism (volume and/or price trigger), and types of remedy. But as suggested by the G-33 countries, the application of the SSM should be automatic in means that it does not involve procedures and formalities that are characterized in the Special Safeguard of Article V of the Agreement on Agriculture, and also in the general Safeguards Agreements. In other words, the SSM will be more practical and applicable for developing countries. According to the G-33 proposal, the characteristics of SSM are: (i) allowed import tariff as a measure of protection, (ii) it is temporally, (iii) all developing countries are allowed to use SSM and considered for every agricultural products, and (iv) all developing countries can apply SSM without the obligation to prove any "injury". The SSM and SP concepts therefore provide a strategic window of opportunity to address food security, livelihood security, and rural development needs in the current agricultural negotiation.

2.2 Background of Indonesian Agricultural Sector

Indonesia as one of the largest agricultural countries with up to 70 percent of its land provided for agriculture has focused its development on this sector. It is the prime mover of national and regional economic development by contributing to GDP's growth and export earning, providing food and raw material for industry, creating job opportunity and increasing income for the people. It creates employment for 45 percent of the total national work force in 2003 (Central Bureau of Statistics Indonesia, 2007). In the GDP, agribusiness sector is the highest share of value added in the national economy which accounts 45 percent of the total value added. Its contribution to the GDP was 12.9 percent in 2006, the second largest portion after the industry sector (World Bank, 2007). Therefore, agriculture sector is very important for Indonesia as it has the potential to generate income and thus reduce poverty. And due to its vital role to the national and rural economy, agriculture revitalization is one of the six economic development priorities of the current cabinet (2004-2009 Agriculture Development Plan).

After the crisis in 1998 to 1999, Indonesia's agriculture trade grow rapidly over the years. Trade balance has experienced a surplus where in 2005 the trade surplus was 5,751 million US dollar, higher compare to the average trade balance in 2003-2004 which was 3,782 million US dollar. Agricultural exports in the period of 2004-2005 increased by 15.7 percent compare to imports of the same period which increased 4.75 percent (table 2.2). Growth figure also showed a well performance. Based on Indonesian Central Bureau Statistics (CBS), during the 2000-2003 period, average growth rate of agricultural sector GDP was 1.83 per annum, higher than during the crisis of only 0.88 percent per annum, and compare to 1983-1997 period (before crisis) of 1.57 percent

Table 2.2
Trade Balance for Agricultural Products in Indonesia (million US$)

Period	Total exports (*A*)	Agricultural exports (*B*)	(*B*/*A*) %	Total imports (*C*)	Agricultural imports (*D*)	(*D*/*C*) %	Balance (*B*) - (*D*)
1995	45,418	5,039	11.10	40,629	3,933	9.68	1,107
1996	49,815	5,276	10.59	42,928	4,470	10.41	805
1997	53,444	5,468	10.23	41,680	3,876	9.30	1,592
1998	48,848	4,824	9.88	27,337	3,358	12.28	1,466
1999	48,665	4,584	9.42	24,003	4,126	17.19	459
2000	62,124	4,511	7.26	33,515	3,577	10.67	934
2001	56,321	4,043	7.18	30,962	3,515	11.35	528
2002	57,159	5,451	9.54	31,289	3,815	12.19	1,637
2003	64,107	6,939	10.82	42,243	3,933	9.31	3,006
2004	71,261	8,916	12.51	52,076	4,358	8.37	4,558
2005	86,285	10,316	11.96	68,736	4,565	6.64	5,751
Average:							
1999-2000	55,395	4,548	8	28,759	3,852	14	697
2000-2001	59,223	4,277	7	32,239	3,546	11	731
2001-2002	56,740	4,747	8	31,126	3,665	12	1,083
2002-2003	60,633	6,195	10	36,766	3,874	11	2,322
2003-2004	67,684	7,928	12	47,160	4,146	9	3,782
2004-2005	78,773	9,616	12	60,406	4,462	8	5,155
Trend (% per year):							
1999-2000	27.66	-1.59	-22.93	39.63	-13.31	-37.93	103.49
2000-2001	-9.34	-10.37	-1.10	-7.62	-1.73	6.37	-43.47
2001-2002	1.49	34.83	32.87	1.06	8.53	7.40	210.04
2002-2003	12.16	27.30	13.42	35.01	3.09	-23.63	83.63
2003-2004	11.16	28.49	15.62	23.28	10.81	-10.10	51.63
2004-2005	21.08	15.70	-4.40	31.99	4.75	-20.67	26.17

Source: Major Agricultural Statistics, FFTC (Food and Fertilizer Technology Centre), 2007

per annum. These statistics figures showed that agriculture in Indonesia is accelerating over the past decade.

Despite the well achievement in Indonesia's agriculture sector, the primary source of agriculture export remains in estate crops sub-sector, particularly palm oil and natural rubber. Staple food which absorbed around 72 percent of the farmers on the other hand had not performed as great as the estate crops subsector. Their exports are still low and the statistics shows that over the years, horticulture and food crops sub sector actually had a trade deficit (table 2.4). Meanwhile, products that are important for Indonesia such as rice, sugar, soybean, and chili are categorized on this group.

Table 2.4
Trade Balance for Agricultural Sub Sector in Indonesia (million US$)

Sub sector	Year						
	1997	1998	1999	2000	2003	2004	2005
Horticulture and Food Crops	-1,459.63	-1,770.65	-2,362.17	134.48	-2,019.85	-2,316.62	-1,230.02
Livestock	-514.63	-247.7	-286.62	-977.53	-388,085.13	-607.64	-420.982
Estate Crops	2,763.2	2,224.72	2,557.31	2,088.73	5,403.56	7,784.1	4,872.07

Source: Statistics Indonesia, various years

As a member of the WTO, Indonesia is obligated to implement all the WTO provisions in their national trade policies. Policies such as tariff reduction and elimination of subsidies would be a major influence for Indonesia's economy. On market access, members set tariff reduction targets that would cut average un-weighted tariff levels by 36 percent over six years (1995-2000) for developed countries and 24 percent over ten years for developing countries (1995-2004). Since then, Indonesia has undertaken a massive policy reforms in their agriculture sector. In 1995, the government has announced a series of deregulation measures which includes a gradual import tariff reduction. It suggested that all import tariff which was over 20 percent will be reduced to a maximum rate of 20 percent in 1998 and a maximum rate of 10 percent in 2003. While import tariff which was 20 percent or lower will be reduced to a maximum of 5 percent in year 2000. Other deregulation packet is also introduced in 1998 in alliance with the IMF suggestion on the credit given to Indonesia during the economic crisis. They remove the government's National Food Logistics Agency (BULOG) which was monopolizing agricultural imports and input subsidies such as fertilizer have also been cut off.

Indonesia currently has a relatively low applied tariff. According to the WTO, the average current applied tariff of Indonesia is around 4% (WTO, 2003). They implement the applied tariff which is far lower than their bound tariff (Table 2.3). Farmers are forced to face this global competitive market while they are not given any incentives from the government. According to Rachman (2005), Indonesia's agricultural commodities have decreased in terms of its competitiveness under the WTO commitments. He stated that most of

Indonesia's exports that gained market shares in the period of 1990-1995 which is before the implementation of the WTO commitment showed an unsatisfactory performance in the period of 1990-2005 which is after the WTO.

Table 2.3
The Bounded and Applied Tariffs of Agricultural Products in Indonesia, 1995-2007

Commodity	Bounded (1995)	Applied Tariff in Indonesia (in % or Rp/kg)					
		1998	2000/01	2002/04	2005	2006	2007
Rice	160	0	Rp 430	Rp 430	30	30	30
White Sugar	95	0	25	Rp 700	40	40	40
Milk / products	210	5	5	5	5	5	5
Soybeans	27	0	0	0	0	0	0
Maize	40	0	0	0	5	5	5
Wheat	18	0	0	0	0	0	0
Meat	50	5	5	5	5	5	5

Source: DGCE, Indonesian Custom Tariff Book, various years

Despite the increase in production in some agricultural products, some products may not perform well. Taking rice for example, although production tends to grow, Indonesia still holds the world's largest importer of rice. Import in rice increased drastically in 1998 when the government implement a zero tariff for import. Import has rise more than 7 times from the previous year after the tariff cut (CBS, 1999). However, the government has re-imposed a tariff of 430 rupiahs per kg (US$50/t) on rice imports by private traders since 2000 to strengthen the market price and provide an incentive to increase planting. And subsequently the industry has made requests for an increase the import tariff to 735 rupiahs per kg (US$ 85/t) but is still under reviewed.

Another example is for sugar. According to Haris (2003), sugar domestic producers are unable to compete with imported sugar, and therefore the sugar producers have requested an increase in import tariff. The same condition applied in the soybeans commodity. Soybeans domestic producers are not able to compete against the cheap subsidized import products. Even in recent years, the soybean industry has asked the government to increase the import protection from 0% to 27%, but this proposal is still under review.

The description above illustrates that even if Indonesia experienced an adequate performance in their agricultural sector, some sub-sector or products are still vulnerable to trade liberalization mostly with the widely open market. Imports in some products may cause a negative response in domestic market competition where domestic producers are unable to compete thus restrain their productivity. And for products that are considered to be important for the national food security, livelihood security, and rural development, protection in market access by implementing Special Products (SP) may be beneficial.

Chapter 3
Theoretical Framework and Literature Review

3.1 Trade Liberalization: pros and contras

Theories of international trade are distinguished and developed over time, from the absolute advantage by Adam Smith, comparative advantage by David Ricardo, until the competitive advantage by Michael Porter which can also be adopted in the international trade. Most of the conventional international trade theories believe that a free global trade will create efficiency and welfare to its members. Free trade theory (or comparative advantage theory) tells us that trade helps people to obtain goods more cheaply than they could produce domestically. Countries will all gain from trade if they possess different factor endowments and also if they export the goods which production requires intensive use of the factor with which it is relatively well endowed and imports the which production requires intensive use of the factor that is poorly endowed with. It will encourage country to transfer resources to their most productive use in each economy to maximize the gains from exploiting comparative advantages. Therefore, it will create a higher efficiency.

Trade liberalization also indicates that tariff and non tariff barriers hinder free trade by distorting prices and resource allocations. By eliminating these barriers, the global market will be more predictable and fair. By joining the WTO, it will reduce policy uncertainty and instability through a legally binding commitment that can increase savings rates and investor confidence and thereby faster rates of capital accumulation. By encouraging greater openness to the rest of the world, there will be inflow of new technologies and other business management ideas so that a country will be more productive.

On the other side, some trade theory shows that some people will suffer a loss in free trade. A common misperception about international economics is that it gives a point of view that everyone will benefit from free trade[6]. And mostly, these benefits are seen from an aggregate point of view. Meanwhile, despite the group who benefited from the global trade, a significant number of parties are also been badly injured. It is argued that when transaction among multiple countries occurs, the result may not be as good as the transaction for two countries. The trade off between comparative advantages of each country may not be equal to all parties. Countries have different resources which are the components of their competitiveness, and based on these differences, how countries react to the trade openness may be differed. And not little do we see the unfair trade practice in this global market which can hindered the optimistic view of beneficial trade liberalization. Based on The Centre of Economic Policy Research, there are four consequences of greater openness resulting from trade liberalization. They identify anti-competitve behaviour,

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6Suranovic, Steven M.; "International Trade Theory and Policy", http://internationalecon.com/Trade/Tch5/T5-5B.php

reduced opportunity for learning by doing, increased volatility, and lost of sovereignity as key short coming of trade liberalization (Cirera et al 2001:16-17). It indicates that free competition in a global market is hard to achieve. Practice of unfair trade still exists, bringing countries just to a highly competitive market. Countries that are not ready and strong enough to face this competition are mostly deteriorated. And not surprisingly, these countries are coming from developing and small income countries where there are still high level of poverty. Therefore, trade liberalization is also potential to create a negative effect as it can create an unfair trade practice. And based upon that reason, some argue that protection through tariff is needed to protect domestic market that is pressured by trade liberalization.

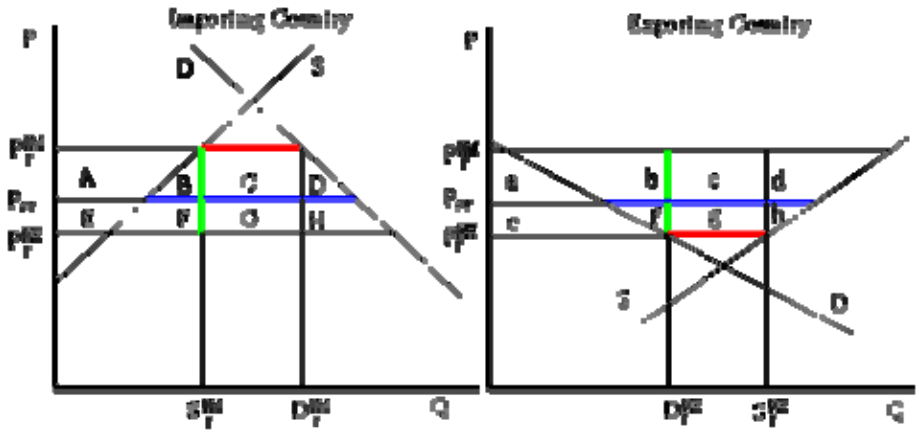
3.2 The impact of trade liberalization and import tariff policy

Trade policy is used for a country to boost their economic activities. In terms of international trade, trade policy can be used for many reasons for the purpose of import-export activities. It is used to increase export, to give incentives for producers to increase their output, or even to protect their industry from the negative effect of international trade. For a country to protect their domestic market, there are many forms of trade policy that can be used such as import tariff, import quotas, and subsidies. But import tariff as a measure to protect domestic market from import surges are the most commonly used trade policy both in developed and developing countries. This is aligned with the WTO commitment to use tariff as market protection tools as it is more predictable. Especially for developing countries, import tariff is the most applicable tools they use compare to the others.

Import Tariff is the tax measures for imported products. There are two types of import tariff, they are specific tariff and *ad valorem* tariff. Specific tariff is the tax that is fixed for every unit of import products. For example, every pair of shoes is subjected to $1 import tariff. Meanwhile, *ad valorem* tariff is the tax that is a percentage of a product's value. For example, import tariff is 1% from the total value of the products.

In analyzing the impact of tariff policy, we can use the *partial equilibrium* model with the assumption of perfect competition. The partial equilibrium analyzes the impact of a trade policy measure only on the direct affecting market. To see the welfare effect, both consumer surplus (CS) and producer surplus (PS) are used. Consumer surplus is defined as the difference in price of a product that a consumer is willing to pay with the actual price that they pay. While the producer surplus is the difference between the actual price that a company/nation receive with the minimum price they are willing to accept. The welfare effect is also distinguished between large countries and small countries (based on the market share). As a big country, any trade policy will influence the world market and thus influence the trading partners. If a country implemented an import tariff, the price of that commodity will rise. Because of the increase in price, demand will decrease. Figure 3.1 describe the welfare effect of a trade policy.

Figure 3.1
Welfare Effect of Implementing Import Tariff for Large Countries



Source: Suranovic, 1997

P_{FT} is the free trade equilibrium price. At that price, the excess demand by the importing country equals excess supply by the exporter. The quantity of imports and exports is shown as in the horizontal distance between the supply and demand curves at the free trade price. When a large importing country implements a tariff it will cause an increase in the price of the good on the domestic market and a decrease in the price in the rest of the world (RoW). Suppose after the tariff the price in the importing country rises to P_T^{IM} and the price in the exporting country falls to P_T^{EX}. If the tariff is a specific tax then the tariff rate would be $T = P_T^{IM} - P_T^{EX}$. If the tariff were an *ad valorem* tax then the tariff rate would be given by $T = (P_T^{IM} / P_T^{EX}) - 1$.

The following Table provides a summary of the direction and magnitude of the welfare effect to producers, consumers and the governments in the importing and exporting countries. The aggregate national welfare effects and the world welfare effects are also shown.

Table 3.1
Welfare Effect of Implementing Import Tariff for Large Countries

Welfare Effects of an Import Tariff		
	Importing Country	**Exporting Country**
Consumer Surplus	- (A + B + C + D)	+ e
Producer Surplus	+ A	- (e + f + g +h)
Govt. Revenue	+ (C + G)	0
National Welfare	+ G - (B + D)	- (f + g + h)
World Welfare	- (B + D) - (f + h)	

Source: Suranovic, 1997

Moreover, Suranovic explain how import tariff policy influence involving parties in both importing and exporting countries. From the importing countries that induce this import tariff policy, the impacts are as follows[7]:

- *Importing Country Consumers* - Consumers of the product in the importing country suffer a reduction in well-being as a result of the tariff. The increase in the domestic price of both imported goods and the domestic substitutes reduces the amount of consumer surplus in the market.
- *Importing Country Producers* - Producers in the importing country experience an increase in well-being as a result of the tariff. The increase in the price of their product on the domestic market increases producer surplus in the industry. The price increases also induces an increase in output of existing firms (and perhaps the addition of new firms), an increase in employment, and an increase in profit and/or payments to fixed costs.
- *Importing Country Government* - The government receives tariff revenue as a result of the tariff. Who benefits from the revenue depends on how the government spends it. Typically the revenue is simply included as part of the general funds collected by the government from various sources. In this case it is impossible to identify precisely who benefits. However, these funds help support many government spending programs which presumably help either most people in the country, as is the case with public goods, or is targeted at certain worthy groups. Thus, someone within the country is the likely recipient of these benefits.

The aggregate welfare effect for the importing country is then found by summing the gains and losses to consumers, producers and the government. The net effect consists of three components: a positive term of trade effect (G), a negative production distortion (B), and a negative consumption distortion (D). Because there are both positive and negative elements, the net national welfare effect can be either positive or negative. The interesting result, however, is that it can be *positive*. This means that a tariff implemented by a large importing country *may* raise national welfare.

3.3 Special Products (SP) Selection

The July framework incorporated provisions on Special Products (SP) and the Special Safeguard Mechanism (SSM) as fundamental components of the special and differential treatments (SDT) to be accorded to developing countries members under the market access pillar of new agreement on agriculture. However, key aspects of these instruments such as the selection of SP and its treatment, along with the specific modalities for new SSM which includes product coverage, possible trigger mechanisms, and remedies; are still under negotiation. Members have been talking about the SP selection by building indicators that are based on the criteria of food security, livelihood security,

[7] Discussion on this part are fully based on Steven M. Suranovic (1997), "International Trade Theory and Policy"

and rural development on a self-designation basis. The discussion on these indicators is mainly proposed by the G33 countries. Based on the previous G33 Jakarta Ministerial Conference in March 2007, the revised list of indicators of selecting SP are as follows[8]:

- Under the criteria of food security:
  - National statutes or regulations identifying key staple products or basket of basic food based on local preferences or circumstances
  - Total product consumed/total of product produced
  - Domestic consumption in the country is significant compared to total world exports; or a significant proportion of total world exports are accounted for by the largest exporting country
  - Share of income spent on a particular product at the nation or regional levels
- Livelihood security criteria:
  - Share of employment of the product in total agricultural labour force or in total rural employment (at national or regional levels)
  - A large share of the product's producers, at regional or national level, are low income, resource poor, or subsistence farmers, including disadvantaged or vulnerable communities and women or a significant proportion of domestic production of the product is produced in disadvantaged regions, including drought-prone, hilly or mountainous regions
  - Productivity per worker or hectare of the product, at regional or national level, is low compared to average global productivity
- Rural Development criteria:
  - Product economic activity share in total rural agricultural output (at national or regional levels)
  - A large share of total domestic production at regional or national level is from small farms (under 10ha), or those no bigger than average farm size in the country; or a large share of farms producing the product are small (under 10ha) or no bigger than average farm size in the country concerned
  - Potential for value addition and linkages generated by a product (extent to which product is or can be locally processed; share of domestic agricultural intermediate inputs used in non-agricultural sectors; value of goods or services used as inputs)
  - A low proportion of the product is processed in the country, compared to the world average; or the product contributes a high proportion to value addition in rural areas, at regional or

[8] For comparison between G33 proposal with FAO and ICTSD suggestion, see Appendix 1.

national level, through its linkages to non-farm rural economic activities, including handicrafts and cottage industries or other forms of rural value addition
    - Tariff revenue generated by the product
- Trade dimension criteria:
    - Extent to which products have to compete with products that exporting countries have heavily subsidised, through domestic support and export subsidies

In this context, it is important for each developing country undertake a process of internal reflection and consultations in order to identify its SP and SSM products based on the indicators above. But while countries have used these indicators in identifying SP, some may face difficulties in the data collection. Thus, the implementation of these indicators may not be perfectly established. A study by FAO (2005) has indicated that in the majority of case studies, the following sub-set of nine indicators was used: (i) product share in calorie intake; (ii) the domestic self-sufficiency rate; (iii) variability in production; (iv) share in area harvested; (v) growth in import; (vi) product displacement by imports; (vii) share in production; (viii) import dependency; and (ix) production growth rate. Moreover, the International Centre for Trade and Sustainable Development (ICTSD) has studied several countries that has undertake the SP selection and suggested that the approach taken for the use of indicators is non-cumulative, in the sense that a product does not necessarily have to fulfil all indicators in order to qualify as a special product. They stated that given the large differences among the countries studied in terms of the size of the economy, or agro-ecological conditions, no uniform threshold have been defined for the different indicators proposed. The threshold has been left to the judgement of local researchers and debated in the context of national stakeholder consultations. Therefore, the indicators are the guidelines in proving that certain products are essential for the national's food security, livelihood security, and rural development.

The selection process has also been different between countries. In some countries, specific values were assigned to each indicator. For example, products which import growth is 5 percent were selected. In other countries different value applied. Meanwhile, in some other countries, the threshold were simply set to ensure that the top thirty ranked products of each indicator qualified for further consideration. Moreover, in some countries the list included those products that exceeded the threshold on at least three of the nine indicators, but in others it was only two. In addition, in some studies, a degree of flexibility was applied for products that exceeded less than two or three indicator thresholds if there was some *a priori* justification for their inclusion. Thus, each country will have their own simulation on selecting their special products.

Studies on selecting SP in Indonesia have also been done. The Permanent Mission of Indonesia for the WTO started by developing the concept of Special Products and supported four main products which are rice, maize, soybeans, and sugar to be included. But some argued that this suggestion is not based on economic rational studies, but more to political reasons. While the criteria of selecting SP is being constructed, Simatupang (2004) has developed

an SP selection process for Indonesia by using 6 indicators namely: (a) percentage of a product to the total domestic agriculture products, (b) percentage of a product in fulfilling the national calories and protein, (c) percentage of a product to the total agriculture employment, (d) dependency on imports, (e) import surges incidence of a product, and (f) the growth trend. He uses a scoring technique where he tested four main Indonesian agriculture commodities which are rice, sugar, maize, and soybeans. Based on his criteria, the four products are eligible for SP. But some questioned rational behind the benchmark in his scoring technique.

A further study by Husein Sawit et.al (2005) concluded 12 products as the proposed SP. They are rice, maize, soybeans, vegetables, sugar, tobacco, meat, poultry, vegetable and animal oil, other food/alcohol drinks and thread. He uses the indicators of products that are net importers, the share of the GDP, the share in calories and protein, and the share to employment. Moreover, the Indonesian Centre for Agriculture Socio Economic and Policy Studies under the Indonesian Ministry of Trade (2005) has adopted the Input-Output Analysis to see the strongest sector based on their activities. They identified 10 sectors to be included, they are: meat, milk, rice, sugar, maize, vegetables and fruits, soybeans, poultry, flour, and miscellaneous food. Out of all the studies, it appears that the four Indonesia's agricultural main products which are rice, maize, sugar, and soybeans are always included as SP.

3.4 SSM Implementation

The Special Safeguard Mechanism (SSM) is intended to provide protection to developing countries against import surges and price depression. According to ICTSD (2005), the first priority should be given to products identified as SP on the basis of food security, livelihood security, and rural development needs. For most developing countries, they do not have in place safety net mechanism that allows them to counter the negative effect of temporary shocks in prices and import surges on specific sectors. Meanwhile, the effect may be long term and permanent. Moreover, they also add another consideration which relate to the sectors in which import penetration has been increasing over time, indicating the local sector is under pressure already. Sudden increases of imports may irremediably damage the viability of those industries. In this context, the comments made above with respect to the self-sufficiency and import penetration is relevant: each country needs to contextualize the analysis and consider whether protection is warranted.

According to the G-33 proposal, an SSM will be available to all developing countries and it would apply to all agricultural products. The right to apply the SSM will be triggered by either the volume of imports or by the price of imports, but not concurrently. The threshold of each trigger are still being discussed, however as suggested by the G33 countries, unlike the normal safeguard which requires evidence of serious injury to local producers before it can be used, the SSM can be invoked without showing such injury, when either a price trigger or a volume trigger comes into play (i. e. when there is a price decline or a volume increase that reaches the "trigger" level). When an injury occurs, developing countries may apply remedies such as the implementation

of import tariff. Moreover, the SSM shall be a permanent mechanism as long as there is abnormality and imbalances in the world trading system.

SSM would be a measure to protect agricultural products that are injured by trade liberalization through import surges and price degradation, however the discussion in this paper will not cover the rational and justification of the SSM. SP as the products essential for developing countries' food security, livelihood security, and rural development are urged to have an access of this SSM.

3.5 Self-Sufficiency

Based on ICTSD report (2005), it is advisable to add to the analysis indicators of self-sufficiency and import penetration, especially on products prominent in the consumption profile of the population. Self-sufficiency would indicate the extent to which local producers is enough to meet consumption needs, while import penetration measures the extent to which total consumption of a particular goods is met through imports. They pointed out that self-sufficiency may and may not represent a problem. It will depend on the context and food security strategy of the country. However, a decreasing level of self-sufficiency even if it remains high may justify protection because there is potentially a threat to local production and food security. This would also be reflected in increasing levels of imports in the local markets where price can be depressed. For developing countries, a decrease in self-sufficiency not only can harm the local small producers which are depending on this sector, but also it will not restrain the side effect of a high volatile global market today. Therefore, self-sufficiency is considered as an indicator that influenced both livelihood security and food security.

Agriculture self-sufficiency has become an important goal in many developing countries including Indonesia. Ruppel and Kellog (1991: p.3) indicate the importance of self-sufficiency is that it will conserve foreign exchange for goods other than agricultural imports. It is also important for the national defense strategy and for the most important thing is to provide adequate supply of food to meet the demand. The concept of food self-sufficiency is somewhat different from the concept of comparative advantage of the international trade. According to Staatz (1991), although international trade can stabilize domestic supply, relying on international market involves risks. Free trade is also making an economy move towards a flexible exchange rate which makes price fluctuate. Additionally, given the condition that today's international trade is supplemented with many subsidies, prices may fall below the domestic price. Therefore, to protect domestic agriculture, it is necessary to encourage a certain level of domestic self-sufficiency in order to have enough domestic production capacity in place.

On the other side, there are also some views that consider self-sufficiency is not an effective way to achieve food security. According to Reutlinger (1987), food security means secured access to food for every citizen at all times. This means that food security does not only involves fulfilling domestic consumption by domestic production, but it focuses more on how people can access it. Even when a country is self-sufficient, it will be food insecure if

people cannot access the food. Moreover, Sen (1982) sees that poverty is a standing block that prevents people from having sufficient access to food. With poverty existing in many parts of the world while the global food supply aggregately has met an adequate amount, increasing food supply is no longer enough to achieve food security. People started to see the importance of food distribution and how people can access them. This means that food security cannot be achieved without an effective alleviation of poverty.

Despite the contradictive views on food security, food self-sufficiency is still widely perceived as a pre-condition for prosperity in developing countries. A country can not develop their food distribution when food supply is not enough. Additionally, learning from the latest food crisis, it is a must that developing countries should hold the ability to achieve their own self-sufficiency and improved accessibility of the staple food. Given the views on how important it is, food self-sufficiency programs still indeed the focus of many developing countries such as Indonesia, Lao People's Democratic Republic, Cambodia and Myanmar (UNCAPSA, 2005). It is seen that food self-sufficiency contributes to the national food security, livelihood security, and rural development.

As for Indonesia, targeting food self-sufficiency has been one of the goals in the agricultural development program. Indonesia that was once self-sufficient in rice in 1984 is aiming to achieve that level again. Not only rice, Indonesia also dreams to be self-sufficient in other products such as soybeans, maize, sugar and cassava. This has been accepted in the national policy level where the current government has included self-sufficiency as one of the development program goal. Therefore, self-sufficiency is an important indicator to see the performance of each product.

3.6 Trade Liberalization and farmer's welfare

A potential concern is that protection for such products may reduce rather than increase the food and livelihood security of poor people, even if it improves the income situation of farmers who are net sellers of those products. This concern arises from the fact that poor people in poor countries frequently have extremely high expenditures shares on staple foods. However, many of the arguments for special product protection appear to be based on a presumption that raising agricultural prices (as for example, occurred when export barriers on rice in Vietnam removed) will reduce rural poverty, and hence improve income and food security. Indeed, Edmond and Pavenik (2005) found that raising the price of rice in Vietnam made many low-income households better off. Morley and Pineiro (2004) also found that world trade liberalization causes world food price to rise and poverty to fall in Latin American countries.

Despite the differences, the major study on trade and poverty stresses that the relationship between trade reform and poverty is very complex, with complementary policies heavily influencing the outcome. Nonetheless, by looking at the framer's income, that trade liberalization would depress price and thus lower their purchasing power, making poverty increase.

Chapter 4
Data and Research Methodology

4.1 Data

The data used in this paper is obtained from different resource both national an international organization. From the national organization, data of specific agricultural products such as import, price and production are obtained from the Agricultural Statistics by the Ministry of Agriculture Republic of Indonesia and also Ministry of Trade Republic of Indonesia. The data on tariff are obtained from the Ministry of Finance Republic of Indonesia. Data are also obtained from international organization mainly FAO. Others are UNCTAD, OECD, World Bank, IMF, and different international research institute such as FFTC (Food and Fertilizer Technology Center) and IRRI (International Rice Research Institute).

4.2 Research Methodology

4.1.1 Methodology for answering the first question

The first question is: "*What agricultural products should to be prioritized as Special Products (SP)?"*

In chapter 3 mentioned above, the SP selection is guided by the indicators which is still under discussion. Some suggestion has made into the negotiation table, and most prominently is the G-33 proposal. Countries have also started to make their own simulation on finding their SP. However, the SP indicators in its implementation may not be perfectly established in all country. The study by ICTSD has stated that the approach taken for the use of indicators is non-cumulative, in the sense that a product does not necessarily have to fulfil all indicators in order to qualify as a special product. This is also due to a problem in the data availability. The threshold has also been left to the judgement of local researchers and debated in the context of national stakeholder consultations due to the wide differences in the characteristics of each country.

Realizing these situations, maximum flexibilities should be pointed out in the SP selection. This does not mean that the selection process is arbitrary, but the indicators are used as the guidelines in proving that certain products are essential for the national's food security, livelihood security, and rural development. Thus, the implementation lies on how the countries can show the importance of those selected products. Adding to this, the SP selection has also been flexible in many countries with different ways. Each country will have their own way of simulation in selecting their special products.

In order to answer this question, I analyze the products based on the indicators mainly proposed by the G-33 countries with some adaption of other suggestion from FAO and ICTSD. Since there is some data availability that may arise, I've work based on the available data according to those indicators. Furthermore, as describe in chapter 3, I also take into consideration the indicators of self-sufficiency and import penetration as suggested by the ICTSD and aligned with FAO suggestion on my analysis. This is to justify the

impact of trade liberalization on each product. Therefore, products that are seen to be eligible for SP based on the indicators of food security, livelihood security, and rural development; and proved to experienced an injury by trade liberalization which is described by an increase in import penetration and a decrease in self-sufficiency, price, and export, are seen to be the products that should be protected under the SP.

The following steps are conducted in answering the first question. Firstly, I do my analysis on the products that are seen to be strategically important for Indonesia as suggested by the Ministry of Agriculture of The Republic of Indonesia[9]. The reason for this is to obtain products to be selected as SP that is aligned with the national development program. The Indonesian Ministry of Agriculture has proposed 14 products to be considered as SP namely: rice, maize, soybean, sugar, meat, poultry, oranges, banana, milk and milk products, cassava, ground-nuts, tomatoes, chili, and durian. Thus, I applied the indicators of SP for these products to see how these products are eligible for SP.

Secondly, from each of the proposed special products, I use descriptive analysis by looking at the impact of trade liberalization on import dependency (percentage of import to consumption), food self-sufficiency (percentage of domestic production to consumption), price and export. The calculation on the impact of trade liberalization on these products is conducted using simple statistic descriptive tools and tested by the t-test two sample of before and after liberalization.

Furthermore, I made a product selection simulation that are prioritized to be included as Special Products based on the most injured products which indicate that those products need to be protected. By conducting a priority scale of these products, a number of products up to not more than 8% (the expected maximum amount of SP) of total agricultural tariff lines are then be selected.

4.1.2 Methodology for answering the second question

The second question is: "*Can SP and SSM restrain the negative effect of trade liberalization?".*

In order to answer this question, I look at how trade liberalization influence production through imports. I have chosen the production as my main observation in this part because a strong production can give an adequate supply for domestic consumption, achieving food self-sufficiency and also contributing for food security. Meanwhile, it also shows a strong livelihood security where for the object products, a significant number of producers are from the small vulnerable farmers.

Trade liberalization can be denoted by a reduction in import tariff. However, given the fact that a certain value of import tariff can be applied in a

[9] "Development Program for Strategic Products in Indonesia", Research and Development, Ministry of Agriculture Republic of Indonesia (2004)

period of years, the estimation would not achieve a factual relationship among both variables. Thus, trade liberalization is defined as a dummy variable indicating when import tariff is liberalized or not, instead of the value of import tariff itself. Based on the hypothesis, when trade liberalized, import tariff would decline and thus import would rise. When import increases, domestic production would be expected to fall.

By building a production model which includes import as an explanatory variable, we can see how import will affect domestic production. Since trade liberalization is increasing market access by reducing import tariff, we can expect that import will increase as trade liberalization is taking place. Therefore, import may be endogenous and thus relying on ordinary least squares (OLS) may result in incorrect estimates of the actual production.

One way to solve the problem of endogeneity is by using exogenous (or natural) variation in imports to provide instrumental variables (IV) estimates of production. This approach relies on finding a variable or set of variables that influence imports, but do not affect production. For this purpose, I use trade liberalization representing a fall in import tariff as an instrumental variable. This is a way to see how SP and SSM can play a role on import and production through the trade liberalization variable. It will give an illustration on how protection in import tariff to the prioritized products can be beneficial and thus SP and SSM would be an effective tool.

Given the time constraint, I run my regression only on one commodity which is seen to be the most important and significant products to be selected as SP. By using a method of *Two Stage Least Square* (2SLS), I analyze the following model to see how trade liberalization affects domestic production through import. Besides import, other variables affecting production are also included. These variables are yield, seed, consumption (demand), fertilizer use, and domestic price. However in this paper, I would like to emphasize on the link between import and production.

:

Production function:

$$Q_t = a_0 + a_1 YLD_t + a_3 SEED_t + a_4 CONS_t + a_5 FERT_t + a_6 P_t + a_7 IMP_t + \varepsilon_1 \text{ ..... (Eq. 4.1)}$$

Import function:

$$IMP_t = \beta_0 + \beta_1 TL_t + \varepsilon_2 \text{.....(Eq 4.2)}$$

Where,

Q_t	= Production in quantity (tons)
YLD_t	= Yield (Ha)
$SEED_t$	= Seed (tons)
$CONS_t$	= Consumption (tons)
$FERT_t$	= Fertilizer (metric tons)
P_t	= Domestic Price (Rp/tons)
IMP_t	= Imports Quantity (tons)

TL_t = Trade Liberalization (Dummy Variable)

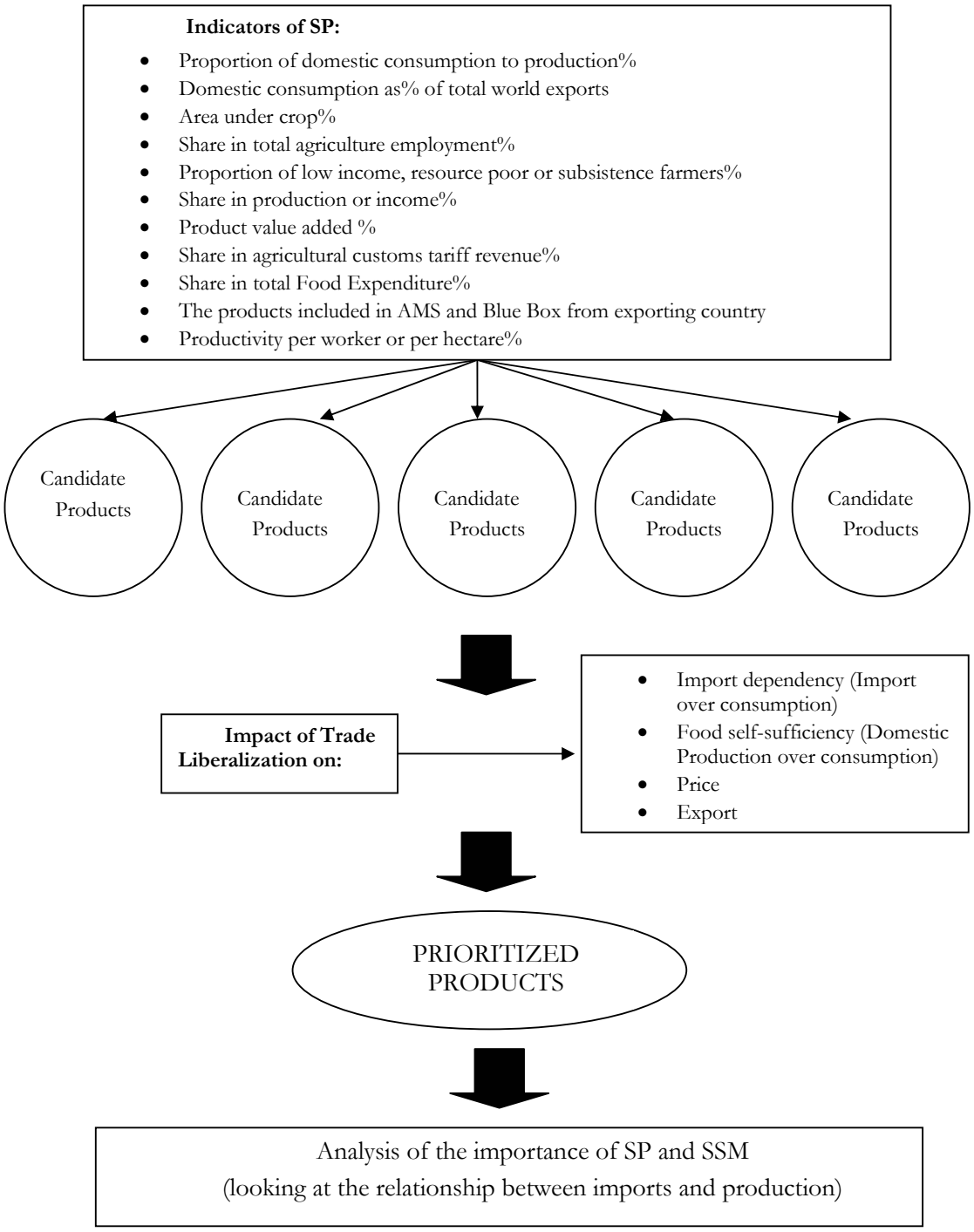
ε_1 = error term function 1

ε_2 = error term function 2

To estimate this model, a test of endogeneity for import variable is conducted using the Smith and Blundell's (1986) procedure. Firstly, import is regressed on all exogenous variables in equations 4.1 and 4.2. The residuals from these regressions are then saved and used as additional regressors in the estimation of equation 4.1. Then the joint hypothesis that all the coefficients on the residuals are zero tested. If endogeneity occurs, I will use of the 2SLS instead of OLS. The basic concept is that the 2SLS is to replace the (stochastic) endogenous explanatory variable, which in this case is the imports variable, by a linear combination as the explanatory variable in lieu of the original endogenous variable. Additionally, the 2SLS is especially designed for an over identified equation, therefore the test of identification is also presented.

Figure 4.1 shows the flow of my research methodology.

Figure 4.1
Methodology Framework Flow



Chapter 5
Result and Analysis

5.1 Prioritizing Special Product (SP)

The selection of SP as mentioned before, are based on the three criteria of food security, livelihood security and rural development. A set of indicators according to these criteria has been developed by different parties. Following the indicators proposed by developing G-33 countries, the simulation below is based on the following indicators:

- Defined as staple food
- Proportion of domestic consumption to production (%)
- Domestic consumption as percentage of total world exports
- The share of income (%) in the national/regional level
- Share in total agriculture employment (%)
- The proportion of low income, resource poor or subsistence farmers (%)
- Productivity per worker or per hectare (%)
- Area under crop (%)
- Share in total food expenditure (%)
- Product value added (%)
- Share in agricultural customs tariff revenue (%)
- The products included in AMS and Blue Box from exporting country

Table 5.1 shows the calculation based on the indicators above on the selected products that are considered as commodity focus that are suggested by the Ministry of Agriculture as mentioned before[10]. The products selected are products that are important on fulfilling the nutrient/diet needs of Indonesian people, it is highly consumed by Indonesian people, or it is seen to be strategically important for Indonesia's agricultural performance. There are 14 products included in this list, they are: rice, corn, soybean, sugar, meat, poultry, oranges, banana, milk and milk products, cassava, ground-nuts, tomatoes, chili, and durian.

From table 5.1 we can see the value of the indicators on each product. However, due to data availability, some indicators are not presented in the table. And since the indicator has no threshold unweigthed, the selection will be based on the average value of every indicator. This is to compare which products are considered low or high comparing to other products. This

[10] " Development Program for Strategic Products in Indonesia", Research and Development, Ministry of Agriculture Republic of Indonesia (2004)

Table 5.1
Value of SP Indicators for the Proposed Products

NO	PRODUCT	INDICATORS									
		Share in nutritional or calorie intake%	Proportion of domestic production to consumption %	Domestic consumption as% of total world exports	Area under crop%	Share in total agriculture employment %	Product value added %	Share in agricul-tural customs tariff revenue%	Share in total Food Expenditure %	Productivity per worker or per hectare%	Proportion of low income, resources poor or subsistence farmer %
1	Rice And Products	48.34	97.85	120.64	24.46	29.21	14.7	0.20	30.58	118.27	n.a
2	Cassava	6.27	101.56	94.44	2.61	2.13	94.04	0.00	8.34	138.46	93.00
3	Maize And Products	8.67	92.21	11.73	7.02	5.92	85.21	0.00	4.49	72.72	n.a
4	Sugar And Products	4.89	76.82	13.00	0.72	2.35	26.45	0.89	17.63	112.02	47.00
5	Ground-Nuts	2.34	91.53	45.40	1.47	2.62	84.97	0.00	0.03	149.67	n.a
6	Milk And Products	0.46	43.86	1.87	n.a	1.30	58.04	2.02	1.09	72.38	66.00
7	Soya Beans And Products	1.31	37.76	1.65	1.14	2.49	84.07	0.00	1.31	56.48	n.a
8	Meat And Products	0.57	97.82	4.73	n.a	2.62	71.44	0.92	0.36	95.79	n.a
9	Chili	0.11	99.47	45.49	0.39	2.60	89.91	0.01	0.57	25.29	n.a
10	Bananas	0.88	101.23	25.62	0.19	0.19	92.71	0.00	2.40	6.22	87.00
11	Oranges	0.22	96.74	7.84	0.15	0.15	92.71	0.30	0.00	1.22	n.a
12	Tomatoes	0.04	96.03	3.95	0.11	2.54	89.91	0.00	0.38	35.68	n.a
13	Poultry And Products	0.83	99.96	12.31	n.a	3.67	46.94	0.05	0.92	7.77	70.00
14	Durians	n.a	n.a	n.a	0.11	n.a	92.7	0.016	0.00	n.a	n.a

Source: FAO; WITS; Indonesian custom tariff book; Indonesian Centre Bureau of Statistics (various years)

average value will then be the threshold in each indicator. A product should be prioritized when the value is above or below the average according to the hypothesis. And products that fulfilled the three criteria of food security, livelihood security and rural development are the ones eligible for SP.

The simulation of these products can be seen in Appendix 2. According to the simulation, 8 top commodities that are essentially important for Indonesia are obtained. These products are rice, cassava, maize, sugar, ground nuts, chilli, soybeans, and banana. The eight products have fulfilled the three criteria of food security, livelihood security and rural development therefore are eligible to be included as SP. From this point forward, I focus my analysis on these 8 products.

Furthermore, I analyze the impact of trade liberalization by looking at the level of import dependency (percentage of import over consumption), self-sufficiency (percentage of production over consumption), price, and export. Since export for most of these products is relatively very small, export performance is considered as an additional indicator to see the competitiveness of the products. The calculation on the impact of trade liberalization on these products is conducted using a simple statistic descriptive tool and tested by the t-test two sample of before and after liberalization (see Appendix 3 to 10).

The results are presented in table 5.2 below. The products listed are according to its priority, where the most important product is the one that experience a significant loss in most of the four criteria. It is selected according to the expected sign and significance of each variable. Products included as SP would be the one experiencing an increase in import dependency (positive sign), decrease in self-sufficiency (negative sign), fall in price (negative sign), and decrease in export performance (negative sign).

From this simulation, I obtain six major products that needed protection through SP. They are: rice, soybeans, sugar, maize, cassava and groundnuts. The explanation is given in the next section of this chapter. In total, these products account for around 40 percent of the agricultural GDP (FAO Statistics). And based on the tariff lines, these products accounted for around 6 percent of all agricultural tariff lines. This means that if the maximum number of SP is agreed on the level of 8 percent, these products must be included.

Table 5.2
Calculation of Significant Effect of Trade Liberalization

No	products	import dependency		self-sufficiency		price		export	
1	rice	+	(*)	-	(*)	-	(*)	-	
2	soybeans	+	(*)	-	(*)	-	(*)	+	
3	cassava	+		-	(*)	-		-	(*)
4	sugar	+	(*)	-	(*)	-		+	(*)
5	maize	+	(*)	+	(*)	-		+	
6	groundnuts	+		-		-	(*)	+	(*)
7	banana	+	(*)	-		+	(*)	-	
8	chilli	+		+	(*)	+	(*)	+	

(*) significant at level of 95%

5.2 Impact of Trade Liberalization on Selected Products

Based on the simulation on Table 5.2, I obtain six major commodities to be included as SP. These products are rice, soybeans, cassava, sugar, maize, and groundnuts. Not only do these products fulfil the criteria of food security, livelihood security and rural development; these products are also proved to be harmed by trade liberalization through the wider market access in Indonesia by lower tariff. For all the eight products, there seems to be an increase in import dependency, although it is not significant to some products. The level of self-sufficiency also tends to decrease after trade liberalization, except for maize. Meanwhile, price overall experienced a decrease, except for banana and chilli. And to some products, the competitiveness of their products in the global market is still high by increasing exports. But for some products such as rice, cassava and banana, their export has experienced a decrease. However, a detail look on the value of each indicator also contributes to the selection. For example, even if banana's import dependency rose significantly, the value is relatively very small.

I choose the six commodities because these commodities are the ones that are seen to be harmed significantly after trade liberalization, and thus needs protection. These products are explained individually in this part. For the remaining two products which are banana and chilli, trade liberalization has not made them worse off. Although they are eligible for Special Products, these products are not proved to be harmed by trade liberalization. This means that they are able to establish an adequate performance despite trade liberalization. Although banana experienced a significant increase in import dependency, the level of import itself is very small (lower than 1%). And as for chilli, they experienced a significant increase in self-sufficiency, suggesting that their performance is increasing even after trade liberalization. While its level of import dependency is also relatively small, which are lower than 5%.

5.2.1 Rice

In Indonesia, paddy/rice is the most important agricultural commodity. Most of rural household (around 18 million out of 21 million households) are paddy producers and almost all Indonesian are rice consumer. Environmentally, paddy fields plays a significant role for the environment to preserve water, micro-climate and soil conservation. Rice production and availability also determine the successful of the government performance. This is why rice is seen as a strategic commodity from political, social and economic point of views.

Since 1969 (the beginning of the first Five Years Development Planning under New Order Regime Era), self-sufficiency on rice has become the Government of Indonesia ultimate policy goal. Many development programs have been conducted such as BIMAS (Mass Guidance/extension program); INMAS (Intensification Program), INSUS (Special Intensification program) and SUPRA INSUS (Super Special Intensification program) to achieve and to maintain self-sufficiency in Rice production. The Government of Indonesia puts high priority to this program and spent at all costs to support this program. Indonesia then achieved rice self sufficiency in 1984. However, due to limited resources and some other priorities in Indonesian Development,

Indonesia could not able to maintain its position to become self-sufficiency in rice production. In 1994, Indonesia becomes net- rice importer country again.

Rice has been very important for Indonesia. Besides being the main staple food for Indonesia, rice farming is also a major source of income for the farmers. Indonesian consumption in 2007 has reached 32.9 million tons for milled rice and 43.9 million tons for paddy. This amount has increased for 4.7 percent from the previous years. And since 1990, the rice consumption increased around 1 percent annually. The increase in demand in rice is mainly caused by the rapid growth of population in Indonesia. To fulfil the increasing demand of rice, rice production in Indonesia must also be improved. Indonesia has performed considerably well in its rice production. In the period of 2000-2003, production of paddy has increased by 0.53 percent per annum. But despite the positive growth in domestic production that Indonesia has experienced, the dependency on import has also grown especially when import tariff are being eliminate in 1998. In the period of 1985 and 1990, rice import per annum has reached 101 thousand tons. But since 1991 it has increased and reached 609,771 tons in 1992.

In 1998 when tariff are being cut into 0 percent, Indonesia experience a high surges of rice imports. The average level of import dependency before trade liberalization of 1.36 percent increased into 6.37 percent in the period of trade liberalization. The t-test shown in Appendix 3a suggested that the increase in the level of import dependency is significant after trade liberalization showing that Indonesia has become more dependent on rice imports. Meanwhile, the level of food self-sufficiency has also experience a statistically significant drop from 67.8 percent to 64.5 percent after trade liberalization (Appendix 3b). This means that after trade liberalization, Indonesia's ability to fulfil its demand from domestic production decrease significantly, while imports increase drastically with around 5 percent increase of import dependency. Meanwhile, specially for rice and sugar, in 2001 the government of Indonesia has implemented a tariff of Rp430 per kg as tariff specific or equivalent to 30 percent of ad valorem tariff. This policy has brought a positive impact where import dependency has decreased to the level of 1.98 percent in average. This fall in the level of import dependency is statistically significant. But the recovery for domestic production as measured in the food self-sufficiency is not statistically significant although in average there has been an increase from 65.42 percent to 69.77 percent. This shows that adjustment towards an import tariff policy may be directly in the level of import but not in the level of production. The level of import, production, and consumption of rice can be seen also in table 5.2.

Although Indonesia is a net importer for rice, the level of export before trade liberalization reached 84,291.76 tons in average since 1985 to 1997. But after trade liberalization, export decrease to a level of 1,956.67 tons per annum in average. The increasing demand in domestic market has caused export to decline. After the government impose tariff in 2001, the export condition then reach to a high level of 10,398 tons in average. The major influence was in 2005 where export quantity was 42,205 tons. Appendix 3c suggests that there

Table 5.2
Indonesia's rice performance, 1990-2005 (tons)

Year	imports	production	Consumption[1)]
1990	49,577	45,178,752	67,355,891
1991	170,993	44,688,240	67,763,144
1992	609,771	48,240,008	68,584,214
1993	24,317	48,181,088	70,426,796
1994	630,073	46,641,500	71,387,499
1995	3,157,700	49,744,140	72,188,734
1996	2,149,757	51,101,504	73,205,108
1997	348,075	49,377,056	74,675,363
1998	2,894,957	49,236,700	78,559,371
1999	4,748,060	50,866,388	78,366,113
2000	1,355,037	51,898,000	78,733,760
2001	642,168	50,460,800	79,786,791
2002	1,798,498	51,489,696	79,093,385
2003	1,625,753	52,137,600	77,529,814
2004	390,832	54,088,468	77,394,429
2005	188,944	54,151,097	76,806,871

1) both milled and paddy
Source: FAO statistics, various years

is no statistical significance of change in export because of trade liberalization. On the other hand, the rise of rice export in 2005 may be caused by the increasing price in the world market which accounted for 286 US$/tons fob (World Bank online), while domestic market price was 210.29 US$/tons.

As market is being liberalized, there will be a pressure in domestic price not only because of cheaper import products, but also the oversupply in domestic market can cause this depression. After trade liberalization in 1998, price significantly decrease from 185.94 US$/tons to 125.18 US$/tons on average (Appendix 3d). But after the implementation of import tariff, there has not yet a significant increase in price. This in turn may harm small producers where their income decreased as the price fall. A variable normally used as farmers' welfare indicator is Term of Trade (TOT) index. TOT is a ratio of price received to price paid by farmers. After sudden drop in 1998-2000, TOT value had significantly increased in 2001, and kept on increasing up to 2003 (Ministry of Agriculture development plan, 2006).

5.2.2 Soybeans

After trade liberalization, import dependency of soybeans increase significantly from 32.45 percent to 58.9 percent. This can be explained by the increase in soybeans imports which accounted for 27.57 percent per annum since 1998 (FAO report). Meanwhile production is not performing well with a decrease of 5 percent per annum since 1998. The soybean production in Indonesia since 2003 to 2005 shows an increase from 672 thousand tons to 808 million tons. But since 2006 the soybean production has decrease from 747.6 thousand tons to 608.3 million tons or decrease up to 139 thousand tons. This is because of the low incentives of soybean farmers to increase production due to a large

import of GMO soybean from the United States at that time which depressed local soybean prices and decreased the farmer's income for a long period.

Meanwhile demand for soybean has increased every year especially for the tofu and *tempe* production and also for the livestock feed. The increase in demand cannot be fulfilled by domestic production as the indicator of food self-sufficiency decreased after trade liberalization. Before trade liberalization, the rate of food self-sufficiency of soybeans was 85.9 percent, and drop to 49.21 percent after liberalization. The difference is statistically significant as shown in Appendix 5b.

Prices also decreased significantly from 465.834 US$/tons before trade liberalization to 323.5 US$/tons afterwards (Appendix 5c). This low price in the domestic market has reduced the farmer's incentive to increase their production. The cheap import products from developed country are more attractive for local consumers as they switched to consume them.

5.2.3 Sugar

Sugar was one of the most valuable commodities in the 19th century and early 20th century. That is why due to its contribution to the Dutch economy, sugarcane, together with coffee, was a top commodity in the cultivation system. However, there is growing opinion that the sugar industry is in its sunset years.

Similar to the two products before, sugar has also experienced an increase in import dependency and a decrease in self-sufficiency. Trade liberalization has made import dependency rise from 2.6 percent to 13.2 percent. This difference is statistically significant as tested in Appendix 6a. Meanwhile the self-sufficiency indicator has decreased from 10.86 percent to 8.65 percent and has been tested in Appendix 6b. This is mainly caused by the decrease in production as much as 0.6 percent per annum since 1998. Even since 1998, domestic production can only fulfil half of the demand. This situation causes import surges as tariff were also being opened.

Although the government has implemented tariff in 2001, and again in 2005, imports are still high. Import dependency kept rising from 13.19 percent to 13.31 percent after the import tariff implementation. This is due to the fact of several domestic problems such as decreasing amount of land for plantation, low efficiency in the industry, and a reschedule of sugar industry development due to the economic crisis[11]. Price in sugar also decreased from 29.75 US$/tons to 27.2 US$/tons where it can weaken the farmer's willingness to increase their production.

5.2.4 Maize

Likewise rice, soybeans, and sugar, import dependency in maize rise after trade liberalization. The import dependency in maize doubled after trade

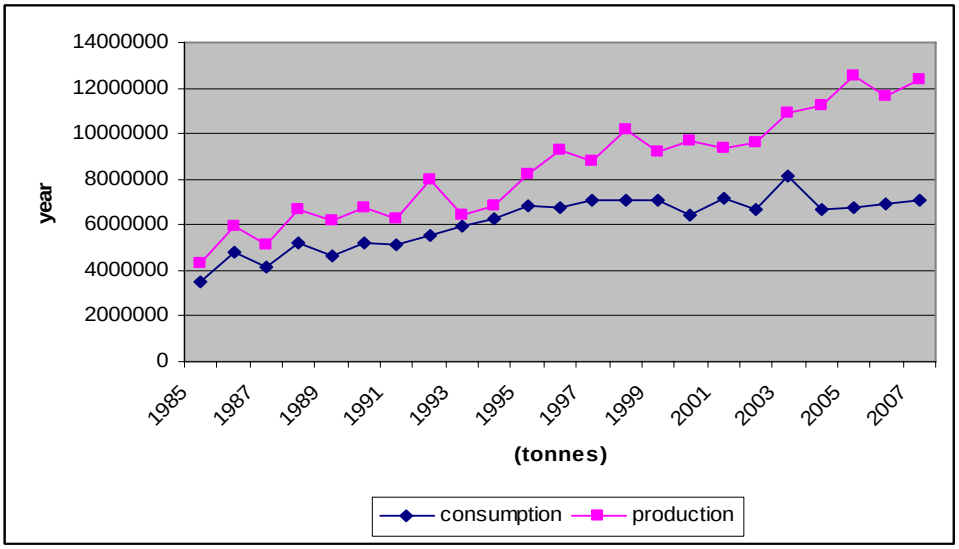
[11] Protection and Promotion Policy for Agricultural Products, Ministry of Agriculture Republic of Indonesia, 2004

liberalization from 6.34 percent to 12.56 percent. The t-test shows that this relationship is statistically significant (Appendix 4a). Meanwhile, Indonesia has experienced a food surplus in maize over the years as production always exceeds its consumption (figure 5.1). There is a tendency that maize domestic production has no problem as it also continue to rise in the trade liberalization era where production grew in average of 4.87 percent annually. This increase of production is a respond to the increase in consumption, where demand of maize also tends to grow over the years due to the increase of maize processing industry and for livestock feed. Generally the supply of maize in domestic market is safe.

Maize export also increased over the years where in the period of 1997 to 2002, maize export grew for 652.89 percent per annum. Although export tends to be lesser than imports, but looking at the vast growth in export shows us that this sector has the potential to expand its market globally and to develop maize domestic industry. And even though domestic price has fallen after trade liberalization, the increase in demand and export are able to boost production. This can be shown at appendix 4d where the fall in price is not statistically significant.

However, despite the well performance in self-sufficiency, import dependency is still high and increasing over the years. The increase in import is also accompanied by the drop in price from 149.83 US dollar to 129.1 US dollar after trade liberalization. This indicate that although production increases over time, there is a threat that import products will dominate domestic market. And by the drop in price, maize farmers will have less incentives to produce more. Therefore, this product must also be protected.

Graph 5.1
Maize production and consumption in Indonesia, 1985-2007



Source: FAO statistics, various years

5.2.5 Cassava

Cassava has experienced a significant increase in import dependency from 2.57 percent to 4.389 percent during trade liberalization. Meanwhile self-sufficiency decreased from 157.03 percent to 139.56 percent. Indonesia also has a potential to become importer of cassava, particularly cassava cake and processed cassava. As statistic shows that total volume import of cassava increased from 26 thousand tons with total value of US$ 4.9 million in 2002 to 305.5 thousand tons with total value of US$ 70.6 million in 2006.

In trade liberalization era, prices of cassava also dropped from 65.76 US dollar per tons to 54.255 US dollar per tons. This again would be disadvantage for the local farmers in this sector as their income decreased. Meanwhile, cassava has also drop its competitiveness where export decreased significantly from 2 million tons to 800 thousand tons. This can be shown at appendix 9.

Referring to the importance of self-sufficiency mentioned by the ITCSD before, a decrease in self-sufficiency even if it remains high may also need protection. This could apply in the case of cassava. Even the level of self-sufficiency is above 100% which means that domestic production actually met the domestic demand, import products can dominate the market slowly by increasing import dependency.

Cassava is considered as a strategic food because of its role in becoming staple food substitution in Indonesia diet. Cassava cake is also an important component for feedstock and can also produced bio-ethanol with competitive prices. Therefore, when import dependency started to rise as trade liberalized, while self-sufficiency decreased, import restriction would be needed in the future.

5.2.6 Groundnuts

Groundnuts also experienced a significant increase in import dependency from 4.525 percent to 5.4 percent after trade liberalization. Meanwhile self-sufficiency decreased from 64.75 percent to 62.02percent. Even if their export performed adequately, the export amount of groundnuts is relatively small to imports. The average groundnuts import from 1995 to 2006 is around 29 thousand tons, while the average export is around 3 thousand tons.

Meanwhile, price of groundnuts has also decreased from 629.32 US dollar per tons to 338.96 US dollar per tons during trade liberalization. This low price may influence the drop in production. This can be shown at appendix 8.

Since groundnuts is seen to be important for protein source in Indonesian diets, and given the fact that it experience a fall in self-sufficiency and an increase in import dependency, groundnuts are then should be included as SP.

5.3 The role of SP and SSM

To see how SP and SSM could be a tool to achieve food security by lowering its dependency on imports and thus promote production, I made model of *Two Stage Least Square* (2SLS) on chapter 4 which is Equation 4.1 and 4.2. If import is significantly influence the level of production, then policy concerning

imports would be an effective tool. Since rice is seen to be the vulnerable and essential product for Indonesia, this simulation is based on the commodity of rice. Given the time constraint, this simulation is only done on this one single commodity.

Before applying the 2SLS, I applied a test for endogeinity to see if there is an endogeinity problem in the model. I also applied the identification test to see if the equation is identified or not. The identification test is to obtain consistent estimates in the model[12]. Meanwhile, the endogeneity test is to see whether the expected variable is endogenous or not. In this case, we test whether import is endogenous or not. If there is endogeinity exists, the Ordinary-Least Square (OLS) will not produce consistent estimators. Thus, according to Gujarati (2003), the method of *Two Stage Least Square* (2SLS) and instrumental variables will give estimators that are consistent and efficient.

Endogeinity Test

To test the Endogeneity of imports, I use the Smith and Blundell's (1986) procedure. First, imports are regressed on all exogenous variables in equations 4.1 and 4.2. The residuals from these regressions are then saved and used as additional regressors in the estimation of equation 4.1. Then the joint hypothesis that all the coefficients on the residuals are zero tested. Appendix 11 shows how the test of endogeneity are done using STATA. Based on the calculation shown in Appendix 11, it is suggested that there is endogeneity. Given this condition, a single OLS method on each equation can not be applied.

Identification Test

In this part, I will use the order condition for identification[13]. I obtain 2 endogenous variables which are production and import from the system, and a total of 9 variables (both exogenous and endogenous variables). Following the condition from Maddala (1992) which are:

1. If $k = g - 1$, the equation is exactly identified
2. If $k > g - 1$, the equation is over-identified
3. If $k < g - 1$, the equation is under-identified

Where k is the number of endogenous variables, and g is the total of all variables. From this condition, I obtained that the model I use is over identified.

According to the tests above, I applied the *Two-Stage Least Square* (2SLS) method in predicting the relationship among variables to obtain consistent and efficient estimators. The result of the 2SLS can be seen in Table 5.3:

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[12] Maddala, "Introduction to Econometrics", Second edition, 1992.
[13] Ibid.

Table 5.3
Estimation of Import and Production Equation

Variable	Import reduced form (Eq 4.2)		Production IV (Eq 4.1)	
intercept	4483432	(0.030)	1.03e+08	(0.031)
import	-	-	-25.00142	(0.018)
yield	-289.9637	(0.126)	-6878.449	(0.028)
seed	2.484771	(0.758)	78.43753	(0.013)
cons	0.1203452	(0.069)	3.466129	(0.008)
fert	-0.2610761	(0.425)	-6.183723	(0.028)
price	0.301663	(0.846)	10.32667	(0.021)
tradelib	140523.7	(0.021)	-	-
F	2.87		576.75	
R^2	0.4177		0.8914	

The result of the regression can also be seen in Appendix 12.

Based on the regression above, we can see that trade liberalization has a significant effect on imports, where a tariff reduction stimulates imports. On the trade liberalization era, the average imports for rice is quite high which is 2,137,622 ton. Meanwhile, if we see the production function, imports which is a function of trade liberalization is statistically significant to production. Based on the regression, an increase in import by 1 tons may cause a decrease in production by 25 tons. This suggests that an increase in import may cause a drop in production. Trade liberalization which stimulates import has weakened the local farmer's incentives to increase their production. This also means that policy regarding import regulation in Indonesia such as import tariff may be beneficial in increasing production in rice and thus restrain the negative effect of declining food self-sufficiency in Indonesia through production.

Other variables that influence the rice production in Indonesia is the yield, seed, consumption, fertilizer, and price. Each of these variables gives a significant influence to rice production suggesting that a change in these variables will influence rice production in Indonesia. This means that besides policy regarding import regulation, policies regarding these variables are also contributing. For example, an increase in the yield provided for local farmers and also an increase in the area harvested may increase the rice production in Indonesia.

Chapter 6
Conclusion

The controversy on the level of flexibilities given for developing countries especially in the agriculture sector become one of the main issue in the current WTO Doha Negotiation. Developing countries under G-33 group has proposed a Special and Differential Treatment (SDT) with higher flexibilities for some agricultural products that are essential for developing countries' food security, livelihood security, and rural development which is known as the *Special Products* (SP). Along with SP, they also proposed the Special Safeguard Mechanism (SSM) - the special mechanism to counter the negative effect of trade liberalization such as import surges or price depression, to be treated for all products including products designated as SP.

The implementation of SP and SSM is seen to be very important for developing countries because they see that the indication of further ambitious tariff reduction in the new round can harm their agriculture sector and their farmers since the previous result of the Uruguay Round was a dissatisfaction. Many studies have shown that the implementation of the Uruguay Round Agreement on Agriculture (URAA) has brought a negative effect to developing countries. Most of them indicate that imports had climbed in recent years.

As for Indonesia, being a member of the WTO also means that they are obligated to implement all the WTO provisions in their national trade policies. Since joining the WTO, Indonesia has undertaken a massive policy reforms in their agriculture sector where Indonesia now has a relatively low applied tariff. Under the open market, Indonesian farmers are forced to face this global competitive market while they are not given any incentives from the government. Indonesia's agricultural commodities have decreased in terms of its competitiveness under the WTO commitments, although in some cases, commodities such as estate crops commodities had earned a net benefit from trade liberalization. Meanwhile for other commodities such as rice, wheat and sugar, trade liberalization has harmed small producers in Indonesia, making it risky for the national food security and livelihood security. Some studies has shown that agriculture products that are not benefiting from trade liberalization in Indonesia came from the food crops sub-sector. These products are seen to be important for the national food security, livelihood security, and rural development. Therefore, protection in market access by implementing SP and SSM for these products is seen to be beneficial.

The key aspects on these instruments lies on the selection of SP and its treatment, along with the specific modalities for new SSM which includes product coverage, possible trigger mechanisms, and remedies. Indicators that are based on the criteria of food security, livelihood security, and rural development on a self-designation basis are being built by members especially by the G-33 developing countries group. In this context, it is important for each developing country undertake a process of internal reflection and consultations in order to identify its SP products based on the indicators proposed.

Although the SP selection process in practice is conducted differently among developing countries, the indicators are used as the guidelines in

proving that certain products are essential for the national's food security, livelihood security, and rural development. Based on ICTSD report (2005), adding an analysis of indicators of self-sufficiency and import penetration, especially on products prominent in the consumption profile of the population it is advisable. Therefore, by looking at the indicators and the factors of self-sufficiency and import penetration, along with price as livelihood security indicators and export as competitiveness indicator, this paper has obtain several main products to be prioritized as Special Products.

Based on the indicators of food security, livelihood security and rural development, this paper has obtained eight main products that are eligible for SP. They are: rice, soybeans, sugar, maize, cassava, banana, chilli and groundnuts. Out of these products, there are six main products that are harmed by trade liberalization. They are: rice, soybeans, sugar, maize, cassava, and groundnut. Therefore, these products are the products that should be included as SP. It accounts for around 6% of the total agriculture tariff lines. If it is agreed that the maximum amount of SP is 8% out of the total agricultural tariff lines, these products are then adequate to fill this quota.

Adding to this, to see how SP and SSM could be a tool to achieve food security by lowering its dependency on imports and thus promote production, a model of Two Stage Least Square (2SLS) is implemented to see the relationship between the main variables which are trade liberalization, import, and production. By applying the model on one of the main selected products which is rice, it is obtain that trade liberalization has a significant effect on imports. In this case, tariff reduction stimulates imports. In the trade liberalization era, the average imports for rice reached a high amount of imports which is 2,137,622 tons. Meanwhile, import which is a function of trade liberalization is proven to be statistically significant to production in rice sector in Indonesia. Based on the regression, an increase in import by 1 tons may cause a decrease in production by 25 tons. This suggests trade liberalization which stimulates import has weakened the local farmer's incentives to increase their production.

The results suggested that policy regarding import regulation in Indonesia such as import tariff is seen to be beneficial in increasing production in the rice sector, thus restrain the negative effect of declining food self-sufficiency in Indonesia through production. Therefore, SP and SSM can play a role in increasing the performance of agricultural sector in Indonesia.

This model has also shown that other variables that influence the rice production in Indonesia may also be important to increase production. In this paper, I obtained other factors that significantly influence the rice production in Indonesia which are yield, seed, fertilizer, consumption, and price. An increase in the yield for example will increase the rice production in Indonesia. This means that besides policy regarding import protection, domestic policies should also be improved. Thus, both protection policy by import tariff through SP and SSM, and promotion policy from within the country itself such as expanding agricultural yield, will bring a positive outcome for the commodity's production and thus giving a strong food security, livelihood security, and rural development.

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Appendix

Appendix 1. Comparison of SP indicators

Criteria	Indicators	Measurement	FAO	ICTSD	G-33
Food security	Contribution to nutrition	• Calories per capita per day derived from the product / calories per capita per day derived from all products	■		
		• Share of product in national or regional consumption, as contribution to caloric intake of the population		■	
		• National statutes or regulations identifying key staple products or basket of basic foods based on local preferences or circumstances		■	■
	Self-sufficiency	• Total of product consumed / total of product produced	■	■	■
		• Total of product imported / total of product consumed	■	■	
	Stability in access of the product	• Standard deviation / coefficient of variation of production and price of product	■		
		• Degree of price transmission (international vs. domestic)	■		
		• Variability in revenue (export) generated by product activity	■		
		• Share of (household) total income derived from product activities	■		
		• Domestic consumption in the country is significant compared to total world exports; or a significant proportion of total world exports are accounted for by the largest exporting country			■
	Product consumption expenditure	• Share of income spent on a particular product at the national or regional levels	■	■	■
Livelihood security	Employment levels	• Share of employment of the product in total agricultural labour force or in total rural employment (at national or regional levels)	■	■	■
		• Share of labour force employed in product industry in total labour force (or total agricultural labour force) - gender/age distribution of labour force employed in production of the product	■	■	
		• The total (absolute number of) labour engaged in a particular sector in the region or nationally		■	
		• The labour requirement in a particular agricultural sector (no. of workers per day or year needed to produce one tonne of livestock product), multiplied by the total land area dedicated to the product, or the total tonnage production of the livestock product		■	
	Income from product	• Share of per capita income derived from product at regional or national level	■	■	
	Agricultural land / assets product share	• Land acreage planted with product / total land under cultivation (at national regional levels)	■	■	
		• Farm holdings growing the products / total number of farms	■		
		• Number of heads of livestock in the country / region		■	
	Surges / displacement by imports	• Correlation between imports and domestic production	■		
		• Growth rate of import substitutes / growth rate of competing domestic product	■		
		• Vulnerability to import displacement - see also below		■	
	Importance in protecting livelihoods of poor and vulnerable groups	• A large share of the product's producers, at regional or national level, are low income, resource poor, or subsistence farmers, including disadvantaged or vulnerable communities and women or a significant proportion of domestic production of the product is produced in disadvantaged regions, including drought-prone, hilly or mountainous regions		■	■
		• Productivity per worker or hectare of the product, at regional or national level, is low compared to average global productivity			■

Criteria	Indicators	Measurement	FAO	ICTSD	G-33
Rural development	Importance in rural agricultural economy	• Product economic activity share in total rural agricultural output (at national or regional levels) • A large share of total domestic production at regional or national level is from small farms (under 10ha), or those no bigger than average farm size in the country; or a large share of farms producing the product are small (under 10ha) or no bigger than average farm size in the country concerned	■	■ ■	■ ■
	Product and rural area growth	• Product growth rates relative to rural area growth rates	■		
	Domestic value-added potential of product	• Potential for value addition and linkages generated by a product (extent to which product is or can be locally processed; share of domestic agricultural intermediate inputs used in non-agricultural sectors; value of goods or services used as inputs) • A low proportion of the product is processed in the country, compared to the world average; or the product contributes a high proportion to value addition in rural areas, at regional or national level, through its linkages to non-farm rural economic activities, including handicrafts and cottage industries or other forms of rural value addition	■	■	■ ■
	Tariff revenue	• Tariff revenue generated by the product	■	■	■
Trade dimension	Substitutes	• Extent to which imported substitute products could displace local production		■	
	Unfair competition	• Extent to which products have to compete with products that exporting countries have heavily subsidised, through domestic support or export subsidies		■	■
	Current level of protection	• Assessment of the level of tariffs and other measures currently available for a particular product, and how these may be affected in the negotiation of international commitments		■	
	Vulnerability to import displacement	• Assessment of the extent to which local production could withstand competition of low-cost imports (see also above)		■	
			19	22	13

Sources: Ford et al, 2007; Bernal, 2005; G-33, March 2007.

Appendix 2 (I). SP Selection Simulation Based on Indicators

NO	PRODUCT	INDICATORS									number of indicators fulfilled	fulfill criteria of food security, livelihood security, and rural development
		FS	FS	FS	LS	LS	RD	RD	RD	LS		
		Share in nutritional or calori intake%	Proportion of domestic production to consump-tion %	Domestic consumption as% of total world ex-ports	Area un-der crop%	Share in total agri-culture employ-ment%	Product value added %	Share in agricultural customs tariff reve-nue%	Share in total Food Expendi-ture%	Productivity per worker or per hec-tare%		
1	Rice and products	48.34%	97.85%	120.64%	24.46%	29.21%	14.70	0.200%	30.58%	118.27		
		*		*		*			*		4	ok
2	Maize and products	8.67%	92.21%	11.73%	7.02%	5.92%	85.21	0.000%	4.49%	72.72		
		*				*	*				3	ok
3	Soybeans and products	1.31%	37.76%	1.65%	1.14%	2.49%	84.07	0.000%	1.31%	56.48		
			*		*		*			*	3	ok
4	Sugar and products	4.89%	76.82%	13.00%	0.72%	2.35%	26.45	0.886%	17.63%	112.02		
			*		*			*	*		4	ok
5	Meat and products	0.57%	97.82%	4.73%	N/A	2.62%	71.44	0.918%	0.36%	95.79		
								*			1	-
6	Poultry and products	0.83%	99.96%	12.31%	N/A	3.67%	46.94	0.048%	0.92%	7.77		
										*	1	-
7	Oranges	0.22%	96.74%	7.84%	0.15%	0.15%	92.71	0.295%	0.00%	1.22		
					*		*			*	3	-

Appendix 2 (II). SP Selection Simulation Based on Indicators

NO	PRODUCT	INDICATORS									number of indicators fulfilled	fulfill criteria of food security, livelihood security, and rural development
		FS	FS	FS	LS	LS	RD	RD	RD	LS		
		Share in nutritional or calori intake%	Proportion of domestic production to consump-tion %	Domestic consumption as% of total world ex-ports	Area un-der crop%	Share in total agri-culture employ-ment%	Product value added %	Share in agricultural customs tariff reve-nue%	Share in total Food Expendi-ture%	Productivity per worker or per hec-tare%		
8	Banana	0.88%	101.23%	25.62%	0.19%	0.19%	92.71	0.000%	2.40%	6.22		
				*	*		*			*	4	ok
9	Milk and products	0.46%	43.86%	1.87%	N/A	1.30%	58.04	2.022%	1.09%	72.38		
			*					*			2	-
10	Cassava	6.27%	101.56%	94.44%	2.61%	2.13%	94.04	0.004%	8.34%	138.46		
		*		*	*		*		*		5	ok
11	Tomatoes	0.04%	96.03%	3.95%	0.11%	2.54%	89.91	0.001%	0.38%	35.68		
					*		*			*	3	-
12	Groundnuts	2.34%	91.53%	45.40%	1.47%	2.62%	84.97	0.001%	0.03%	149.67		
				*	*		*				3	ok
13	Chilli	0.11%	99.47%	45.49%	0.39%	2.60%	89.91	0.013%	0.57%	25.29		
				*	*		*			*	4	ok
14	Durian	N/A	N/A	N/A	0.11%	N/A	92.71	0.016%	0.00%	N/A		-
average value		**5.76%**	**87.14%**	**29.90%**	**3.49%**	**4.44%**	**71.62**	**0.340%**	**5.24%**	**68.61**		

Note:

FS = Food Security

LS = Livelihood Security

RD = Rural Development

Appendix 3. Impact of Trade liberalization on Rice

3a. Import dependency

t-Test: Two-Sample Assuming Equal Variances

	period 1	*period 2*
Mean	1.355384615	6.37
Variance	4.911310256	13.1079
Observations	13	3
Pooled Variance	6.082251648	
Hypothesized Mean Difference	0	
df	14	
t Stat	-3.174517668	
P(T<=t) one-tail	0.003377135	
t Critical one-tail	1.761310115	
P(T<=t) two-tail	0.006754271	
t Critical two-tail	2.144786681	

t-Test: Two-Sample Assuming Equal Variances

	period 2	*period 3*
Mean	6.37	1.986
Variance	13.1079	2.40343
Observations	3	5
Pooled Variance	5.971586667	
Hypothesized Mean Difference	0	
df	6	
t Stat	2.45655398	
P(T<=t) one-tail	0.024674856	
t Critical one-tail	1.943180274	
P(T<=t) two-tail	0.049349713	
t Critical two-tail	2.446911846	

3b. Food Self-Sufficiency

t-Test: Two-Sample Assuming Equal Variances

	period 1	*period 2*
Mean	67.79769231	64.5
Variance	3.439135897	2.7667
Observations	13	3
Pooled Variance	3.343073626	
Hypothesized Mean Difference	0	
df	14	
t Stat	2.815849717	
P(T<=t) one-tail	0.006872318	
t Critical one-tail	1.761310115	
P(T<=t) two-tail	0.013744637	
t Critical two-tail	2.144786681	

t-Test: Two-Sample Assuming Equal Variances

	Period 2	*Period 3*
Mean	64.5	68.83714286
Variance	2.7667	14.79765714
Observations	3	7
Pooled Variance	11.78991786	
Hypothesized Mean Difference	0	
df	8	
t Stat	-1.830450483	
P(T<=t) one-tail	0.052282447	
t Critical one-tail	1.859548033	
P(T<=t) two-tail	0.104564895	
t Critical two-tail	2.306004133	

3c. Export

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	84291.76923	1956.666667
Variance	13167673811	571224.3333
Observations	13	3
Pooled Variance	11286659155	
Hypothesized Mean Difference	0	
df	14	
t Stat	1.209970099	
P(T<=t) one-tail	0.123162409	
t Critical one-tail	1.761310115	
P(T<=t) two-tail	0.246324818	
t Critical two-tail	2.144786681	

t-Test: Two-Sample Assuming Equal Variances

	Period 2	*Period 3*
Mean	1956.666667	10398.6
Variance	571224.3333	320383062.8
Observations	3	5
Pooled Variance	213779116.6	
Hypothesized Mean Difference	0	
df	6	
t Stat	-0.790605653	
P(T<=t) one-tail	0.229636925	
t Critical one-tail	1.943180274	
P(T<=t) two-tail	0.459273849	
t Critical two-tail	2.446911846	

3d. Price

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	185.9428571	125.1766667
Variance	215.0973238	925.5764333
Observations	7	3
Pooled Variance	392.7171012	
Hypothesized Mean Difference	0	
df	8	
t Stat	4.443567189	
P(T<=t) one-tail	0.00107884	
t Critical one-tail	1.859548033	
P(T<=t) two-tail	0.00215768	
t Critical two-tail	2.306004133	

t-Test: Two-Sample Assuming Equal Variances

	Period 2	*Period 3*
Mean	125.1766667	154.344
Variance	925.5764333	1510.00973
Observations	3	5
Pooled Variance	1315.198631	
Hypothesized Mean Difference	0	
df	6	
t Stat	-1.101289978	
P(T<=t) one-tail	0.156488696	
t Critical one-tail	1.943180274	
P(T<=t) two-tail	0.312977392	
t Critical two-tail	2.446911846	

Appendix 4. Impact of Trade Liberalization on Maize

4a. Import Dependency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	6.338909857	12.55827558
Variance	38.39299402	40.95004074
Observations	13	8
Pooled Variance	39.33506387	
Hypothesized Mean Difference	0	
df	19	
t Stat	-2.206801083	
P(T<=t) one-tail	0.019915428	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.039830856	
t Critical two-tail	2.09302405	

4b. Food Self-Sufficiency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	125.4191487	148.4097028
Variance	98.29741953	376.5570061
Observations	13	8
Pooled Variance	200.8141093	
Hypothesized Mean Difference	0	
df	19	
t Stat	-3.61043348	
P(T<=t) one-tail	0.000931836	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.001863672	
t Critical two-tail	2.09302405	

4c. Export

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	63998	122298.25
Variance	4916494688	43285179336
Observations	13	8
Pooled Variance	19052325874	
Hypothesized Mean Difference	0	
df	19	
t Stat	-0.939947157	
P(T<=t) one-tail	0.179520967	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.359041934	
t Critical two-tail	2.09302405	

4d. Price

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	149.8314286	129.09625
Variance	1079.219914	483.6075411
Observations	7	8
Pooled Variance	758.5055595	
Hypothesized Mean Difference	0	
df	13	
t Stat	1.45471119	
P(T<=t) one-tail	0.084733318	
t Critical one-tail	1.770933383	
P(T<=t) two-tail	0.169466636	
t Critical two-tail	2.160368652	

Appendix 5. Impact of Trade liberalization on Soybeans

5a. Import Dependency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	32.24558675	58.8928469
Variance	18.45322381	259.4724167
Observations	13	8
Pooled Variance	107.2497686	
Hypothesized Mean Difference	0	
df	19	
t Stat	-5.726132619	
P(T<=t) one-tail	8.06671E-06	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	1.61334E-05	
t Critical two-tail	2.09302405	

5b. Self Sufficiency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	85.90909074	49.20763048
Variance	77.05705646	188.7940109
Observations	13	10
Pooled Variance	124.9443226	
Hypothesized Mean Difference	0	
df	21	
t Stat	7.80607714	
P(T<=t) one-tail	6.08858E-08	
t Critical one-tail	1.720742871	
P(T<=t) two-tail	1.21772E-07	
t Critical two-tail	2.079613837	

5c. Export

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	439.3076923	571
Variance	1130092.231	253394.5714
Observations	13	8
Pooled Variance	807098.3563	
Hypothesized Mean Difference	0	
df	19	
t Stat	-0.326215204	
P(T<=t) one-tail	0.373913657	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.747827313	
t Critical two-tail	2.09302405	

5d. Price

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	465.8342857	323.4925
Variance	1602.453295	3969.262679
Observations	7	8
Pooled Variance	2876.889117	
Hypothesized Mean Difference	0	
df	13	
t Stat	5.127660136	
P(T<=t) one-tail	9.70536E-05	
t Critical one-tail	1.770933383	
P(T<=t) two-tail	0.000194107	
t Critical two-tail	2.160368652	

Appendix 6. Impact of Trade liberalization on sugar

6a. Import dependency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	2.600794	13.19814
Variance	2.504487	43.56922
Observations	10	5
Pooled Variance	15.13979	
Hypothesized Mean Difference	0	
df	13	
t Stat	-4.97252	
P(T<=t) one-tail	0.000128	
t Critical one-tail	1.770933	
P(T<=t) two-tail	0.000255	
t Critical two-tail	2.160369	

t-Test: Two-Sample Assuming Equal Variances

	Period 2	*Period 3*
Mean	13.19814	13.30971
Variance	43.56922	7.913116
Observations	5	4
Pooled Variance	28.28803	
Hypothesized Mean Difference	0	
df	7	
t Stat	-0.03127	
P(T<=t) one-tail	0.487963	
t Critical one-tail	1.894579	
P(T<=t) two-tail	0.975927	
t Critical two-tail	2.364624	

6b. Self Sufficiency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	10.86259	8.653196
Variance	0.341806	0.828733
Observations	10	5
Pooled Variance	0.491629	
Hypothesized Mean Difference	0	
df	13	
t Stat	5.75298	
P(T<=t) one-tail	3.34E-05	
t Critical one-tail	1.770933	
P(T<=t) two-tail	6.68E-05	
t Critical two-tail	2.160369	

t-Test: Two-Sample Assuming Equal Variances

	Period 2	*Period 3*
Mean	8.653196	7.050505
Variance	0.828733	0.029641
Observations	5	4
Pooled Variance	0.486265	
Hypothesized Mean Difference	0	
df	7	
t Stat	3.426156	
P(T<=t) one-tail	0.005521	
t Critical one-tail	1.894579	
P(T<=t) two-tail	0.011043	
t Critical two-tail	2.364624	

6c. Export

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	5591.9	22156.6
Variance	27632635	66149821
Observations	10	5
Pooled Variance	39484077	
Hypothesized Mean Difference	0	
df	13	
t Stat	-4.81296	
P(T<=t) one-tail	0.000169	
t Critical one-tail	1.770933	
P(T<=t) two-tail	0.000339	
t Critical two-tail	2.160369	

t-Test: Two-Sample Assuming Equal Variances

	Period 2	*Period 3*
Mean	22156.6	40098.67
Variance	66149821	9671553
Observations	5	6
Pooled Variance	34773005	
Hypothesized Mean Difference	0	
df	9	
t Stat	-5.02476	
P(T<=t) one-tail	0.000357	
t Critical one-tail	1.833113	
P(T<=t) two-tail	0.000714	
t Critical two-tail	2.262157	

6d. Price

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	29.75	27.194
Variance	6.328133	114.5049
Observations	4	5
Pooled Variance	68.14345	
Hypothesized Mean Difference	0	
df	7	
t Stat	0.461575	
P(T<=t) one-tail	0.329193	
t Critical one-tail	1.894579	
P(T<=t) two-tail	0.658387	
t Critical two-tail	2.364624	

t-Test: Two-Sample Assuming Equal Variances

	Period 2	*Period 3*
Mean	27.194	19.14333
Variance	114.5049	5.209747
Observations	5	6
Pooled Variance	53.78538	
Hypothesized Mean Difference	0	
df	9	
t Stat	1.812859	
P(T<=t) one-tail	0.051633	
t Critical one-tail	1.833113	
P(T<=t) two-tail	0.103266	
t Critical two-tail	2.262157	

Appendix 7. Impact of Trade liberalization on Banana

7a. Import Dependency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	0.000471191	0.005325513
Variance	4.43394E-07	4.04552E-05
Observations	14	5
Pooled Variance	9.85794E-06	
Hypothesized Mean Difference	0	
df	17	
t Stat	-2.967616831	
P(T<=t) one-tail	0.004314953	
t Critical one-tail	1.739606716	
P(T<=t) two-tail	0.008629907	
t Critical two-tail	2.109815559	

7b. Self Sufficiency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	113.0205931	111.3999509
Variance	3.090197027	5.69870865
Observations	14	5
Pooled Variance	3.703964468	
Hypothesized Mean Difference	0	
df	17	
t Stat	1.616314805	
P(T<=t) one-tail	0.062215353	
t Critical one-tail	1.739606716	
P(T<=t) two-tail	0.124430706	
t Critical two-tail	2.109815559	

7c. Export

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	25999.07143	12606.85714
Variance	1281629630	786960849.5
Observations	14	7
Pooled Variance	1125418436	
Hypothesized Mean Difference	0	
df	19	
t Stat	0.862380182	
P(T<=t) one-tail	0.199616342	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.399232684	
t Critical two-tail	2.09302405	

7d. Price

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	723566.2143	2440841.114
Variance	1.65391E+11	53692466710
Observations	14	7
Pooled Variance	1.30118E+11	
Hypothesized Mean Difference	0	
df	19	
t Stat	-10.28430305	
P(T<=t) one-tail	1.67211E-09	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	3.34422E-09	
t Critical two-tail	2.09302405	

Appendix 8. Impact of Trade liberalization on groundnuts

8a. import dependency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	4.524713692	5.381821663
Variance	7.957174837	1.594082378
Observations	13	8
Pooled Variance	5.612877615	
Hypothesized Mean Difference	0	
df	19	
t Stat	-0.805099894	
P(T<=t) one-tail	0.215361215	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.43072243	
t Critical two-tail	2.09302405	

8b. self sufficiency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	64.75230769	62.01780952
Variance	21.55831923	8.398355048
Observations	13	8
Pooled Variance	16.70991137	
Hypothesized Mean Difference	0	
df	19	
t Stat	1.488667084	
P(T<=t) one-tail	0.076493051	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.152986103	
t Critical two-tail	2.09302405	

8c. export

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	1862.692308	4269.875
Variance	1380140.897	3394568.125
Observations	13	8
Pooled Variance	2122298.297	
Hypothesized Mean Difference	0	
df	19	
t Stat	-3.677162831	
P(T<=t) one-tail	0.000800469	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.001600939	
t Critical two-tail	2.09302405	

8d. price

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	629.3242857	338.96625
Variance	5558.893662	8154.949198
Observations	7	8
Pooled Variance	6956.76972	
Hypothesized Mean Difference	0	
df	13	
t Stat	6.726333863	
P(T<=t) one-tail	7.06254E-06	
t Critical one-tail	1.770933383	
P(T<=t) two-tail	1.41251E-05	
t Critical two-tail	2.160368652	

Appendix 9. Impact of Trade liberalization on cassava

9a. import dependency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	2.57	4.389333333
Variance	9.466166667	8.755646476
Observations	13	8
Pooled Variance	9.20439607	
Hypothesized Mean Difference	0	
df	19	
t Stat	-1.334509438	
P(T<=t) one-tail	0.098905323	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.197810646	
t Critical two-tail	2.09302405	

9b. self sufficiency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	157.0338462	139.5769048
Variance	343.1260256	11.49253333
Observations	13	8
Pooled Variance	220.9452653	
Hypothesized Mean Difference	0	
df	19	
t Stat	2.613562117	
P(T<=t) one-tail	0.008541616	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.017083232	
t Critical two-tail	2.09302405	

9c. export

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	2015591.769	816915.625
Variance	6.77979E+11	2.87392E+11
Observations	13	8
Pooled Variance	5.34078E+11	
Hypothesized Mean Difference	0	
df	19	
t Stat	3.650114135	
P(T<=t) one-tail	0.000851346	
t Critical one-tail	1.729132792	
P(T<=t) two-tail	0.001702691	
t Critical two-tail	2.09302405	

9d. price

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	65.76857143	54.255
Variance	87.62884762	398.8707429
Observations	7	8
Pooled Variance	255.2206374	
Hypothesized Mean Difference	0	
df	13	
t Stat	1.392517139	
P(T<=t) one-tail	0.093563172	
t Critical one-tail	1.770933383	
P(T<=t) two-tail	0.187126343	
t Critical two-tail	2.160368652	

Appendix 10. Impact of Trade liberalization on chilli

10a. import dependency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	2.65557427	2.921729074
Variance	1.808981186	0.494817244
Observations	11	8
Pooled Variance	1.267854857	
Hypothesized Mean Difference	0	
df	17	
t Stat	-0.508702738	
P(T<=t) one-tail	0.308749441	
t Critical one-tail	1.739606716	
P(T<=t) two-tail	0.617498883	
t Critical two-tail	2.109815559	

10b. self sufficiency

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	601199.5714	930698.3333
Variance	1.27762E+11	47256118661
Observations	14	9
Pooled Variance	97093202156	
Hypothesized Mean Difference	0	
df	21	
t Stat	-2.475031493	
P(T<=t) one-tail	0.010963889	
t Critical one-tail	1.720742871	
P(T<=t) two-tail	0.021927777	
t Critical two-tail	2.079613837	

10c. export

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	0.171784615	0.170651248
Variance	0.050036856	0.013072836
Observations	13	10
Pooled Variance	0.034195133	
Hypothesized Mean Difference	0	
df	21	
t Stat	0.014571228	
P(T<=t) one-tail	0.494255901	
t Critical one-tail	1.720742871	
P(T<=t) two-tail	0.988511803	
t Critical two-tail	2.079613837	

10d. price

t-Test: Two-Sample Assuming Equal Variances

	Period 1	*Period 2*
Mean	78352.85714	178429.2
Variance	180667746	833626108.7
Observations	14	5
Pooled Variance	334305007.8	
Hypothesized Mean Difference	0	
df	17	
t Stat	-10.50587441	
P(T<=t) one-tail	3.73764E-09	
t Critical one-tail	1.739606716	
P(T<=t) two-tail	7.47527E-09	
t Critical two-tail	2.109815559	

Appendix 11. Test of Endogeneity

. reg import yield seed cons fert price tradelib

Source	SS	df	MS
Model	1.5881e+13	6	2.6468e+12
Residual	2.2141e+13	24	9.2256e+11
Total	3.8022e+13	30	1.2674e+12

Number of obs	31
F(6, 24)	2.87
Prob > F	0.0298
R-squared	0.4177
Adj R-squared	0.2721
Root MSE	9.6e+05

import	coef	Std.Err	t	P>|t|	[95% Conf.	Interval]
yield	-289.9637	182.9022	-1.59	0.126	-667.4553	87.52797
seed	2.484771	7.967448	0.31	0.758	-13.95923	18.92878
cons	.1203452	.0631965	1.90	0.069	-.0100859	.2507763
fert	-.2610761	.32186	-0.81	0.425	-.9253625	.4032103
price	.301663	1.533602	0.20	0.846	-2.863537	3.466863
tradelib	140523.7	1408108	0.10	0.021	-2765669	3046717
_cons	4483432	1941816	2.31	0.030	475719.6	8491144

. predict import_hat
(option xb assumed; fitted values)

. predict residd, residual

. reg production yield seed cons fert price import_hat residd

Source	SS	df	MS
Model	3.0676e+15	7	4.3822e+14
Residual	1.8259e+13	23	7.9388e+11
Total	3.0858e+15	30	1.0286e+14

Number of obs	31
F(6, 24)	552.00
Prob > F	0.0000
R-squared	0.9941
Adj R-squared	0.9923
Root MSE	8.9e+05

import	coef	Std.Err	t	P>|t|	[95% Conf.	Interval]
yield	- 6878.449	2785.185	2.47	0.021	12640.04	1116.854
seed	78.43753	27.58282	2.84	0.009	21.37813	135.4969
cons	3.466129	1.140209	3.04	0.006	1.107426	5.824831
fert	-6.183723	2.498864	-2.47	0.021	-11.35302	-1.014429
price	10.32667	3.9433	2.62	0.015	2.169331	18.484
Import_hat	-25.00142	9.295388	-2.69	0.013	-44.23039	-5.772444
residd	.3677729	.1893543	1.94	0.064	-.0239364	.7594821
_cons	1.03e+08	4.23e+07	2.42	0.024	1.51e+07	1.90e+08

. test import_hat = residd

(1) import_hat - residd = 0
F(1, 23) = 7.45
Prob > F = 0.0120

Appendix 12. 2SLS Estimation

First Stage (reduced form)

. reg import yield seed cons fert price tradelib

Source	SS	df	MS
Model	1.5881e+13	6	2.6468e+12
Residual	2.2141e+13	24	9.2256e+11
Total	3.8022e+13	30	1.2674e+12

Number of obs	31
F(6, 24)	2.87
Prob > F	0.0298
R-squared	0.4177
Adj R-squared	0.2721
Root MSE	9.6e+05

import	coef	Std.Err	t	P>|t|	[95% Conf.	Interval]
yield	-289.9637	182.9022	-1.59	0.126	-667.4553	87.52797
seed	2.484771	7.967448	0.31	0.758	-13.95923	18.92878
cons	.1203452	.0631965	1.90	0.069	-.0100859	.2507763
fert	-.2610761	.32186	-0.81	0.425	-.9253625	.4032103
price	.301663	1.533602	0.20	0.846	-2.863537	3.466863
tradelib	140523.7	1408108	0.10	0.021	-2765669	3046717
_cons	4483432	1941816	2.31	0.030	475719.6	8491144

. predict import_hat
(option xb assumed; fitted values)

Second Stage

. reg production yield seed cons fert price import_hat

Source	SS	df	MS
Model	3.0646e+15	6	5.1076e+14
Residual	2.1254e+13	24	8.8558e+11
Total	3.0858e+15	30	1.0286e+14

Number of obs	31
F(6, 24)	576.75
Prob > F	0.0000
R-squared	0.8931
Adj R-squared	0.8914
Root MSE	9.4e+05

import	coef	Std.Err	t	P>|t|	[95% Conf.	Interval]
yield	-6878.449	2941.653	-2.34	0.028	-12949.72	-807.1748
seed	78.43753	29.13238	2.69	0.013	18.31125	138.5638
cons	3.466129	1.204265	2.88	0.008	.9806485	5.951609
fert	-6.183723	2.639247	-2.34	0.028	-11.63086	-.7365853
price	10.32667	4.164829	2.48	0.021	1.730883	18.92245
Import_hat	-25.00142	9.817591	-2.55	0.018	-45.26393	-4.738907
_cons	1.03e+08	4.47e+07	2.30	0.031	1.04e+07	1.95e+08