THE ABILITY OF THE INDONESIAN DAIRY SECTOR TO RESPOND TO GLOBAL AGRICULTURAL TRADE REFORM

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Massey University

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Rudy Ruhnayat

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ABSTRACT

Although there has been a considerable increase in the agricultural trade studies since the process of the Uruguay Round, insufficient attention has been given to the contents of a country's individual schedule commitments that are attached to the Round's Agreements, particularly those which are developing country food importers.

This study assesses the ability of the Indonesian dairy sector to respond to global agricultural trade reform resulting from the Round's Agricultural Agreement. Indonesia is among the countries which import dairy products. As required by the Agreement, the Indonesian government is committed to gradually phasing-out the mixing ratio policy which requires importers to absorb local fresh milk, within a 10 year implementation period (1995-2005). From the beginning of 2005 imports of dairy products will be governed by tariff-only protection.

Using unit value differentials and dynamic partial equilibrium analysis, the gradual removal of the mixing ratio operations in the mid-term of the implementation period, *i.e* the year 2000, and at the end of the period, *i.e* the year 2005, was modelled with 1994 as a base. By assessing changes in consumption, production, and trade, as well as prices resulting from the scenarios' simulations over the both period, the different welfare effects of the new solutions and the base situation can be estimated and attributed to the likely gradual removal of the mixing ratio policy. The product focused on in this study comprised local fresh milk and its imported subsitutes in producing local wholemilk powder such as skim milk powder and anhydrous milk fat.

The results indicate that even though the expansion, followed by the removal, of the mixing ratio policy is estimated to greatly increase the flows of imported dairy products - particularly the intermediate ones - as the gap between consumption growth and the growth of local fresh milk production seems to widen, Indonesian fresh milk producers are still likely to enjoy greater welfare through improved productivity and local price changes induced by the movements of world dairy prices. Milk processors and consumers would indeed become beneficiaries as well under all scenarios.

In addition, government revenues collected from import tariffs are expected to increase due to increased quantities of imports and changes in world dairy prices. These results leave a wide range of possible choices for the Indonesian government in mapping out dairy trade reform following her commitments in the Uruguay Round.

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CHAPTER I
INTRODUCTION

1.1. Background

The Uruguay Round of Multilateral Trade Negotiations under the aegis of the General Agreement on Tariffs and Trade (GATT) was finally brought to a conclusion at Marrakech in mid-April 1994, several years behind schedule. The most ambitious 'Round' since the establishment of GATT, which began in September 1986, brings together the various fifteen Agreements reached in the Round.

One of the component agreements concerns agriculture and brings it, for the first time, within the ambit of a comprehensive set of rules and disciplines governing international trade. The negotiations on agriculture proved sufficiently difficult that, on several occasions, failure threatened to put the entire Round in jeopardy. Conclusion of the 'Agreement on Agriculture' has therefore been acclaimed as an important achievement.

Agriculture was largely ignored in the previous GATT rounds primarily because, at the inception of the General Agreement, a number of countries made it a precondition for their accession to the Agreement that special *waivers* and protocols be granted that allowed them to accord special treatment to their agricultural commodities. As a result, agriculture was essentially taken out of the GATT.

A proliferation of national agricultural policies largely based on national objectives and interests mushroomed, mainly but not exclusively, in developed countries. The policies followed resulted in higher domestic prices relative to world prices. Others, particularly in developing countries, kept domestic prices

lower than world prices. Consequently, agricultural protection frequently ended up in an insulation of domestic prices from movements in world prices.

In recent years, because of the mounting budgetary costs of agricultural support policies to governments in major trading nations such as the United States of America (US) and the European Union (EU), there has developed a consensus among major trading nations and agricultural exporting nations that some remedial action must be taken to reduce the degree of protection and other trade distorting support in the agricultural sector, and to bring agriculture under the rules and disciplines of the GATT.

Global agricultural trade reform, as a result of the Uruguay Round, requires an elimination or a reduction of agricultural support and protection. The World Trade Organisation (WTO), the successor organisation of the GATT post Uruguay Round, will monitor the implementation of the Agreement. Effects will fully be felt around the year 2005.

The signing of the long-awaited GATT Uruguay Round Agreement, however, brings about important consequences for national dairy policy in the countries where any support and protection exist. Before the Uruguay Round, the world market for dairy products - only about 3% of world milk production (OECD, 1982) - was among those that were heavily influenced by government support and protection (Verheijen, Broekmans, & Zwanenberg, 1994).

As noted by OECD (1987), there are only two countries - Australia and New Zealand - which have the overall level of assistance of less than a quarter of the value of output, whereas the average of assistance among dairy producing countries - particularly the EU and the US - is almost two-thirds, and the highest, Japan, exceeds three-quarters of the value of the output.

In addition, nearly all world exports are made by the EU, US, Australia, and New Zealand (OECD, 1995). In contrast, most countries that are net importers of dairy products are developing countries (Verheijen, Broekmans, & Zwanenberg, 1994).

Global agricultural trade reform, therefore, is likely to increase the world price of dairy products. Rae and Nixon (1994) estimate that the price of skim milk powder, for instance, could rise as much as 40 per cent over the remainder of this decade.

Unfortunately, insufficient attention has been given to the interests of developing country dairy importers with respect to various effects caused by the reform, although there was a considerable increase in agricultural trade studies throughout the process of Uruguay Round. In addition, such agricultural studies in the context of Uruguay Round are made difficult by insufficient information of the detailed contents of countries individual schedule commitments that are attached to the Uruguay Round Agreement as legally-binding documents. These detailed country schedules were negotiated, often commodity by commodity - bilaterally or unilaterally - among members which have interests in particular commodities, in the last four months before Marrakech meeting in April 1994.

Indonesia, which is a middle developing country with 1.1% share of world merchandise exports and imports (GATT, 1994 cited in Anderson, 1995) is a net importer of dairy products. Since the late 1970s the Indonesian government has been engaged in fostering the development of local dairy industries and protecting them from possible distorted overseas competition.

In the early 1980s, the Indonesian government introduced the mixing ratio policy that allows local milk processors to import dairy products, particularly the intermediate ones such as skim milk powder, in proportion to the amount of

local milk purchased. This policy is designed to achieve a greater degree of self-sufficiency in dairy products as well as to supplement dairy farmer incomes. Since then a major boost to production occurred along with the rapid growth of the domestic dairy industry which is based on smallholder farms organised into cooperative structures that are large relative to their size two decades ago. However, the mixing ratio policy has been suspected of preventing adoption of efficient production and marketing practices within the domestic dairy industry, protecting the industry from import competition and insulating local milk producers from international price movements.

Parallel with the global agricultural trade reform, the Indonesian government planners decided to boost agribusiness with market-oriented agricultural diversification and segmentation as the major area for growth leading into the next century. As a consequence, since the 1991 reform, the share of agriculture covered by non-tariff protection continues to fall (World Bank, 1994), although a number of agricultural commodities remain on the 'government restricted goods list'. The mixing ratio policy remains attached to that list. However, commitments made by Indonesia in the context of the Uruguay Round clearly notify that the mixing ratio policy is one among those that will gradually be removed by the end of implementation period, *i.e.* 2005.

Given government concerns with dairy farm income and with a potential problem in response to the global agricultural trade reform, calls for adjustment of dairy policy will bring about a dynamic and challenging transformation for the Indonesia dairy sector as it prepares to face more international competition from the efficient pasture-based producing countries such as New Zealand and Australia. An attempt to assess the ability of the Indonesia dairy sector to respond to global agricultural trade reform, therefore, appears to be desirable. For example, what mixing ratio is then likely to be imposed in the mid-term of the implementation period, i.e. 2000, and what level of import tariff is likely to replace the mixing ratio policy at the end of the period, i.e. 2005.

To illustrate the degree of protection caused by the mixing ratio policy, assessments of unit value differentials will be carried out. Dynamic partial equilibrium analyses are then employed to project the magnitude of the welfare gains induced by the reform on the Indonesian dairy industry which involves the dairy farmers as producers, the milk processors as consumers, as well as government revenues and quota rents, in 2000 and 2005.

1.2. The Objectives of the Study

The broad objective of the study is concerned with the ability of Indonesia's dairy sector to respond to the reform. Specifically, the objectives are:

i. to describe the issues of global agricultural trade reform as a result of the Uruguay Round and its consequences for developing countries such as Indonesia;

ii. to provide quantitative analyses of the gradual removal of the mixing ratio policy in the mid-term of the implementation period and at the end of the period under a series of scenarios and to estimate the effects of these on the Indonesian dairy industry;

iii. to suggest alternative policy measures available to the Indonesian government for future dairy reform.

1.3 Organisation of the Thesis

This thesis is organised into six chapters. The next chapter reviews the literature on global agricultural trade reform as a result of the Uruguay Round Agreement. It describes Indonesia's commitments, including those for dairy products. This chapter ends with a discussion of prior studies concerning the consequences of the reform on developing countries including both net food exporters and importers.

Chapter III describes the dairy industry in Indonesia, and discusses indicators of production, imports, and consumption. The policies affecting the development of the dairy industry are addressed, followed by a description of the milk marketing and distribution system in Indonesia. Previous studies of comparative advantage of locally-produced dairy products are discussed at the end of this chapter.

Chapter IV describes the methodology used in this study which includes the measurement of protection and the dynamic partial equilibrium analyses. Chapter V presents the results of the quantitative analyses by discussing the general findings and alternative measures available for future dairy reform in Indonesia. Lastly, Chapter VI provides a summary of the study, the conclusions that can be drawn from it, and recommendations for further study.

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CHAPTER II
GLOBAL AGRICULTURAL TRADE REFORM

This chapter is devoted to exploring the GATT's Uruguay Round, and identifying key issues covered by the Agreement on Agriculture that relate to this study. The chapter is divided into three sections.

The first section overviews past GATT Rounds and the process of bringing agriculture into the Uruguay Round that resulted in individual country commitments to make adjustments as required by the Final Agreement. Dairy products are one among those that are covered in the commitments made by Indonesia.

The second section reviews previous studies regarding the likely impacts of global agricultural trade reform for developing countries, either as food exporters or food importers.

The last section summarises all the selected issues.

2.1. Agriculture in the Uruguay Round Multilateral Trade Negotiations (URMTNs) - GATT and Indonesia's Commitment on Agriculture.

After a long effort, an agricultural agreement was successfully incorporated in the "Final Act" which brought the URMTNs to a conclusion in the middle of April, 1994 at Marrakech, Marocco. However, the result of this agreement will fully be felt around the year 2005. Indonesia, which is among those that signed the Final Act, has submitted its individual country commitments on agriculture to be annexed to the agreement. These commitments include dairy products.

2.1.1. Review of Past GATT Rounds and the Process of Bringing Agriculture into the URMTNs.

Over the five decades since GATT came into being in 1948 as a temporary arrangement of commercial policy, there have been eight rounds of the GATT (see Table 2.1) designed to implement its four principal elements: i) the most favored nations clause of Article 1; ii) the national treatment clause of Article 2; iii) a commitment to use "transparent" rather than "opaque" trade policy instruments; and iv) a commitment to liberalise trade barriers in the context of reciprocal negotiations (Hufbauer, 1989).

Agriculture was treated as an exception and not subject to the same discipline as industrial products in the successive GATT rounds prior to the Uruguay Round. However, before being accepted in the Uruguay Round, efforts had been made to discuss the "untouchable" agricultural sector since the fifth (the Dillon) Round.

While most of the early trade rounds were largely concerned with the reduction of tariffs, the later rounds began the process of revising, reinterpreting or extending the original articles of the General Agreement (GATT, 1990). For instance, the governments of industrialised market economies (IMEs) cut the

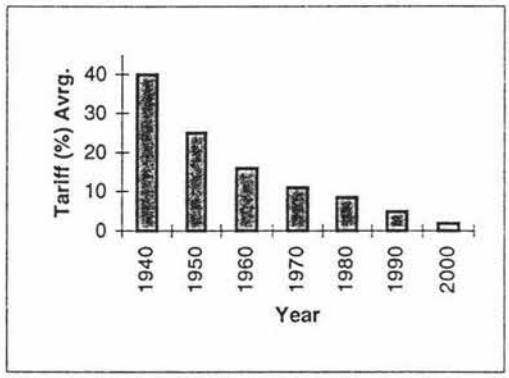
average tariff on manufactured goods from 40% in 1947 to less than 10% in the early 1980s, and brought it down even further to roughly 5% in the early 1990s (see Figure 2.1).

Table 2.1. The GATT's Rounds

Round	Date	Number of countries
Geneva	1947	23
Annecy	1949	33
Torquay	1950	34
Geneva	1956	22
Dillon	1960-61	45
Kennedy	1962-67	48
Tokyo	1973-79	99
Uruguay	1986-94	118

Source: The Economist, September 22, 1990.

Figure 2.1. The Decline in Industrial Market Economies' Tariffs Following the GATT Rounds



Note: Year of 2000 is an estimation.

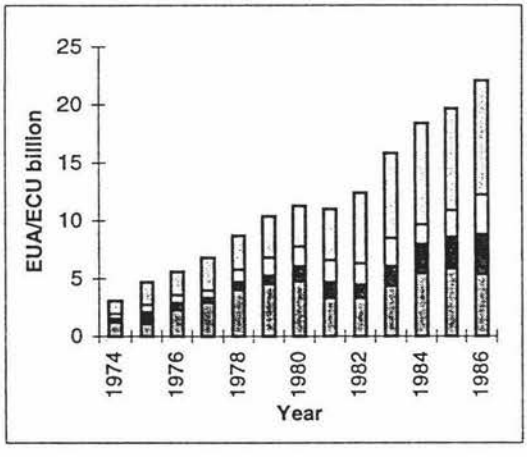
The Dillon Round succeeded in lowering tariffs for some agricultural commodities such as cotton, vegetable, soybeans (and derivatives) and canned fruit (Evans & Walsh, 1994). However, this Round failed to address agricultural issues (Goldin, Knudsen, & van der Mensbrugghe, 1993).

Although the sixth, called the Kennedy Round, ended up with not only tariff reduction commitments, but also with a new GATT Anti-dumping Agreement (GATT, 1990), member positions on agriculture till the end of the Round remained very far apart (Evans *et al*, 1994).

The seventh, the Tokyo Round, went much further by discussing, for the first time, the question of non-tariff barriers to agricultural trade (Evans *et al*, 1994). A deeper attempt to discuss the agricultural sector was made in this Round, with particular attention given to the opening of dairy markets and the European Union (EU) beef market. Some tariff reductions, resulting in Codes

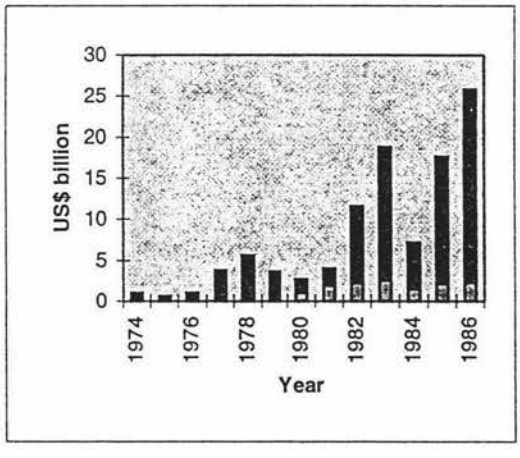
of Conduct for dairy products and meat confined to a limited number of countries (Oxley, 1990 & Carson, 1994), were also made. However, the growth in fiscal expenditures on agriculture in the USA and EU remained high. As shown by Figure 2.2, dairy products remained the largest recipient in the growing agricultural expenditures in the EU throughout 1974-1986, followed by cereals and beef. Meanwhile for the same period, as presented by Figure 2.3, fiscal expenditure on dairy in the USA was not steadily on the top list as in the EU, but this product remained one of the big recipients of the US's support payments. As a result, world markets for dairy products were among those that were the most distorted (Zietz & Valdes, 1988).

Figure 2.2. The Distribution by Commodity of EU Gross Expenditures on Agriculture



Bottom light grey: **dairy**
White: **cereal**
Dark grey: **beef**
Top light grey: **others** (sugar, oils and fats, fruit and vegetables, wine)

Figure 2.3. The Distribution of the US Net Expenditure on Agriculture



Light grey: **dairy**
Dark grey: **others** (maize, wheat, cotton, soybeans)

Source: Commission of the European Communities and Zietz, "Der Agrarsektor in den GATT - Verhandlungan", Die Welttwirtschaft 1 (June 1987): 200 - 201, in Zietz & Valdes.

Provisions within the GATT itself also treated agricultural products differently from others. Goldin *et al* (1993) note this as special treatment reflecting the post-World War II position of the United States, which was that international treaty obligations which would constrain domestic agricultural policy were unacceptable. This US position culminated in the 1955 GATT waiver for US agriculture.

Quantitative restrictions on agricultural imports were able to be applied to agricultural commodities so long as domestic production was also subject to quantitative restrictions, whereas the exemption of export subsidies was conditional on countries respecting "equitable" market share (OECD, 1995). These GATT exemptions and derogations paved the way for US to receive a waiver in 1955 following the US Congress mandatory for the US President to implement import quotas for products for which domestic stabilisation or price support policy existed, such as dairy products, sugar, cotton and peanuts (ABARE, 1990).

That waiver which allowed agriculture to be virtually exempted from the GATT's disciplines became a precedent for other countries to seek a derogation from particular GATT obligations. Switzerland and Japan got waivers for their agricultural policies as part of their protocols of accession to GATT (Raghavan, 1990). State trading enterprises which operated quantitative import restrictions became widespread, as in Japan (OECD, 1995).

As a result, the mounting budgetary costs to the EU and US government of agricultural support policies, associated in particular with mounting surpluses, caused unbearable storage costs and subsidies to dispose of such surpluses in international markets (Raghavan, 1990). In addition, the ever-increasing friction and disputes regarding agricultural trade among the major trading nations since the mid-1970s, such as the EU and the US, was a running sore

due to intensified competition with the use of export subsidies for markets with lower and lower prices, whereas Cairns group[1] exporters could not finance their farmers to compete in those distorted markets (Oxley, 1990).

A serious attempt to reduce the degree of protection and other trade distorting support in the agricultural sector, and to bring agriculture within the orbit of GATT rules and disciplines was made at the Tokyo Economic Summit of the Group of Seven More Developed Nations[2] in May 1986. The importance of negotiating agreements on agriculture was finally underlined in the eighth Round, popularised as the Uruguay Round.

The eighth Round which was launched in the Ministerial Meeting in Punta del Este, Uruguay, in September 1986, went far beyond what had been achieved in previous Rounds, by involving developing countries in the multilateral trading system, in extending disciplines to **agriculture** and services, in covering new aspects of trade such as trade-related aspects of intellectual property rights and trade related investment measures, and in establishing the newly created World Trade Organisation (WTO) as a successor of the GATT.

The Uruguay Round aimed at achieving greater liberalisation of trade in agriculture and to bringing all measures affecting import access and export competition under strengthened and more operationally effective GATT rules and disciplines (OECD, 1995). Encircled with the mandate were "the reduction of import barriers and tariffs, circumscribe non-tariff barriers, improve safeguards (emergency protection) arrangements, better control the incidence of subsidies affecting agricultural trade, improve the institutional structure of the GATT, improve access for tropical products (Miller, 1988; Oxley, 1990).

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[1] The members of the Cairns group are Argentina, Australia, Brazil, Canada, Chile, Colombia, Fiji, Hungary, Indonesia, Malaysia, New Zealand, Philippines, Thailand, and Uruguay.

[2] The member of the Group of Seven are the United States, Canada, France, the Federal Republic of Germany, the United Kingdom, Italy, and Japan.

However, negotiations on agriculture proved difficult throughout the process of the Uruguay Round (Cahill, 1995). The role of the Cairns group was instrumental in securing a comprehensive negotiating mandate for agriculture and remained influential in agricultural negotiations, acting as a counterweight to the two major parties, the EU and the US (ABARE ,1990).

On several occasions, failure threatened to put the entire Round in jeopardy. One such problem, as noted by ABARE (1990), was the marked divergence in the EU and US negotiating positions with respect to the phasing-out of agricultural support post the 1988 Mid-Term Review of the Round. A compromise agreement among the two was finally reached bilaterally under the so-called "Blair House Accord" in November 1992 and the 1993 Accord. This Accord was seen as a breakthrough in accommodating the US and EU interests in the Draft Final Act which had been tabled in December 1991 by Dunkel, the Director General of GATT (OECD, 1995).

OECD (1995) noted the important points from the Accord process. As a result of the 1992 Accord, a smaller reduction in the volume of export subsidies was agreed at 21 per cent (instead of 24 per cent), relative to the original Dunkel proposal. The 1993 Accord agreed that countries were allowed to use the base period of 1991-1992 if the volume of subsidised exports during the period was higher, on average, than the volume of subsidised exports in the 1986-1990 base period. The impact of this will be to allow greatly increased subsidised exports during the early years of the implementation period which started in 1995. Other important points of the Accord are: i) exclusion of existing compensation payments in the context of the EU's Common Agricultural Policy reform and the US deficiency payments, even though such payments were not considered as exempted measures under the Draft Final Act; ii) cuts could be spread across all domestic subsidy programs rather than applied on a product-

by-product basis. The Accord finally brought about a conclusion of the bilateral agreement between the US and the EU concerning oilseeds which is attached to the EU's schedule of commitments.

Following that development, the Agreement on Agriculture was finally adopted as a part of the Final Act in December 1993. Detailed individual country schedules, as an integral and legally-binding part of the Agreement, were then negotiated and verified in April 1994 at Marrakech, Marocco.

2.1.2. The Agricultural Outcome of the Uruguay Round

The definitive text concerning agriculture is in the section entitled the Agreement on Agriculture of the Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations. As summarised by Rae and Nixon (1994), and OECD (1995), there are three main pillars of the global agricultural trade reform contained in the Agreement of Agriculture. They are: 1) market access, 2) domestic support, and 3) export competition.

Market access

All non-tariff barriers will be converted into tariff equivalents, popularly known as tariffication, based on the difference between average internal prices and world market prices during the 1986-88 period. Both ordinary customs duties and those resulting from tariffication have to be bound and reduced on a simple average basis by 36% with a 15% minimum reduction in individual tariff items over six years starting in 1995.

With respect to tariffied commodities, access opportunities shall initially be granted at the beginning of the implementation period at a minimum of 3 per cent of the average 1986-88 consumption, and increased to 5 per cent at the end of the period. In cases where imports had already exceeded the required minimum level, that access has to be maintained and increased. These market access opportunities are generally established at the four-digit level of harmonised system (HS).

Domestic support

Support to producers is to be reduced by 20% of total levels of support across all commodities from a 1986-88 base. This must be done over the period 1995-2000. The commitments are expressed in the form of an aggregate measure of

support (AMS). The exceptions are if product-specific or sector-wide domestic support represents at most 5% of the value of production, or if the domestic support has no (or minimal) distorting effects on trade or production (called green box support).

Export competition

On a commodity-by-commodity basis, budget expenditure on export subsidies and the quantity benefiting from such subsidies are to be reduced by 36% and 21% of the 1986-90 average outlay respectively (alternatively a 1991-92 base may be used) over six years starting 1995. Those products that have not received subsidies in that base period will be ruled ineligible for future subsidies.

Developing countries are given more time to adjust, i.e. ten years not six, and are expected to make smaller reductions in the areas of market access, domestic support, and export competition, i.e. two-thirds of those expected of developed countries. In addition, a specific ceiling binding is an alternative to tariffication and is an option only for developing countries with unbound tariffs. Such a ceiling binding offers a tariff for binding at a rate higher than the general rate, while non-tariff measures still have to be removed (GATT, 1993).

There is a separate agreement attached to the Agreement on Agriculture entitled the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS). This Agreement articulates the current GATT provision that allows non-tariff measures such as import licensing and even import prohibitions to be applied for the protection of plant, animal, and human health. On the other side of the coin, it provides that such restrictions to trade must be scientifically justifiable, if challenged.

Another feature of the SPS Agreement is the harmonisation of border standards to those of international organisations where appropriate and the promotion of equivalency in which the standards of one country are considered to meet the requirements of others even where they are not exactly the same. In addition, special and differential treatment and technical assistance provisions apply to developing countries.

Another agreement attached to the Final Act which may have a direct or indirect impact on agricultural trade is that on state trading enterprises (STE). The agreement requires a restricted role for STEs. This includes parastatal marketing boards which are commonly suspected of making the market mechanism unworkable, particularly in agriculture, through its exclusive or special rights or privileges, including statutory or constitutional powers, in purchasing or selling the level or direction of imports or exports (Shaffer, 1994). With the establishment of this agreement, reviews of the notifications on the existence and impact of STEs as well as their activities should be conducted.

2.1.3. Indonesia's Individual Commitments on Agriculture.

Indonesia's commitments are contained in "Schedule XXI - Indonesia" which is annexed to the Marrakech Protocol. The Protocol provides legal effect to market access deals arising from the negotiations. Indonesia's schedule is one of 81 verified Schedules annexed to the Protocol (individual EU nations are considered as one in the GATT). The individual commitments made by Indonesia are the result of negotiating modalities and consessions gained by other countries in bilateral negotiations such as - in the case of market access - with the US for rice, and with New Zealand for certain dairy products. Indonesia's schedule can be summarised as follows.

Export subsidies

Under the terms of the Agreement, Indonesia offered to reduce rice export subsidies from US$ 28.3 million with a quantity of 299,750 tonnes to US$ 21.5 million covering 257,785 tons by the end of 2004. Through this commitment, Indonesia cannot surpass the annual commitment levels for rice or introduce new export subsidies on any other agricultural commodities.

Domestic support

Indonesia made no commitment for domestic support. This indicates that during the 1986-88 base period for domestic support Indonesia's policies were categorised as "green box" or other exempt policies, or that the total value of support (as measured by the aggregate measure of support (AMS)) on individual products fell within the 10 per cent de minimis limit allowed for developing countries. Measures which were notified included government funding of fertiliser and seed support programmes, irrigation subsidies,

agricultural research and extension services, and production programmes for livestock, food and estate crops.

Market access

Indonesian commitments on market access include tariff bindings and phasing out of non-tariff measures as required by the Agreement on Agriculture. Concerning tariff bindings, Indonesia took both ceiling binding and tariffication approaches as the basis for the country's negotiations.

With respect to ceiling bindings, these covered nearly all agricultural tariff lines which represent new bindings, i.e. 1276 out of 1341 tariff lines (see Table 2.2).

Table 2.2. Summary of Indonesia's Agricultural Market Access Commitments of Uruguay Round

	Tariff lines		Tariff averages a)		
	Number	Per cent of total tariff lines	Simple	Import weighted b)	1992 imports (US$ million)
Existing bindings	65	0.7			
New bindings post Uruguay Round	1,276	13.6			
Total agricultural tariff lines	1,341	14.3	19.9	5.9	2,464

Notes: a) includes surcharges
b) weighted using 1992 value of imports

Source: TIP Project, Ministry of Trade and Industry, 1994

As shown by Table 2.3, bound tariffs will initially range from 10 percent (non-wheat cereal flour) to 238 percent (dairy products other than those in the Indonesia - New Zealand bilateral agreement). These rates are substantially above existing tariff rates for the great majority of products. Ceiling bindings are to be reduced by Indonesia over a ten-year period by a minimum of 10 percent each, and overall by an average of 33 percent. These reductions will lower bindings to the range 9 to 210 percent by 2004. By then, some four-fifths of agricultural tariff lines will be bound at ceiling tariff rates of 40 percent, while tariffs on other items will be bound at rates of mainly 50 and 60 percent.

Table 2.3. Indonesia's Uruguay Round Market Access Commitments on Major Agricultural Commodities

			Rate of ceiling tariff binding (%)	
H.S code	Product	Existing tariffs (%)	Initial	Final
01	Livestock	0, 15	45, 50	40
02	Meat	20, 30	70	40, 50
04	Dairy products	20, 30, 40	50, 70, 100, 238	40, 210
07.01 - 10	Vegetables (fresh & chilled)	10, 30	70, 60, 90, 100	40, 50
08.03 -10	Fruit (fresh)	20, 30	60, 90	40, 50
09.01	Coffee	0, 25, 30	95, 100	40, 50
09.02	Tea	30	100	40, 60
09.04 - 08	Spices	5, 30	75, 100	40, 60
10.01.90 - 10. 05, 07, 08; 11.02 -03	Cereal and products thereof	0, 5, 10, 15	10, 30, 70, 180	9, 27, 40, 160
12.01, 03, 07-08	Oilseeds	5, 10	30, 45	27, 40
15.08 - 14	Veg. oils	5, 10, 20	45, 50, 60	35, 40
15.17.10	Margarine	30, 40	100, 110	40, 60
17.02. - 17.04	Sugars and confectionary	10, 15, 30, 40	70, 75, 80, 90, 110	40, 95
22.03 - 08	Alcoholic bev.	40, 50	90, 170	70, 150
24.02 - 03	Tobacco process	5, 15, 30	70, 90, 130	40

Source: GATT Secretariat, 1994

Initial ceiling bindings, of respectively 180 and 110 percent, have been offered on rice and sugar products currently importable exclusively by the State-trading entity, i.e. the National Logistic Agency (BULOG). These rates are to undergo minimal reductions to 160 and 95 percent, respectively, by 2004. Ceiling bindings on other BULOG-controlled products, although much lower, are also subject to minimal reductions, such as on yellow soybeans and soybean meal where the bound rates are to be reduced from 30 and 50 percent, respectively, to 27 and 30 percent. In the case of flour imported by BULOG, the bound rate of 10 percent on non-wheat flour will be reduced to 9 percent by 2004, while the initial bound rate on wheat flour of 30 per cent will fall to 27 percent.

Other, non-BULOG controlled, agricultural commodities are subject to specific ceiling bindings, together with the maximum initial and final bound tariff rates. These include meat (70 down to 50 per cent), most fresh fruit and vegetables (90 down to 40 percent), tea (100 down to 60 percent), coffee (100 down to 50 percent, spices (100 down to 40 percent), margarine (100 down to 60 percent), sugars and sugar confectionery (90 down to 40 percent), cigarettes (130 down to 40 percent), and alcoholic beverages (170 down to 150 percent).

As tariffication was not used by Indonesia for most agricultural products, the associated current and minimum access provisions do not apply and Indonesia cannot claim the special agricultural safeguard provisions included in the agreement. The only exemption is for rice in which Indonesia - as a result of negotiation - guarantees an access threshold for rice imports of 70 thousand tonnes annually at a tariff rate of 90 percent.

On the other hand, the tariffication approach was applied for certain dairy products (see Table 2.4), as a result of bilateral talks with New Zealand in the context of the Uruguay Round. That country, which is the largest exporter of dairy products to Indonesia, is a holder of initial negotiating rights (INR) for

those products. The mixing ratio policy, which is a type of non-tariff barrier by which the government limits milk import conditional on the quantities of domestic of milk purchased by domestic processors, is covered in the bilateral agreement. Under the agreement, the mixing ratio policy will be gradually phased out through an expansion of the ratio from a level of 1:1.6 (local:import) over a 10 year implementation period (1995-2004). A tariff quota of 414,700 tonnes (fresh milk-equivalent) was set and within-quota tariffs were bound at 40% but applied rates range between 5% and 25%. The outside-quota tariff rates were bound at 238%, reducing to 210% by the beginning of 2005. From the year 2005, the importation of dairy products will be governed by tariff-only protection. Dairy products which are covered by the agreement include milk powder (skim and whole milk), buttermilk powder and anhydrous milk fat.

Table 2.4. Mixing Ratio Product Coverage

			Tariff binding (%)		
H.S code	Product	Existing tariffs (%)	Initial	Final	Min. access opportunities (thousand tonnes)*
					414,700
04.02.10.100	Skim Milk powder in pack >= 12.5 kg	5	238	210	
04.02.21.190 & 04.02.29.190	Wholemilk powder	30	238	210	
04.03.90.100	Buttermilk powder	30	238	210	
04.05.00.100	Anhydrous milk fat	5	238	210	

Note: *) Fresh milk-equivalent
Source: GATT Secretariat, 1994

2.2. Impacts of Agricultural Trade Reform on Developing Countries.

The process of the Uruguay Round multilateral trade negotiations greatly stimulated the development of large scale agricultural trade studies in attempts to answer fundamental questions arising in the implementation of global agricultural trade reform. Most of the studies focus upon the magnitude of the impact of the reforms on world prices of agricultural commodities, and provided indications of the consequences of such reforms in both industrialised market economies (IMEs) and non-IMEs.

2.2.1. The Likely Effect on World Agricultural Prices

Various estimates of the size of the reform gains have been made by a number of preliminary assessments. These include a series of institutional works, such as by the UNCTAD/UNDP/Weber (1990), and FAO (1995). Enthusiasm for such assessments involves individual work as well, such as Anderson and Tyers (1990, cited in Goldin and Knudsen, 1990), Page and Davenport (1991, cited in FAO, 1994), Goldin, Knudsen, and Mensbrugghe (1993, cited in FAO, 1994), and Brandao and Martin (1993).

Modelling work which uses partial equilibrium comparative static analyses based upon supply and demand elasticities, is carried out by UNCTAD *et al.* This shows the consequence of simultaneous changes in levels of agricultural support and tariffs as well as other border measures that prevailed in IMEs (using the base period of 1984-86). It assumed a 20% reduction in producer price support and unchanged policies in non-IMEs countries. This study covered both temperate and tropical products.

Unlike UNCTAD *et al*, Page *et al* assumed a 33% reduction of agricultural support from a 1987-88 base period and that all tariffs would be reduced and some eliminated. The degree of liberalisation assumed for tropical products,

such as coffee and cocoa, differed by product and importing country in which assumed reductions of MFN rates by IME countries were between 40% to 70%.

In the Anderson *et al* (1990, cited in Goldin and Knudsen, 1990) study, a partial equilibrium model was employed to estimate the welfare effects of complete liberalisation of food policies in all IME countries and of complete global liberalisation, including developing countries. This study, which focussed on wheat, coarse grains, meat, dairy products, and sugar, attempted to incorporate technology both exogenously and endogenously in the model. Anderson *et al* assumed that technological change is endogenous with respect to price, and higher prices - as expected from the reform - induce greater and quicker advances, so that reform would accelerate advances in technology and productivity.

Goldin *et al* (1993, cited in FAO, 1994) and Brandao *et al* (1993) use the Rural Urban North South Model (RUNS) of the Organisation for Economic Co-operation and Development (OECD). This model, which was originally developed by Jean-Marc Burniaux and Jean Waelbroeck (Brandao, 1993), utilises a full general equilibrium framework to capture supply and demand relations for different economic sectors, rather than the sector of interest as in partial equilibrium models. Thus RUNS also includes factor markets (labour, land, capital), and the feedback effects from income to demand and savings.

The analysis of Brandao *et al* (1993) covered seven temperate zone products and five tropical products. It discussed i) tariffication of import barriers and their reduction by 36%; ii) reduction of the value of export subsidies by 36%; and iii) a 20% reduction in the rates of assistance provided by domestic support based on the value of aggregate measure of support (AMS).

Unlike the Brandao *et al* study which focused on agricultural liberalisation, Goldin *et al* (1993, cited in FAO, 1994) considered the overall liberalisation of trade policies. This study was based on a one-time 30% reduction of tariff

equivalents for temperate and tropical products in all participating countries and a 30% cut in input subsidies.

FAO's assessment of the Uruguay Round (1995) is largely based on its world food model. This study estimated percentage price changes caused by the Uruguay Round (UR) in the year 2000 through simultaneous estimation of production, consumption, imports, exports, and world prices.

Although there is considerable variation in the results presented in Table 2.5, these studies indicate consistent patterns which encourage the conclusion that the policies of IMEs depressed world food prices in particular, and lowered the volumes of world trade in many agricultural commodities so that with agricultural support and protection reduced or eliminated, supply from the IMEs falls, and brings about an increase in world prices of most agricultural commodities.

As shown in Table 2.5, the prices of the relatively heavily protected dairy, sugar, and meat commodities are generally estimated to rise more than other commodities. In addition, ABARE's recent study carried out by Andrews et al (1994) showed that world dairy prices resulting from the implementation of the Uruguay Round Agreement could increase by 16 per cent.

Wheat prices are projected to rise in all studies presented in Table 2.5, reflecting the removal of the high average rates of protection in the IMEs. The rice price is estimated to increase very substantially in the UNCTAD *et al* and FAO, but, in Page *et al* and Brandao *et al*, the percent increase of the rice price is less than the percent increase of wheat and coarse grains, and Goldin *et al* estimated a price decline for rice. This result reflects the relatively minor importance of the IMEs as a group in the world rice market (Brandao *et al*, 1993).

Concerning tropical products which are of particular interest to developing countries, the likely increases in world price levels are estimated to be smaller than for temperate commodities. This reflects the fact that border measures and internal taxes are generally the principal forms of market intervention for tropical products in the IMEs (UNCTAD *et al*, 1990). Another is that the producing countries tend to tax their exports, and that the Uruguay Round does not require reform of such taxes.

Tabel 2.5. Simulated Effects of Trade Liberalisation on World Prices

	Per cent Price Change					
Commodity	UNCTAD et al (1990)	Page et al (1991)	RUNS (Brandao et al) (1993)	RUNS (Goldin et al) (1993)	Anderson et al * (1990)	FAO (1995)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Temperate Prod.:						
Wheat	7.5	5.0	6.3	5.9	25	7
Coarse Grains	3.4	1.8	4.4	3.6	3	
Rice	8.3	1.2	4.2	-1.9		8
Meat	13.0	5.3	6.1	4.7	43	
Sugar	10.6	5.0	10.2	10.2	22	
Soybeans	0.0		4.52			
Soybeans oil	0.1			4.1		
Dairy products		**9.3**	**10.1**	**7.2**	**95**	**8**
Tropic. Prod.:						
Coffee	0.4	0.8	0.41	-6.1		
Cocoa	0.0	1.0	0.14	-4.0		
Tea	0.5		2.34	3.0		
Tobacco	0.3					
Cotton	0.9		2.23	3.7		
Groundnuts	1.5		4.52			
Groundnut oil	0.6			4.1		
Plant & Flower		1.0				
Spices		0.2				

Note : *) scenario of complete liberalisation of food policies only in IMEs countries.
Source: FAO (1994 & 1995), and Goldin *et al* (1990).

2.2.2. Impacts on Developing Country Food Exporters

UNCTAD *et al* (1990), FAO (1995), Anderson *et al* (1990), Page *et al* (1991, cited in FAO, 1994), Goldin *et al* (1993, cited in FAO, 1994), and Brandao *et al* (1993) generally conclude that the process of agricultural trade reform presents developing countries which are net exporters with more opportunities than if there is no reform. These countries are among those that gain from higher world prices. Specifically, UNCTAD *et al* and Page *et al* estimated the change in developing countries' export earnings.

The quantitative results reported by UNCTAD *et al* covered seven temperate products and seven tropical products, and concluded that the reforms were likely to be welfare-improving through increasing the net export earnings of developing countries by as much as US$ 321 million for temperate products and US$ 121.2 million for tropical products (see Table 2.6).

As shown in Table 2.6, Page *et al* (1991, cited in FAO, 1994) estimated the change in net export earnings of developing countries to be as much as US$ 712 million for five temperate products and US$ 174 million for four tropical products.

Most of the change in developing countries' export earnings derive from meats, sugar, and rice. UNCTAD *et al* (1990) points out that these reflect greater world demand for those commodities as a result of reduction in producer support price mainly in the IMEs such as in Japan (rice), and the EU and US (meats and sugar).

In the case of wheat, two developing countries, i.e. Argentina and Uruguay, are likely to benefit from increased wheat prices, while most developing countries are not suppliers of wheat to the world market (UNCTAD *et al,* 1990). FAO (1994) supports this UNCTAD finding by stating that the export share of developing countries in the world cereal market is small, i.e. 10%.

Table 2.6. Estimated Change in Net Export Earnings of Developing Countries as a Result of IMEs Agricultural Reform

	Change in net export earnings (US$ million)	
Commodity	UNCTAD *et al*	Page *et al*
(1)	(2)	(3)
Temperate products:		
Wheat	-200.7	46
Coarse grains	32.8	37
Rice	168.7	34
Meats	186.1	443
Sugar	133.0	152
Soyabean	0.3	n.a
Soyabean oil	0.6	n.a
Total:	321.0	712
Tropical Products:		
Coffee	62.8	115
Cocoa	16.2	33
Tea	6.5	n.a
Tobacco	10.1	n.a
Cotton	22.9	n.a
Groundnuts	1.5	n.a
Groundnut oil	1.3	n.a
Plants and Flowers	n.a	21
Spices	n.a	6
Total	121.2	174

Source: FAO (1994)

Concerning tropical products which are mostly exported by developing countries, greater export earnings are estimated to come to coffee and tea producing countries in Latin America, Asia, and Africa. On the other hand, Pakistan, Egypt, and several Latin American countries are likely to achieve marginal gains in cotton exports (UNCTAD *et al,* 1990).

Interestingly, Anderson and Tyers (1991, cited in Brandao *et al,* 1993) note that the gain to the developing countries is much larger when they participate in the process of reform. Goldin and Knudsen (1990), and Brandao *et al* (1993) support the Anderson and Tyers point of view. Brandao *et al* underlines that the bulk of the gains through exports for developing countries would come from reforming their own policies, such as export taxes, while Goldin *et al* state that the inclusion of developing countries in the reform process would significantly influence the final market and price implications of the process of reform. In addition, by using the Ministerial Trade Mandate (MTM)-developing countries partial equilibrium model, Moreddu, Paris, and Huff (1990, cited in Goldin *et al,* 1990) showed an additional export surplus of US$ 1,438 million for developing countries if those countries also participate in reducing agricultural support.

However, FAO (1994) warned that changes in export earnings expected from higher world prices resulting from the implementation of the UR Accord are dependent to a large extent upon the net trade position of developing countries. In the case of sugar, for example, developing countries are substantial exporters accounting for two-thirds of total world exports. Martin and Winters (1995) also note that due to the limited agricultural reform under the UR, the resulting terms of trade changes are likely to be much smaller than previously expected for developing countries, although the prices of some commodities, such as sugar, beef, coffee, cocoa, and cotton, are projected to increase substantially during 1992-2002.

2.2.3. Impact on Developing Country Food Importers

Some developing countries, because of their high dependence on food imports, will be affected by the process of agricultural trade reform (Goldin and Knudsen, 1990). On average, about one-fifth of the developing countries total imports over the last 30 years were accounted for by food (FAO, 1995). As shown by Table 2.5, prices of most significant food import items for developing countries, such as grains and dairy, point to increase.

UNCTAD *et al* (1990) states that while the higher food prices could be beneficial in the long-run, in the short-run they would bring hardship to developing countries that are net importers of food.

> "Remunerative prices in the long-run will contribute to making food production in food deficit developing countries more attractive, provided that the benefits of the higher prices are passed on to the producers and are complemented by institutional and infrastructural improvements. In the short run, however, high food prices would continue to increase pressure on the balance of payments of many food-deficit countries, with serious consequences not only for their debt repayment capacity and their ability to maintain essential imports at adequate levels but also for the well-being of the poor, whose food intake is already inadequate" (UNCTAD/UNDP/Wider, 1990, p.xiii).

Using a computable general equilibrium (CGE) model, Sadoulet and de Janvry (1990, cited in Goldin *et al*, 1990) conclude that the low income developing countries which are net buyers of cereals would be, in the short-run, the most negatively affected by rising prices.

> Countries with more possibilities for import substitution in cereals are, in the short run, the most negatively affected by rising prices as these spill over directly to all cereal prices, lead to a fall not only in the volume but also in the value of cereal imports, and, consequently, to an exchange rate revaluation, with negative consequences on the other tradable sectors. The welfare effect is highly negative on the poor and regressive (Sadoulet and Janvry, 1990, cited in Goldin et al, 1990, p.480)

The way to mute this effect, Sadoulet *et al* suggest, is to increase the supply response of cereals through public investment in agriculture.

FAO (1995) provides more cautious results. This study found that the food import bills of developing countries were likely to increase (see Table 2.7). On the other hand, a very recent study carried out by Anderson (1996) suggests that any food price rise which might occur because of implementation of the Uruguay Round Agreement is likely to be hampered by dirty tariffication[3] made by many signatory countries.

Table 2.7. Food Import Bills of Developing Countries

Region	Number of Countries	Based period (1987-1989)	Projected (2000)	Size of increase	Increase caused by UR effect	
	US$ billion					(%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Africa	52	6.0	10.5	4.5	0.5	11
Latin America	46	8.0	12.7	4.7	0.3	6
Near East	19	11.5	16.8	5.3	0.8	15
Far East	20	14.5	24.7	10.2	2.0	20
World	137	40.0	64.7	24.7	3.6	15

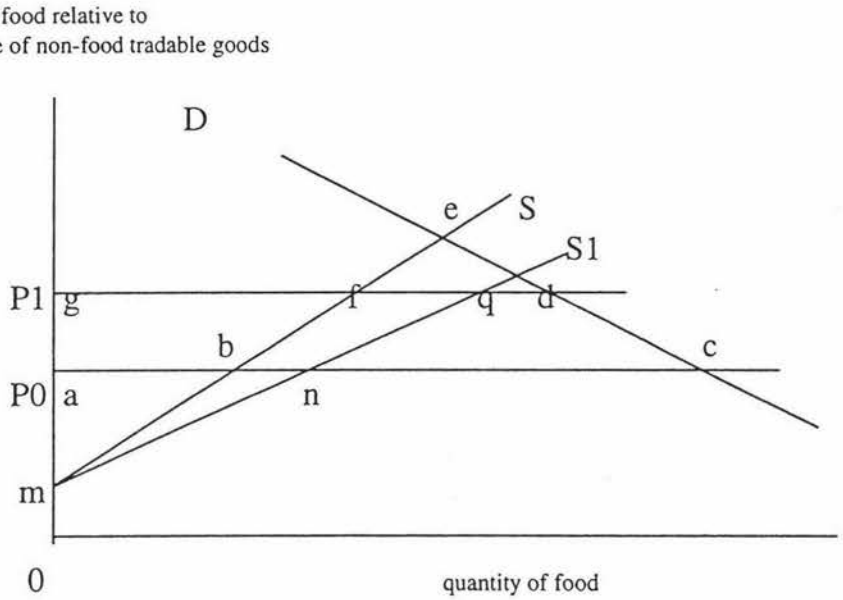
Source: FAO (1995).

However, while an increased food import bill could be a result, it remains possible that even food importing developing countries would gain from the reform. Anderson and Tyers (1990, cited in Goldin *et al*, 1990) demonstrated such a possibility by incorporating feedbacks from price changes to the dynamics of innovation in their model. By referring to Ruttan (1982, cited in Goldin *et al*, 1990), and Alston, Edward, and Freebarin (1988, cited in Goldin *et al*, 1990), Anderson *et al* point out that it is likely that the rate of

[3] The process of converting unbound tariffs into 'ceiling bindings' unrelated to previous actual rates of protection, as well as setting them far above the tariff equivalents of restriction actually in place in the 1980s/early 1990s.

induced technical change in a sector is positively related to the sector's expected mean level of profitability. Therefore, technical innovations induced by price rises resulting from trade reform as shown by Anderson and Tyers in Figure 2.4 can boost agricultural productivity growth and improved welfare.

Figure 2.4. Dynamic Partial Equilibrium Effects on a Food Importing Economy of a Higher World Price of Food



If the price of food rises from P0 to P1, consumer welfare is reduced by area *acdg* in the Figure above, but producer welfare is increased not just by area *abfg* but also by area *mqf* less the amortised cost of the research which generated the shift in the supply curve (assuming producers paid for that research). It is possible that the gain in producer welfare could outweight the loss in consumer welfare in this dynamic case, even if the country were to remain a food importer. This would be the case if area *mqf* minus the amortised cost of research exceeded area *bcdf*, which is more likely the larger the shift in the supply curve and the smaller the cost of the investment required to generate that shift, all other things being equal (Anderson and Tyers, 1990, cited in Goldin and Knudsen, 1990, p.43).

Thus Anderson and Tyers point of view is parallel with that of Magiera (1989). Over the longer run, higher world prices, according to Magiera, are likely to stimulate research and investment in developing countries.

Rae (1995) supports these optimistic points of view by pointing up a number of possible conditions in which the potential loss to food importers in developing countries could be reduced, or even reversed.

Firstly, higher world food prices resulting from the implementation of the Uruguay Round Agreement could switch the developing country from an importer to an exporter of the commodity in question. Depending on the extent of the price rise, domestic producer gains could more than offset the losses to consumers. This situation would improve the balance of payments that is usually a major issue in developing countries. Even in cases where the countries remain net food importers, a higher per unit import price need not result in higher expenditure on food imports. This is dependent on the extent to which the higher price reduces the need for imports.

Secondly, the instability of international commodity prices caused primarily by climatically-induced production shocks would have less impact on world prices since the more open industrialised countries will themselves absorb more of the shock than previously. Provided that the countries allow world price changes to be transmitted to their domestic economies, and that producers are averse to price risk, then the countries would experience a gain in welfare.

Thirdly, higher commodity prices resulting from global agricultural trade reform are likely to improve the distribution of income, even should the countries remain net importers of food. An increase in prices would benefit developing country producers, but not consumers. In the case that rural incomes are lower than those of the urban population, higher prices would lead to a more even income distribution.

Fourthly, referring to the model developed by Anderson *et al* (1990, cited in Goldin *et al*, 1990) which incorporated feedbacks from price changes to the dynamics of innovation, development proposals may become more profitable

when evaluated against higher and more stable prices, and the rates of return on research and development expenditure would be enhanced.

Finally, even should a developing country suffer a welfare loss due to trade reform, the country can have a legitimate claim to trade concessions in other areas in return for supporting reforms that result in increased food import costs, such as improved access to industrial countries for textiles, clothing, and raw material exports.

2.3. Summary

The Uruguay Round Agreement brought about a new environment for global agricultural trade through greater market access, reduced domestic subsidies, and a curtailment of export subsidies. In addition, the outcomes relating to sanitary and phytosanitary measures and state trading enterprises in the Agreement provide a more predictable market than ever before.

Indonesia, which is among those that signed the Agreement, is committed to phase-out all agricultural policies other than those in the Agreement's provisions. This includes the tariffication of certain dairy products which are covered by the mixing ratio policy such as milk powder (skim and whole milk), buttermilk, and milk fat. From 2005, import of those dairy products will be governed by tariff-only protection.

The dairy sector as a whole has been highly influenced by the agricultural policy of governments, mainly but not exclusively, in industrialised countries. For instance, export subsidies have long been a favoured method used by industrialised countries to dispose of surplus production.

Studies of the impact of global agricultural trade reform as a consequence of the Uruguay Round Agreement estimate that the world price of most relatively-heavily protected commodities is likely to rise more than for other commodities. A great potential for change induced by the Agreement is therefore possibly in dairy products. Falls in subsidised exports, and some increases in market access following the implementation of the Agreement, are expected to raise world dairy prices by up to 40 per cent.

Developing countries, including Indonesia, are major importers of dairy products so that their food import bills could be higher. However, those countries may possibly gain from that relative price change provided that they allow a sufficient proportion of the rise in the world price to flow into their domestic markets, and to influence production, research and investment decisions.

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CHAPTER III
THE DAIRY INDUSTRY IN INDONESIA

This Chapter discusses important features of Indonesian dairy industry, and consists of five sections. The first section discusses indicators of national dairy development which include production, consumption, and imports. The next section deals with government policies affecting the development of the dairy industry. Four policies are discussed: the mixing ratio policy, import tariffs, import licensing, and investment restrictions on milk processing. The third section reviews milk marketing and distribution in Indonesia, while the fourth section discusses the issues of comparative advantage based on previous studies carried out by Septiani (1988) and Kasryno *et al* (1989). The last section summarises all the selected issues.

3.1. Indicators of National Dairy Development

Due to a series of serious economic problems in the 1970s and 1980s, such as the oil price shocks, falls in world commodity prices and world recession, Indonesian agriculture and food processing were seen as critical components of government efforts to promote the diversification of the economy and to improve general living standards as well as to achieve greater levels of self-sufficiency. The dairy sector is one among those that were targeted by these efforts. As a result, the government implemented several support arrangements designed to foster increased production in dairy sector. Along with the country's economic growth, national dairy development since then improved rapidly as reflected by the indicators of production, import and consumption.

3.1.1. Production

Dairy farming was introduced to Indonesia in the 1880s by the Dutch who brought Freisen bulls with them and bred the bulls with local cows to obtain the breed now called "Grati" (GKSI, 1990). These early holdings which were initially intended to meet the Dutch community's need for milk were the embryo of dairy farming in Indonesia (Soewardi, 1986). Most dairy farms are concentrated in Java (GKSI, 1990), which contributes 95 per cent of total milk supplies (ADC, 1993). A small part of the industry is located in Northern Sumatra.

There are three major reasons for the geographic location of the Indonesian dairy industry (Kasryno *et al*, 1989): i) there is a ready market since about 110 million Indonesians (and certainly the bulk of affluent consumers) live on the island of Java; ii) the milk processing industry is concentrated around the Javanese cities of Jakarta, Yogyakarta, and Bandung; iii) there is a highland area in Java with a climate more suited to dairy production than most other parts of Indonesia, such as Pengalengan in West Java, Boyolali in Central Java, and Pujon in East Java.

The government made several attempts to encourage domestic production in the 1960s and 1970s through the import of large numbers of cows for breeding purposes, and the establishment of joint venture cooperatives with foreign companies. However, little progress was achieved with these measures (ADC, 1993).

A major boost to domestic milk production occurred in the early 1980s when the government introduced regulations requiring local processors to use local raw milk in processing, known as the mixing ratio policy. Together with the development of the dairy cooperatives, this policy which determines the import volume of intermediate dairy products (in fresh milk equivalent) to be allowed

for each unit of domestic fresh milk purchased by milk processors, has had a tremendous effect on local dairy development as reflected from the indicators in Table 3.1.

Table 3.1. The Indicators of Milk Production in Indonesia

Year	Dairy cow population	Import cattle (cumulative)	Number of dairy farms	Number of cooperatives	Production (FME)	milk price paid by factory	Average daily milk per cow
	('000 heads)	('000heads)	('000 persons)	('000)	('000tonnes)	(Rp./kg)	(kg/day/cow)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1978	93	n.a	2.2	11	62.3	70-105	1.84
1979	94	3.5	6.8	32	72.2	165-185	2.1
1980	103	10.4	12.8	63	78.4	213-224	2.09
1981	145	21.7	28.6	133	85.8	250-275	1.62
1982	172	30.7	38.6	162	117.6	275-300	1.87
1983	179	56.2	41.7	183	174.6	300	2.67
1984	203	56.2	60	178	179	300	2.42
1985	208	56.3	59.5	173	191.9	328	2.53
1986	222	56.3	67	173	220.2	390	2.72
1987	233	62.6	71.4	173	234.9	395	2.76
1988	263	69.1	71.4	173	264.9	400	2.76
1989	288	75.9	74	195	338.2	440	3.22
1990	294	82.8	74	195	345.6	461	3.22
1991	306	82.8	74	200	360.2	491	3.23
1992	325	82.8	74.1	200	382.2	532	3.22
1993	329	85.8	77.4	204	413	580	3.44
1994	331	86	84.3	207	425	615	3.52

Note: n.a stands for unavailable data.
FME stands for fresh milk equivalent
Sources: Directorate General of Livestock (DGL)-MOA, and GKSI, several issues.

The total number of dairy farms and milk cows increased significantly from 6,780 and 94,000 in 1979, to 84,300 and 331,000 respectively in 1994. Import of 82,500 cattle, mainly from Australia and New Zealand, during 1979 to 1994, made a large contribution to the increase in dairy cow population. This brought about a sharp rise in milk production during the period 1979 - 1994 from 72,200 tons to 388,600 tons.

Increased local milk production was related to the cattle population growth derived from either domestic or imported cattle-breeding. Taryoto *et al* (1993) indicated that a 1 per cent growth of the cattle-breeding population throughout 1969-1973, 1974-1978, and 1979-1983 brought about a 0.81 per cent, 2 per cent, and 1.22 per cent increase in milk production, respectively. In addition, from Table 3.1, it is found that throughout 1984-1988 and 1989-1994 the average annual increases in milk production resulting from a 1 per cent growth in cattle numbers were 1.53 per cent and 2.79 per cent respectively.

The sharp increase in production throughout the period 1989-1994 compared to the period 1984-1988 was, according to DGL-MOA (1995), influenced by the improved varieties of cattle used in breeding and management skills. The first includes genetic improvement caused by artificial insemination (AI) programs in which government established some facilities to provide AI services to the dairy farmers, whereas the latter refers to improvements in feeding, health, sanitation and artificial insemination services.

While some large scale commercial operations have been set up, most milk is produced in Eastern and Central Java on small farm holdings with three or four cows. These farm holdings use traditional management practices. As a consequence, the productivity level per cow remains low, ranging from 3.52 kg per cow per day, although they are 68.4 per cent higher than in the early 1980s (see Table 3.1). However, productivity levels, ranging from 10-12 litres per cow per day were found in major milk producing areas, such as Pengalengan in West Java, Boyolali in Central Java, and Pujon in East Java (GKSI, 1990). Be that as it may, this level of productivity remains lower than other milk producing countries where production per cow is normally in excess of 20 litres per cow per day (Barichello, 1987).

Because of the high price and lack of grazing land, the Indonesian dairy industry is based on confined rearing and management, rather than the pasture based system (Smith *et al*, 1995). Cattle are tethered in sheds and are fed on grasses that are either cultivated by the farmer or brought at markets. This feed is supplemented by feed concentrates, usually purchased at the farmer's cooperative. The costs of feed account for between 60 per cent and 80 per cent of the total costs of milk production (Bappenas, 1990).

Indonesia's dairy supply is price inelastic. Remenyi (1986) estimated a supply elasticity coefficient for Indonesian milk of 0.5, indicating that an increase in price is associated with a less than proportionate increase in supply.

3.1.2. Consumption

Since dairy products are not a significant part of the traditional Indonesian diet, per capita consumption is low by world standards. National consumption is estimated to range between 900 thousand to 950 thousand tonnes of milk equivalent per annum. This converts to between 4.5 and 5 kilograms on a per capita basis, compared with over 240 kilograms for Australia (Smith *et al*, 1995). Among ASEAN countries, milk consumption in Indonesia remains lower than that in Thailand, the Philippines, and Singapore. In 1984, per capita milk consumption in Thailand, the Philippines and Singapore was 15.45 kg, 30.90 kg, and 77.25 kg per year respectively (Bappenas, 1990).

Most milk in Indonesia is consumed in processed forms, as fresh milk has a short shelf life and refrigerated storage facilities are limited. Children and babies mainly consume milk made from powdered milk, whereas adults drink milk in liquid or condensed form, as well as ice cream, cheese, and butter (ADC, 1993). With 33 per cent of market share, full cream milk powder is the

most important dairy product consumed in Indonesia, followed by sweetened condensed milk with 24.4 per cent market share (CIC, 1991).

Skim milk powder (SMP) and anhydrous milk fat (AMF) are semi-finished products used in local food processing and condensed milk manufacture. This market is predominantly supplied by imports. However, there has been a steady increase in the past five years in local SMP production, although output remains well below actual drying capacity (ADC, 1993). Meanwhile, local AMF production, according to ADC (1993), remains static at best, leaving increased scope for increased imports.

Remenyi (1986) found that Indonesia's dairy demand is price inelastic at about -0.5, indicating that a proportionate change in price is associated with a less proportionate change in the quantity demanded. However, World Bank (1992) used a price elasticity of demand parameter for dairy of -1 to -1.03 when making projections over the 1995 - 2005 period.

As in other developing countries, most Indonesians consider dairy products as luxury goods. As expressed by Lipsey (1983), luxury commodities could be fairly left by households when the prices of the commodities rise. Or, quoting from Hirshleifler's book entitled Price Theory and Applications (1976), luxury goods tend to be much more heavily purchased as incomes rise.

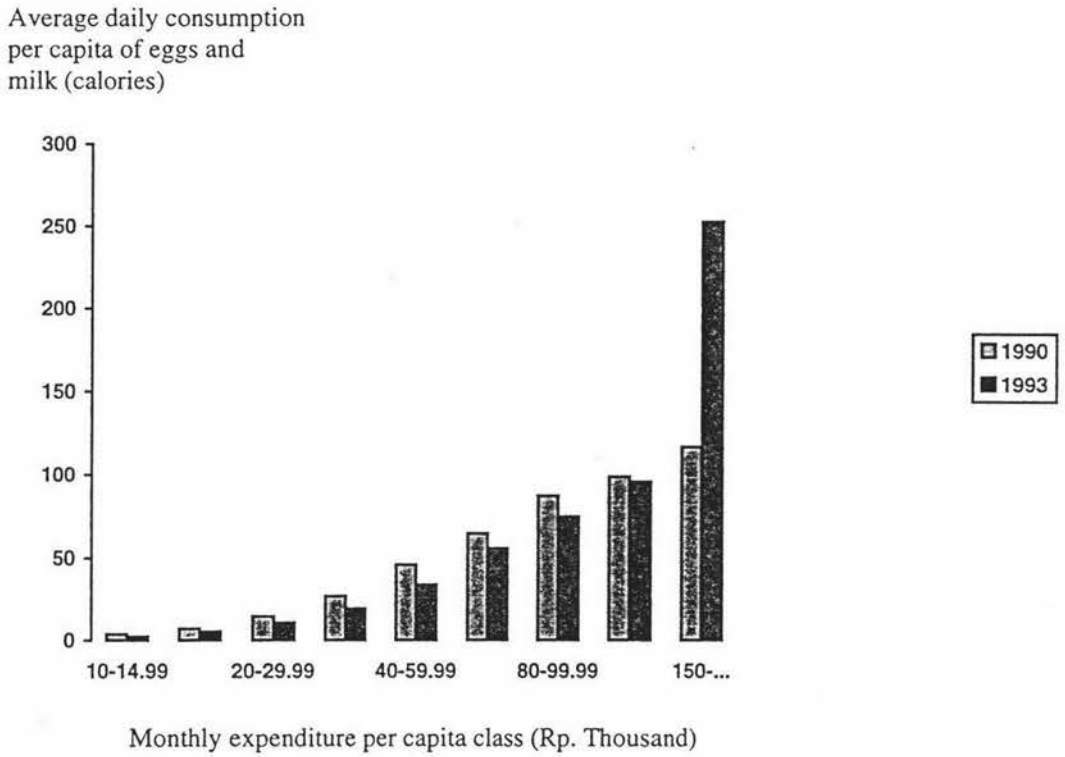
The recent study of Hakim (1994) found that the average of milk expenditure elasticities for households reporting consumption of milk in Java were about 1.62, indicating that a one per cent increase in total household expenditure is estimated to result in a greater than one per cent increase in household expenditure on milk.

Government food consumption statistics show that expenditure on eggs and dairy products accounts for less than one per cent of food expenditure among the lowest income groups compared with five per cent in the middle income groups and nine per cent among the highest income groups (ADC, 1993). In addition, as stated by the ADC report (1993), actual expenditure on dairy products by the higher income groups is more than 15 times higher than that of lower income groups.

A Central Bureau of Statistics study on average daily per capita consumption of calories by eggs and milk in relation to expenditure showed that from 1990 to 1993 the consumption of eggs and milk declined among those who were in the expenditure class of below Rp.150 thousand per household. In contrast, for those who were in the class above Rp.150 thousand, the consumption of these foods increased. It is worth noting that during this period of years there was an increase in the price of fresh milk paid by milk processors at village cooperative gates from Rp. 461 in 1990 to Rp. 580 in 1993 (MOA, 1995). This brought about an increase in consumer price from Rp. 1500/litre in 1990 to Rp. 2200/litre in 1993 (MOA, 1995).

Figure 3.2 shows that along with improved nominal income per capita from Rp. 155 thousand in 1978 to Rp. 1,524 million in 1993, total consumption of dairy products in Indonesia increased from 502.6 thousand tonnes in 1978 to 932.9 thousand tonnes in 1993. Data collected from the Directorate General of Livestock, MOA, and GKSI, Jakarta, showed that per capita milk consumption improved from 3.6 kg per year in 1978 to 4.9 kg per year in 1993.

Figure 3.1. Average Daily Consumption per Capita of Eggs and Milk, and Monthly Expenditure per Capita Class

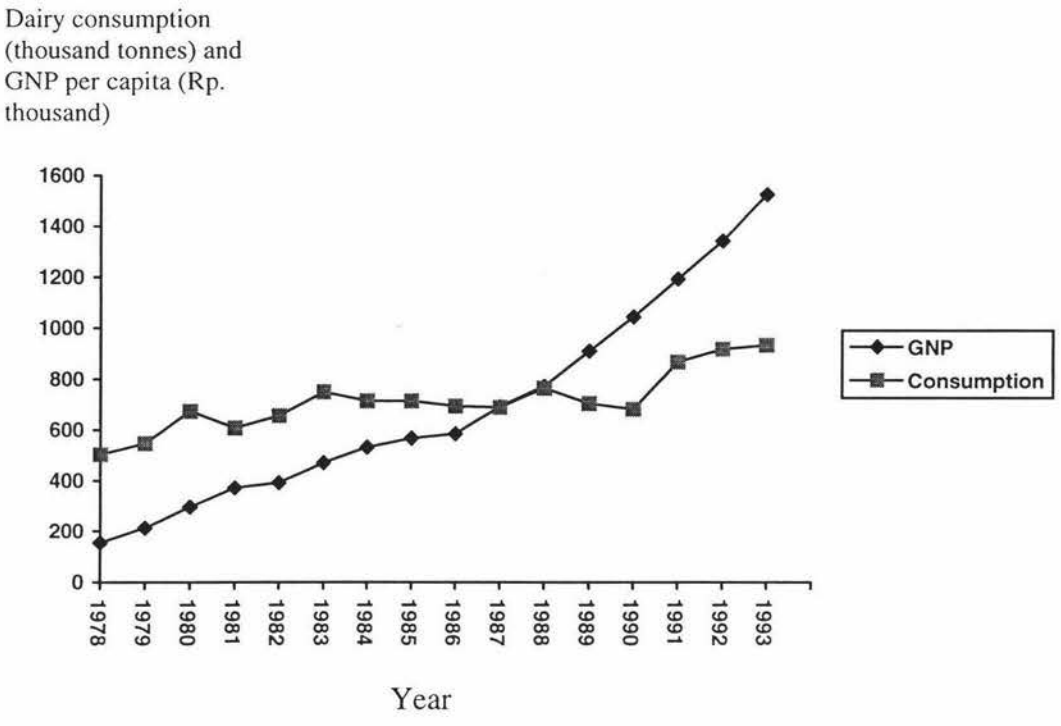


Source: Central Bureau of Statistics, Jakarta, 1990 and 1993

The level of total dairy consumption in Indonesia continues to rise along with per capita income, even though throughout 1980-1990 consumption growth was static (see Figure 3.2). ADC (1993) suspects that the higher prices for milk and processed products resulting from government support such as the mixing ratio policy[1] contributed to this static consumption growth.

[1] discussed in section 3.2

Figure 3.2. Dairy Consumption and GNP per Capita (1978 - 1993)



Source: GKSI, several issues, and ADB, 1995

However, bearing in mind Indonesia's massive population (about 185 million), and more importantly, its rapid economic growth rate of between 7 and 8 per cent a year since the early 1990s, it is reasonable to expect that demand for dairy products will continue to increase, leaving further scope for increased imports as growth of local supply tends to be below the growth of demand.

3.1.3. Imports

Indonesia is a significant net importer of dairy products with around 60 percent of domestic consumption currently being met from imported inputs (ADC, 1993). The major imported product is bulk milk powder for blending, repacking, or recombining. Skim milk powder (SMP) and anhydrous milk fat (AMF) are the main intermediate dairy products consumed by milk processors.

Imports of dairy products to Indonesia have fluctuated throughout the period 1978 - 1994 as shown by Figure 3.3. These imports generally decreased throughout the 1980s due to the tightening of the mixing ratio policy (see Table 3.3 in section 3.2) coinciding with a strong surge in Indonesian milk production which outstripped the growth in overall demand in those years (ADC, 1993).

Table 3.2. Dairy Food Balance (in fresh milk-equivalent)

Year	Production	Import	Consumption	Year	Production	Import	Consumption
	('000tonnes)	('000tonnes)	('000tonnes)		('000tonnes)	('000 tonnes)	('000 tonnes)
1978	62.3	440.3	502.6	1987	234.9	452.6	687.5
1979	72.2	474.2	546.4	1988	264.9	497.8	762.7
1980	78.4	594.3	672.7	1989	338.2	365.2	703.4
1981	85.8	521.1	606.9	1990	345.6	333.9	679.5
1982	117.6	536	653.6	1991	360.2	507.7	867.9
1983	174.6	572.8	747.4	1992	385.2	533.2	918.4
1984	179	533.5	712.5	1993	413	519.8	932.8
1985	191.9	521.5	713.4	1994	425	510.5	935.5
1986	220.2	473	693.2				

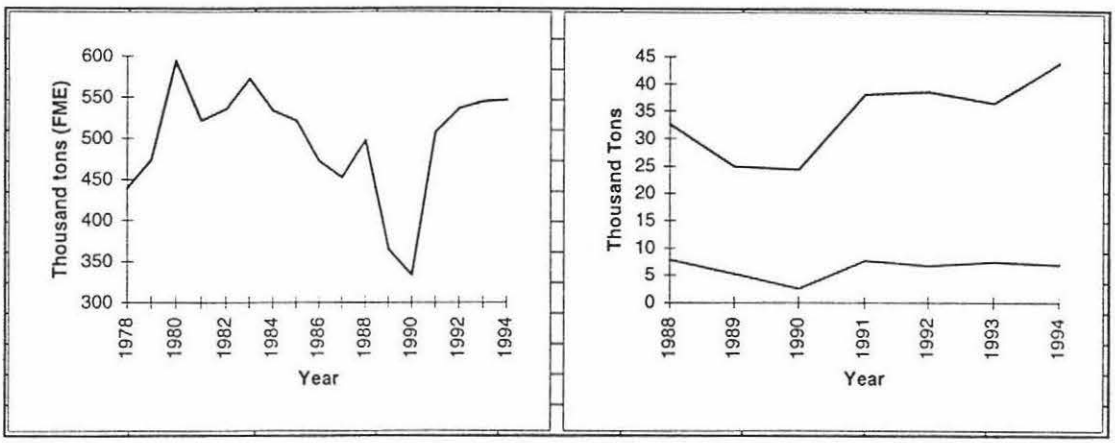
Source: Jakarta's Central Bureau of Statistics, DGL-MOA, GKSI, several issues

As shown in Table 3.2, local milk output rose from 78.4 thousand tonnes to 338.2 thousand tonnes during the period 1980s, whereas in the same period aggregate consumption on a milk equivalent basis rose only by 30.7 thousand tonnes, from 672.7 to 703.4 thousand tonnes. This resulted in reduced opportunities for imports. However, as shown by Figure 3.3, import volumes have recovered in the early 1990s along with the relaxation of the mixing ratio policy[2]. This occurred due to the slowing growth in local milk production while demand has continued to grow (see Table 3.2). Consequently, SMP and AMF imports were affected as shown by Figure 3.4.

[2] see Table 3.3 in section 3.2

Figure 3.3. Indonesia's Dairy Imports (fresh milk-equivalent)

Figure 3.4. SMP and AMF Imports to Indonesia



dark grey: SMP light grey: AMF

source: Directorate General of Livestock - MOA, Jakarta, several issues.

Among registered importers, P.T Food Specialties Indonesia (FSI) is the largest importer of dairy raw materials, followed by P.T Friesche Vlag Indonesia (FVI), with average annual shares of 33 percent and 21 percent of the total imports respectively. In terms of products, FSI is the largest importer of SMP, whereas FVI is the largest importer of AMF.

The main suppliers of imported dairy products to Indonesia are Australia, New Zealand and the Netherlands. Besides other intermediate dairy products, these three countries also supply 27.2%, 15%, and 14% of the total imports of SMP respectively (CIC, 1991). However, Australia and New Zealand have increased their share of sales to Indonesia in recent years (ADC, 1993).

3.2. Policies Affecting the Development of Dairy Industry

Agricultural policy in Indonesia attempts to achieve a large number of objectives. According to the sixth five-year development plan (MOI, 1992), these include low and stable food prices, ensuring long-term food adequacy, agricultural and rural development, the development of value-added processing

industries, and wider macroeconomic objectives such as employment generation, poverty alleviation, and saving (or generating) foreign exchange. These objectives, as appraised by the World Bank (1992), are often competing and give rise to a multitude of policy instruments and, as a result, the policy setting for agriculture is often more complicated than that for the industrial sector and is often more difficult to reform.

Reflecting the objectives of agricultural policy mentioned above, as condensed from the Ministry of Trade's guidance book (1991), the principal agricultural trade policy instruments cover import licensing requirements, tariffs, and a variety of export regulations. The latter include bans, taxes, and licensing requirements which serve as informal quotas. Dairy products such as skim milk powder, wholemilk powder, buttermilk powder, and anhydrous milk fat are among those that remain on the government restricted goods list (the World Bank, 1994). There are a number of dairy trade and investment policies. The most important ones include the mixing ratio policy, import tariffs, import licensing, and investment restrictions on milk processing.

Mixing ratio policy

This instrument is a type of non-tariff barrier by which the government limits milk imports conditional on the quantities of domestic milk purchased by domestic milk processors. As shown in Table 3.3, the 1994 mixing ratio of 1: 2 means that two equivalent units of milk raw materials are allowed to be imported for each unit of domestic fresh milk purchased by the milk processors.

There are four dairy products which are covered by this regulation: skim milk powder, whole milk powder, buttermilk powder and anhydrous milk fat. To import such dairy products, the milk processors need to show "absorption certificates", locally called BUSEP, indicating the volume of domestic milk absorbed by the milk processors. This policy, which is a type of variable import

quota, is aimed at protecting dairy farmers by obligating the milk processors to absorb domestically produced fresh milk at reasonable prices.

Table 3.3. Mixing Ratio Policy, 1978 - 1996

Year	Semester	Mixing Ratio		Year	Semester	Mixing Ratio	
		Domestic	Imported			Domestic	Imported
1978		1	25	1989	I, II	1	0.7
1979		1	20	1990	I	1	0.53
1980		1	16		II	1	0.75
1981		1	10	1991	I	1	1
1982	I	1	8		II	1	2
	II	1	7	1992	I	1	2
1983	I	1	6		II		1.25
	II	1	5	1993	I	1	1.07
1984	I, II	1	3.5		II	1	1.6
1985	I, II	1	2	1994	I, II	1	2
1986	I, II	1	2	1995	I	1	2
1987	I, II	1	1.2		II	1	2.9
1988	I	1	1.7	1996	I	1	2.25
	II	1	0.7		II	1	2

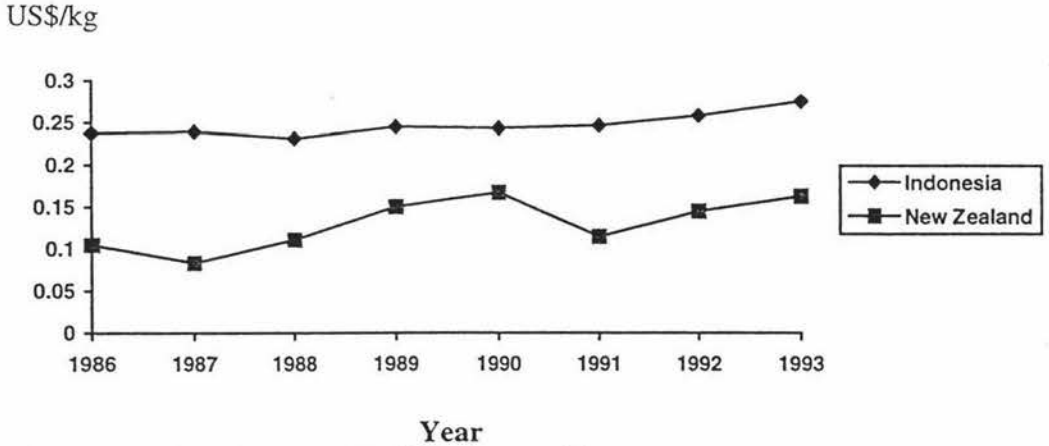
Source: Directorate General of Livestock, MOA, and GKSI, several issues.

This import ratio, which is evaluated every semester, is set through a series of meetings between the milk processors -as a group called IPS- and the dairy cooperatives union (GKSI). Initially, IPS members meet to estimate market demand and local production figures for processed dairy products. From these estimates they arrive at a figure for the quantity of milk that needs to be imported. Secondly, the IPS and representatives of GKSI meet to discuss GKSI's estimates of domestic production. Finally, a dairy national coordinating team headed by a senior government official from Ministry of Agriculture meets to legalise the result of the IPS/GKSI negotiated import ratio. In addition, the government does not directly legislate any minimum farm gate or manufactured product prices for milk. Instead the price of local fresh milk at village cooperative gates is negotiated between IPS and GKSI.

However, in practice, not all IPS members use local milk inputs. Therefore, those which do not absorb local milk are still entitled to import, provided they submit "absorption certificates", locally called BUSEP. They can buy the certificates from members who absorb local milk.

Since the mixing ratio policy was introduced, the import ratio initially declined throughout the 1980s from 1:16 early in that period to 1:0.7 at the end of the period (see Table 3.3). This occurred due to the strong surge in Indonesian milk production which outstripped the growth in overall demand during this period of years, and resulted in a tightened import ratio. However, the slowing growth in local milk production in more recent years caused the relaxation of the import ratio in order to meet the continued growth of demand.

Figure 3.5 Producer Price of Milk in Indonesia and New Zealand



Source: GKSI, FAO, and the World Bank, several issues.

Another function of the mixing ratio policy is to balance the high cost of milk inputs among the milk processors. The producer price of milk in Indonesia during 1986-1993, for instance, was maintained well above the equivalent price in New Zealand (an efficient dairy producing country) over the same period (see Figure 3.5). Thus, if a milk processor is using milk in accordance with the current ratio, the processor should not need to purchase import entitlement ('absorption certificate' or BUSEP) from other milk processors. However, if

the milk processor is using local milk in excess of the ratio, the processor will have such entitlements to sell. Alternatively, if the processor is buying less local milk than the ratio, the processor will have to buy such entitlements.

A study carried out by the Asian Development Bank in 1987 (cited in Bappenas, 1990) indicated a relationship between processing costs and the mixing ratio policy; processing costs increased as more local fresh milk was used and, therefore, total costs became higher due to the higher processing costs. Table 3.4 shows that the direct processing cost increased from Rp. 174 per kg to Rp. 274 per kg as the mixing ratio (local:import) went down from 1: 2 to 1: 1.

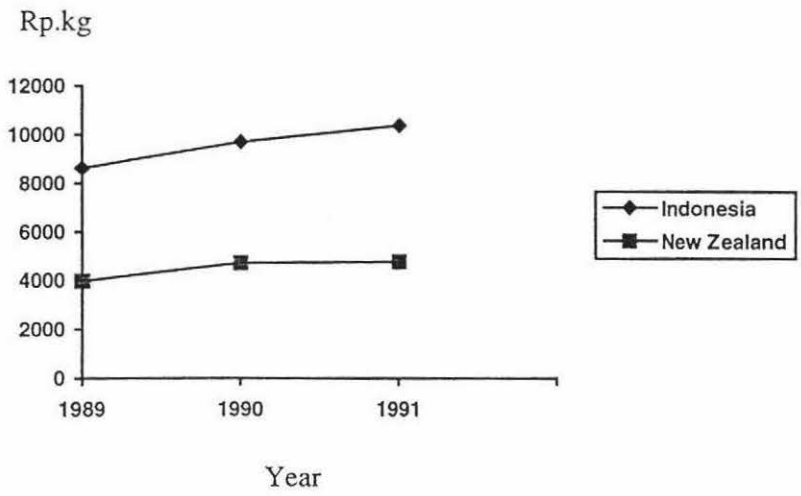
Table 3. 4. Relationship Between Mixing Ratio Policy and Total Milk Cost (Rp./kg), 1987

Mixing ratio (local: import)	Direct processing cost	Packaging material cost	Capital cost	Milk cost	Total cost
1: 2	174	395	0.01	2,203	2,772
1.5: 1	224	395	0.01	2,292	2,911
1:1	274	395	0.01	2,647	3,316

Source: ADB (1987)

As a result, the prices of domestic dairy products are affected by the high cost of milk inputs. For instance, the wholesale price of powdered milk in Indonesia throughout 1989-1991 was much higher than the price in New Zealand for the same product (see Figure 3.6).

Figure 3.6. The Wholesale Price of Powdered milk in Indonesia and New Zealand (1989-1991)



Source: ADC, CIC, NZ stat, several issues

Import tariffs

The main objective of this policy is to generate government revenues. Raw materials or intermediate dairy products such as skim milk powder and anhydrous milk fat, besides being subject to mixing ratio policy, are charged with 5 per cent import tariff, while dairy products are subject to an average 25 per cent import tariff.

Import licensing

The mixing ratio imposes a major restriction on the importers of certain dairy products. Only designated importers are allowed to import specified milk products. They are: i) P.T. Pantja Niaga as the sole milk importer to fulfil the dairy requirements of the non-milk food industry, and ii) selected IPS members as importers of intermediate dairy products subject to BUSEP certificates submission. The certificates can be transferred for a fee to other members who intend to import. This import licensing policy is particularly intended to

effectively control the implementation of the mixing ratio policy for the industry.

Investment restrictions on milk processing

The Indonesian government controls investment in certain dairy industries. In an attempt to promote full utilisation of domestic production capacity, skim milk powder and condensed milk industries are closed to new investment. However, investment in AMF and pasteurised or sterilised milk remains open.

3.3. Milk Marketing and Distribution

Article 33(1) of the 1945 Indonesian Constitution states that "the economy shall be organised as a joint endeavour based upon the principle of brotherhood". This article forms the basis of the principle of economic democracy in Indonesia. This means that priority is placed on the prosperity of society, not the prosperity of individuals. In the agricultural sector the most common vehicle for achieving these aims is the agricultural cooperative.

Most dairy farmers are members of cooperatives. These may be either dairy production cooperative units (KPS) or village cooperative units (KUD). These cooperatives fulfil many functions and play a major role in deciding what happens on the farm. For instance, such a cooperative provides veterinary services which include artificial insemination or embryo transfer when required. These cooperatives sometimes provide credit to their members for investment in cattle.

Each farmer's cooperative purchases the milk from that farmer, who is responsible for delivering daily production to collection points. A cooperative's employee gives each farmer's milk a rudimentary check - involving a test of its specific gravity - to determine its purity. Once its volume has been measured, the milk is placed in non-refrigerated metal cans. Trucks then transport the milk

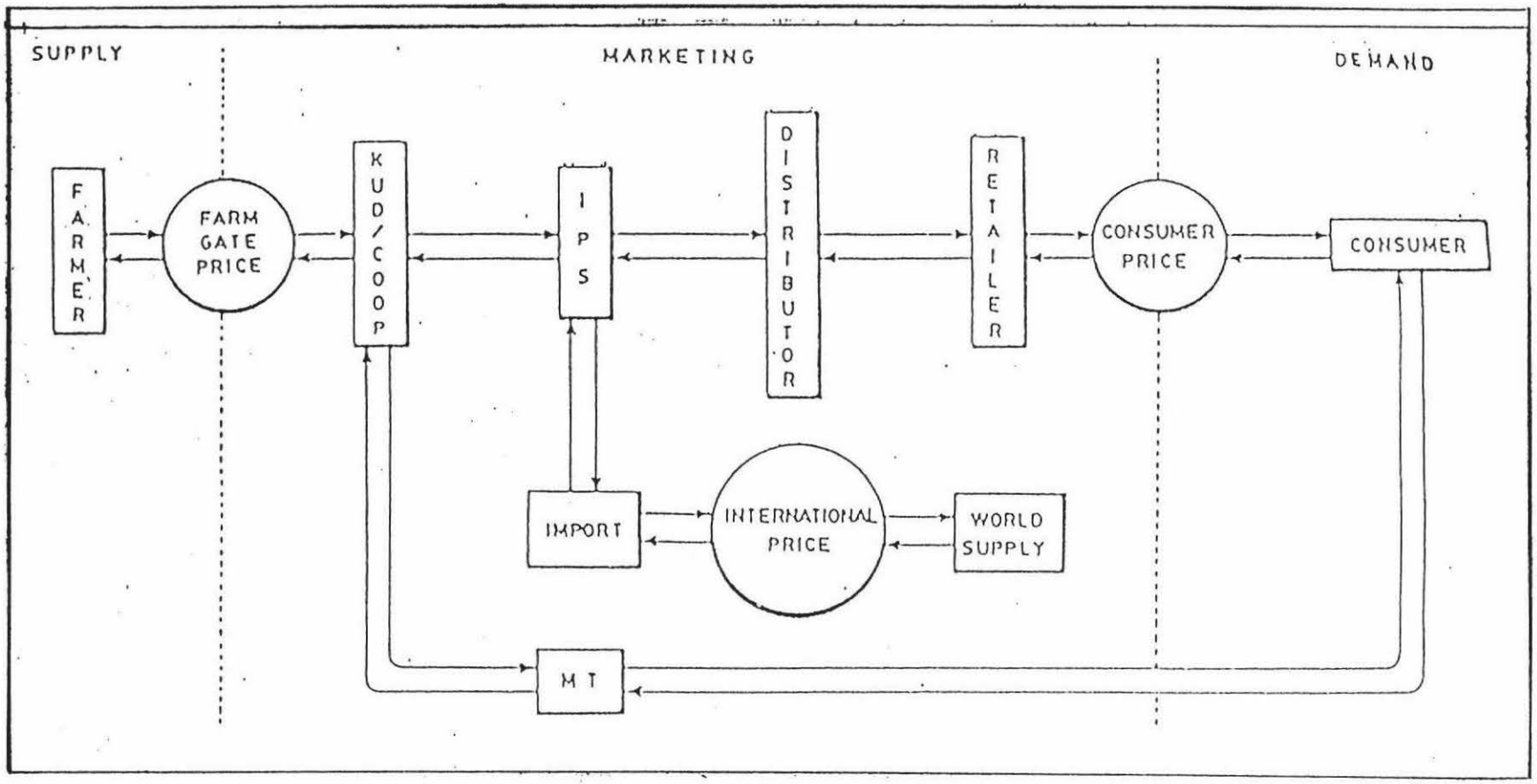
from each collection point to the cooperative and from there it is sold to milk processors. The dairy cooperative union (GKSI) was formed in 1979 as a representative group for primary dairy cooperatives, and this institution plays an important role in negotiations with milk processors (IPS) such as setting milk quality standards and milk price payments to the primary cooperatives by IPS.

In terms of the distribution and marketing of fresh milk (see Figure 3.7), GKSI, with its associated bodies such as KUD/KPS and IPS are dominant. Individual cooperatives that take in 5,000 litres or more per day are given the right to sell fresh milk for GKSI milk treatment or to sell directly to IPS. However, each member must follow the GKSI-IPS procedures, particularly quality standards and price levels. Approximately 90% of domestic fresh milk goes to IPS as raw material for processed milk products, while the rest is consumed directly as pasteurised fresh milk (Erwidodo *et al*, 1993). Thus, private distributors' share in marketing fresh milk is small.

The local government at provincial or district level plays an important role in marketing fresh milk. In the form of SK Bupati (the decree of the head of the district government), the local government sets the farm gate price, and marketing and handling costs (including redistribution fees to the local government), as well as the prices paid by IPS for certain standards of milk based on the negotiation outcomes between GKSI and IPS. The main objective of this decree is to stabilise milk prices received by dairy farmers by formalising the agreement between GKSI and IPS.

However, separate policy issues concerning these local regulations that formalise or regulate prices at the local level relate mainly to the cost components and the levels of marketing costs set by the local government. These total marketing costs can reach approximately 25 per cent of the dairy farm gate price (Erwidodo *et al*, 1993).

Figure 3.7 Dairy and Milk Industrial System in Indonesia



Note : MT stands for milk treatment

Source: Bappenas (1990)

The milk manufacturers are concentrated in Jakarta and Surabaya, while most milk is produced in Eastern and Central Java. Accordingly, the raw material (fresh milk) has to be transported from the producing regions to the milk processing locations. Kasryno et al (1989) found that interregional trading of semi-processed milk produced in Salatiga, Central Java, for instance, is very inefficient, primarily due to the high transportation cost.

The concentration of milk processing companies around big cities with good sea port facilities, such as Jakarta and Surabaya (which are not close to dairy farms), indicates that the milk processing plants were not fully designed for using local fresh milk as inputs, but rather were designed to process imported intermediate dairy products (Taryoto, 1993).

3.4. Comparative Advantage

The domestic cost ratio (DRC) and the resource cost ratio (RCR) are commonly used indicators of comparative advantage. The DRC can be formally stated as the ratio of domestic resource costs of production to the difference between the border price of output and foreign (or tradeable) costs:

$$DRC = \frac{\text{domestic factor cost per unit of output}}{\text{border price of output} - \text{foreign costs per unit of output at border prices}}$$

The RCR is the DRC value divided by the shadow foreign exchange rate (SER), and indicates whether domestically produced goods have a lower economic cost than their equivalent import or export value.

$$RCR = \frac{DRC}{SER}$$

If RCR < 1, the country is said to have a comparative advantage in the production of that good, and a comparative disadvantage RCR > 1.

Using both the domestic cost ratio (DRC) and the resource cost ratio (RCR), the study carried out by Kasryno *et al* (1989) concluded that the Indonesian dairy industry does not have comparative advantage in milk production. Their computed RCR for corporate farms ranges from 1.67 to 5.02, while for households, representing the majority of small-scale farms, the RCR range was 1.40 to 3.52.

Table 3.5. Comparative Advantage Criteria for Milk Production

Producing region	Technology	Trade Regime	Wholesale location	RCR	DRC	Net economic benefit
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Corporate	Imported breed	IR	Jakarta	5.02	8315	-208
			Surabaya	3.19	5275	-170
			Bandung	2.82	4659	-149
		IS	Salatiga	2.88	4767	-150
		EP	Semarang	2.85	4718	-155
	Cross breed	IR	Jakarta	2.20	3640	-204
			Surabaya	1.74	2883	-155
			Bandung	1.67	2767	-139
		IS	Salatiga	1.70	2819	-142
		EP	Semarang	1.67	2767	-142
Household	Imported breed	IR	Jakarta	3.52	5828	-176
			Surabaya	2.66	4398	-147
			Bandung	2.70	4463	-138
		IS	Salatiga	2.40	3979	-127
		EP	Semarang	2.36	3908	-131
	Cross breed	IR	Jakarta	1.74	2885	-168
			Surabaya	1.40	2317	-109
			Bandung	1.45	2400	-115
		IS	Salatiga	1.45	2407	-115
		EP	Semarang	1.45	2240	-99

Notes: IR stands for inter-regional trade, EP for export production, and IS for import substitution.

Source: Kasryno, et al (1989).

Employing the same analytical tool, Septiani (1988) computed the RCR of domestic production of intermediate dairy products (SMP and AMF) in an integrated dairy farm-processing system. Her result showed that the RCR of intermediate products ranged from 1.5 to 2.07. These figures were derived from a productivity level of 8-15 litres of milk per cow per day.

Both RCR analyses, either by Kasryno *et al* or Septiani, are sensitive to changes in prices. Kasryno *et al*, for instance, estimated that small-scale dairy farming, assuming no technological and productivity changes, would be economically feasible if the world prices of dairy products increased by 17 per cent or if fresh milk prices increased by 48 per cent. Septiani calculated that given the existing level of productivity, domestic production would become economically feasible if world prices of the products in question increased by 50 per cent.

Therefore, an expected general movement towards a deregulated world dairy market, which is estimated to bring about an increase in the world price of those products, could assist in making Indonesia's dairy sector economically feasible.

3.5. Summary

The development of the Indonesian dairy industry is influenced by two major factors: income and taste changes, and changes in government policy. As the Indonesian economy has been growing at an astounding rate of around 7-8 per cent a year since the early 1990s - and possibly for the remainder of this decade - with corresponding increases in income and expenditure, it is reasonable to expect that demand for dairy products will continue to increase.

As required by the Uruguay Round Agreement, the Indonesian government is committed to gradually phase-out the mixing ratio policy which requires importers to absorb domestic milk, although the policy has contributed to the development of a large, but apparently still inefficient, dairy industry. From 2005, the import of dairy products will be governed by tariff-only protection.

Therefore, the policy change is likely to accelerate the increased consumption of dairy products following global agricultural trade reform, leaving further scope for increased imports as growth of local supply has tended to be below growth of demand since 1990s.

In addition, domestic suppliers who have been supported and protected by the government through a mixing ratio policy have to overcome low quality and inefficient dairy production either at the farm and processing level, or at the marketing and distribution level. However, previous studies of comparative advantage in the livestock commodity system indicate that domestic milk production in Indonesia would become economically feasible only if world prices of dairy products were to increase significantly. Interestingly, studies of the impact of global agricultural trade as a result of the Uruguay Round Agreement estimate substantial price increases for dairy products.

This leaves scope for a specific study of the ability of the Indonesian dairy industry to respond to and survive under the more competitive environment induced by the Agreement. The next chapter looks at the method to be used to estimate the welfare effects within the Indonesian dairy industry. This involves a dynamic partial equilibrium analysis, with the mixing ratio policy the major object of interest.

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CHAPTER IV
METHODOLOGY

The objective of this chapter is to present the methodology for an assessment of the degree of protection and the magnitude of the welfare effects of the mixing ratio policy. Like Sazanami's study (1995) which measures the costs of protection in Japan, this study describes levels of Indonesian dairy protection through the mixing ratio policy as tariff-equivalent duty rates. The dairy product covered in this study includes whole milk powder locally produced either using 100 per cent local fresh milk or using 100 per cent imported intermediate dairy products (skim milk powder and anhydrous milk fat). Both intermediate dairy products constitute about 85 per cent[1] of total dairy imports covered by the mixing ratio policy. Dynamic partial equilibrium analyses are then employed to project the welfare effects of the gradual removal of such a policy in the mid-term of the implementation period, *i.e* 2000, and at the end of the period, *i.e* 2005.

4.1. Method of Estimating Level of Protection.

Unlike Sazanami's study (1995) which is a straightforward comparison of imported products with local products, the method of estimating the level of protection used in this study considers the purchasing cost of imported intermediate dairy products (skim milk powder and anhydrous milk fat) for making local finished products (whole milk powder) in comparison with the purchasing cost of local freshmilk for producing the same product.

[1] Indonesian Central Bureau of Statistics (1994)

This study directly compares the cost of insurance and freight (cif) import unit values in Indonesian ports and import tariffs for skim milk powder and anhydrous milk fat in a proportion to make one kilogram of whole milk powder, with the village cooperative gate unit value paid by milk processors in proportion to make one kilogram of whole milk powder. Import unit values are calculated by dividing the declared cif value of imports with the volume of imports.

These unit value comparisons are expected to capture the level of protection caused by the mixing ratio policy. For instance, if the unit value for producing locally one kilogram of whole milk powder using 100 per cent imported intermediate dairy products (skim milk powder and anhydrous milk fat) after including import taxes is 100, and if that of its raw domestic substitute is 150, the comparison suggests that the domestic dairy farmer receives a tariff-equivalent rate of protection through the mixing ratio policy equal to 50 per cent of the imported unit value.

To begin constructing the tariff-equivalent figures, c.i.f import data for skim milk powder and anhydrous milk fat were collected from Indonesia's Central Bureau of Statistics, and fresh milk prices paid by local milk factories at the village cooperative gates were obtained from the Dairy Cooperative Union. Import tariffs for skim milk powder and anhydrous milk fat were quoted from the book of import tariffs published by the Ministry of Finance, Jakarta. Foreign exchange rates were obtained from Indonesia's Central Bank, as well as from the Asian Development Bank. The mathematical construction of the tariff-equivalents is shown below.

Local milk processors purchase fresh milk from local dairy farms at the village cooperative gates in order to make whole milk powder. The standard of the milk quality the processors purchase requires 3 per cent fat and 7.9 per cent solid non-fat (Bappenas, 1990) so that 1 kilogram of whole milk powder requires 275.2 grams of fat and 724.77 grams of solid non-fat (DGL-MOA, 1993). This is equivalent to 9.17 kilograms of local fresh milk. Therefore, local milk processors need to purchase 9.17 kilograms at the cooperative gate's price to make 1 kilogram of wholemilk powder. The cost of this milk purchase is assumed to be the domestic price (*DP*).

The comparable imported intermediate dairy products to make 1 kilogram of whole milk powder (724.77 grams of skim milk powder and 275.2 grams of anhydrous milk fat[2]) arrives at the Indonesian ports at a unit value of *WP*. After converting unit value of *WP* into local currency (Rupiah), import tariffs and the mixing ratio policy are imposed to give a landed unit value of *WP1*:

$$WP1 = WP\,(1+ t+nt) \qquad (4.1)$$

here t is the ad valorem equivalent of tariffs and nt is the tariff-equivalent of the mixing ratio policy. By assuming that:

$$DP = WP1 \qquad (4.2)$$

the inferred extent of the tariff and the mixing ratio policy can be calculated as follows:

$$(DP - WP)/WP = t + nt \qquad (4.3)$$

[2] approximately equal to 8.25 kilogram in fresh milk-equivalent under the mixing ratio' conversion rates.

This is the key measure used to assess the combined level of protection caused by tariffs and the mixing ratio policy. Since the statutory tariff is known, the remaining gap can be calculated as the degree of protection caused by the mixing ratio policy.

Specific tariff equivalent: $nt = ((DP-WP)/WP) - t$ (4.4)

Ad-valorem tariff equivalent: $nte = (nt/WP) * 100\%$ (4.5)

Table 4.1. Value of Variables for Estimating the Degree of Protection of the Mixing Ratio Policy in 1994

Variables	Unit	1994 Values	Description
World Price: SMP AMF	US$/kg	 1.68 1.83	CIF Price*)
Import tariff **)	%	5	
Domestic Price	Rp./kg	615	Local fresh milk at village coop gate ***)
Exchange rate ****)	US$/Rp	2161.71	

Source: *) BPS-Jakarta (1994)
**) Directorate General of Custom-MOF, Jakarta
***) The Dairy Cooperative Union (1996)
****) The average of annual period (Asian Development Bank, 1995, and Indonesian Central Bank, 1996)

Table 4.1. above presents the data for calculating the degree of protection caused by mixing ratio operations during 1994. This unit value differential method will be used for supporting the projections of welfare effects in 2000 and 2005.

4.2. Dynamic Partial Equilibrium Analysis

The magnitude of the effects of the mixing ratio policy on the local dairy farmers as producers, on the milk processors as consumers, and on government revenues and quota rents, can be calculated through computable dynamic partial equilibrium analyses. This calculation is useful for providing information on the welfare effects for the Indonesian dairy industry which involves local fresh milk producers, milk processors, as well as government and holders of import licenses.

The model is subject to three important qualifications. First, it is a partial equilibrium analysis and therefore ignores the effects of the policy reform on other sectors, as well as effects of policy reforms in other sector on the dairy industry. Second, only one policy, that is the mixing ratio policy, is being investigated. Third, dynamic effects on a gradual removal of the policy in the mid-term of the implementation period, *i.e* 2000, and at the end of the period, *i.e* 2005, are projected in a simulation by modelling technical improvement in domestic supply and income growth in consumption.

The basic parameters of the model, *e.g.* those in the supply or demand functions, are calibrated so that the model is able to reproduce the 1994 base data. The model is then used to make projections to the years 2000 and 2005 with endogenous factors including the domestic milk price, local milk supply, demand, and imports. Exogenous variables include world prices, productivity growth of domestic supply, income and population growth. The 1994 data set is chosen as a base, bearing in mind that all data required for supporting the model in that year are the latest updated data available. Finally, eight scenarios are recognised by this model.

4.2.1. Milk Consumption

Rae (1995) considered private expenditure per capita as one of the most important factors influencing the level of consumption of livestock products in the East Asian region. In order to measure the effect of that factor on dairy consumption in Indonesia, the function which describes the relationship between the consumption and expenditure needs to be specified for projecting dairy consumption to the year 2000 and 2005. The consumption functions can then be written as:

$$Qd = a + bDP + cY \qquad (4.6)$$

where
Qd = quantity demanded per capita
DP = domestic price of milk
Y = private consumption expenditure per person
a, b, and c = parameters

The parameter b and c are estimated from known elasticities as follows:

Parameter c can be found from:

$$\varepsilon y = c \frac{y_{1994}}{Qd_{1994}} \qquad (4.7)$$

where εy is expenditure elasticity of demand.

Parameter b is estimated from:

$$\varepsilon d = b \frac{DP_{1994}}{Qd_{1994}} \qquad (4.8)$$

where εd is price elasticity of demand.

The parameter a can then be found since all other variables and parameters in the consumption function (4.6) are known. Finally, total consumption in any year will be estimated by multiplying the projected level of consumption per person by the projected population size.

$$TQd = Qd * \text{population} \qquad (4.9)$$

where TQd is total consumption.

A database for supporting the estimation of the consumption function is in Table 4.2.

Table 4.2. Value of Variables for Projecting Milk Consumption

Variables	Unit	Base 1994
Population (a)	million	190.7
Private consumption expenditure (a)	US$/capita	471.1
Consumption (b)	kg/capita	3.87
Local price (c)	Rp/kg	615
εd (d)	- 0.9	
εy (e)	0.8	

Notes: before being measured on a per capita basis, consumption is the sum of local supply for producing powdered milk and imports of skim milk powder and anhydrous milk fat in fresh milk-equivalent, with the conversion rate for skim milk powder and anhydrous milk fat at 11 and 1 respectively.

Sources: a) Indonesian Central Bureau of Statistics (1994);
b) Dairy Cooperative Union, DGL-MOA, several issues, and Erwidodo (1993);
c) Dairy Cooprative Union (1996);
d) World Bank estimation (1992);
e) Smith *et al* (1995)

4.2.2. Milk Supply

A supply function can be written as:

$$Qs = f(DP) \qquad (4.10)$$

where Qs is the quantity supplied and DP is the price of the product in question.

Anderson *et al* (1990) examined the influence of factors other than price in supply functions. He attempted to incorporate technical change to illustrate the gains from global agricultural trade reform for developing countries. To exhibit these characteristics, the rate of productivity growth induced by improved technology symbolised by γ will be inserted into the supply function as an additional explanatory factor. Employing a computerised regression analysis over the 17-year period 1978 through 1994 (see Table 3.1 column 8), γ is determined as follows:

$$ln\ Y = a + \gamma t \qquad (4.11)$$

where
$ln\ Y$ = natural log of milk production per cow per day
a = intercept
t = year
γ = annual productivity growth rate

The result shows that improved technology over the 17-year period 1978 - 1994 was increasing at a rate of 4.4 per cent per year.

The supply function may now be writtten:

$$Qs = \alpha (1+ \gamma)^{\wedge} s + \beta DP \qquad (4.12)$$

where
Qs = quantity milk supplied locally
γ = annual productivity growth rate
s = 6 for the year 2000, and 11 for the year 2005
DP = domestic price of milk
α and β = parameters

Parameter β can be estimated through the following formula:

$$\varepsilon s = \beta \frac{DP_{1994}}{Qs_{1994}} \qquad (4.13)$$

The supply of local fresh milk to milk processors for producing milk powder in 1994 is computed at about 245 thousand tons[3], while the price elasticity of supply is about 0.5 (Remenyi, 1986). Once these variables are known, parameter α can be estimated so that the equation can reproduce the 1994 base values.

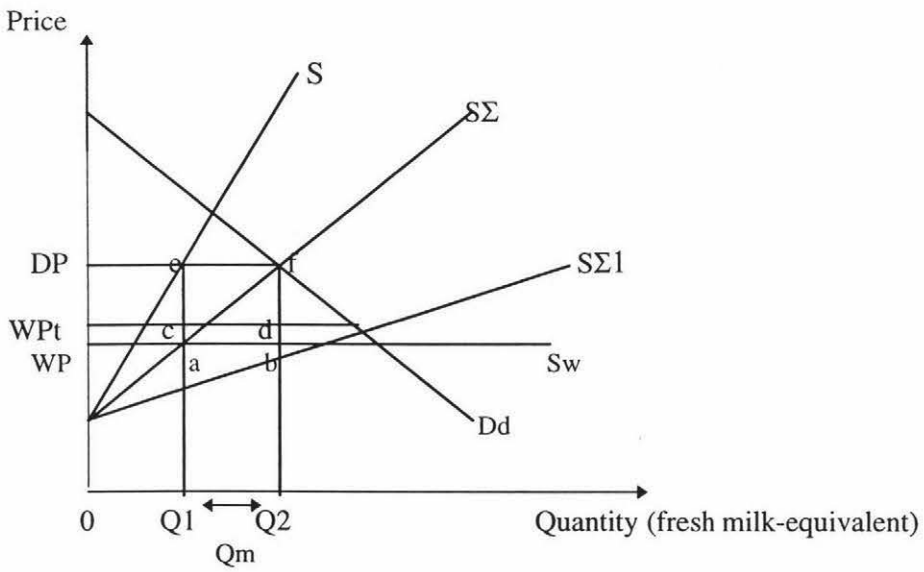
The gap between total domestic consumption (equation 4.9) and production (equation 4.12) represents the quantity of imports:

$$Qm = TQd - Qs \qquad (4.14)$$

where Qm = quantity of imports.

Figure 4.1 below illustrates the effects of introducing the mixing ratio policy on

Figure 4.1. Effects of Mixing Ratio Policy



[3] Based on around 55% of local milk production (Erwidodo *et al*, 1993)

powdered milk produced locally, either using local fresh milk or imported intermediate dairy products such as skim milk powder and anhydrous milk fat. The initial supply and demand conditions in the figure are shown by the lines S and Dd. The latter is a derived demand at the level of the milk processors. SΣ is total supply and includes both domestic supply and imports. This situation is captured by:

import quantity/domestic supply = r, where r is the mixing ratio parameter.

The mixing ratio is a value in the form (1:r), where r is the quantity of imports allowed for every unit of domestic milk utilised. This has an effect of changing the domestic availability of milk from S (domestic supply curve) to SΣ, where SΣ is defined by:

$$S\Sigma = (1+r)S \qquad (4.15)$$

The supply curve of imports of the intermediate dairy products from the rest of the world is represented by Sw which is horizontal because Indonesia is assumed to be a small player in the world dairy market, with no ability to influence world prices.

Since the government introduced the mixing ratio policy, the domestic price (DP) has been well above the world price plus import tariff (WPt):

$$WPt = WP\ (1+t) \qquad (4.16)$$

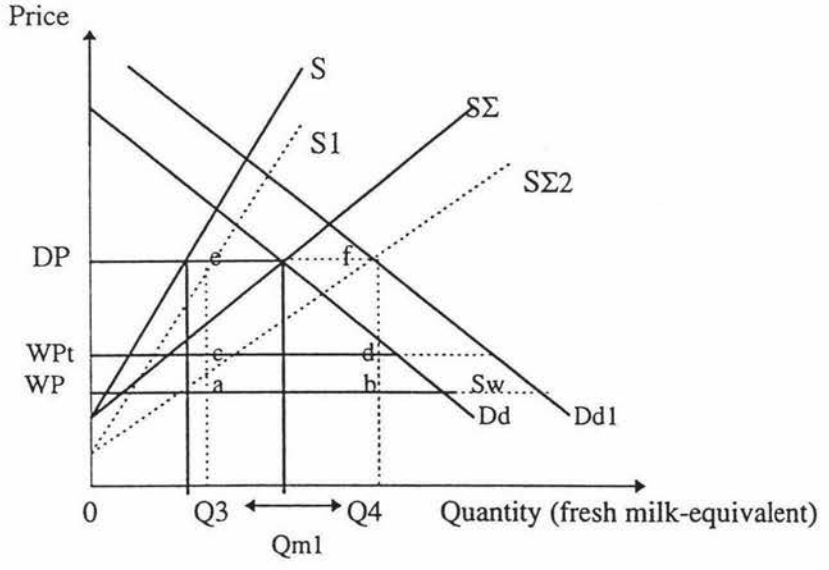
where t is the tariff rate expressed as a decimal.

At DP, local milk processors are willing to purchase quantity Q2, while local dairy farmers are encouraged to supply quantity Q1. The quantity of imports is reflected by the area between Q1 and Q2 (Qm).

The magnitude of the effects in a situation where there was no mixing ratio policy would lower the barrier-inclusive price of imports in the domestic market from DP to WPt (world price plus tariff). The decrease in the domestic price to WPt causes a rightward shift in the supply curve SΣ to SΣ1. Thus as the mixing ratio policy is phased out, by increasing the value of *r*, SΣ becomes flatter and the ratio of imports to domestic production becomes larger.

Because of the reduction of support and protection which would lower the level of domestic dairy prices in industrialised market economies and increase the world price of the products, dairy productivity growth in developing countries is likely to increase through induced technical change in the era of post global agricultural trade reform (Anderson *et al*, 1990). As well, Lipsey (1983) points out that the improved productivity growth can be caused by improvements in technology. This induces a shift in the country's fresh milk supply curve to the right (S1).

Figure 4.2. The Dynamic Effects of the Reform



On the demand side, an increased consumption expenditure resulting from economic growth shifts the milk processors' demand curve to the right (Dd1). When equilibrium is restored (indicated by SΣ2), the output of the fresh milk locally produced increases, as does the quantity of imports (Qm1).

4.2.3. Method for Calculating the Welfare Effects

By having endogenous supply, demand, imports and domestic price in the year targeted, as well as the exogenous projections of private consumption expenditure, world price, and the mixing ratio, the welfare effects to the dairy farmers as producers, milk processors as consumers, and government revenues from import tariffs, as well as quota rents, can be estimated.

Producer surplus, which is in the area above the supply curve and below the domestic price, is computed through the following formula:

$$Ps = (DpQs) - 0.5[Dp\{Qs - \alpha(1+\gamma)^{s}\}] \qquad (4.17)$$

Consumer surplus which is in the area below the demand curve and above the domestic price, equals:

$$Cs = 0.5(((a/b+((c/b)y)) - Dp)TQd) \qquad (4.18)$$

Government revenue which is graphically represented by the area abcd, is calculated as:

$$Gr=(TQd-Qs)\,(tWP) \qquad (4.19)$$

where t is the tariff rate expressed as a decimal.

Quota rents, which are indicated by the area cdef, can be estimated by:

$$Qr = (TQd - Qs)[Dp - \{(1+t)Wp\}] \qquad (4.20)$$

The world price refers to the purchasing cost of that quantity of imported intermediate dairy products (skim milk powder and anhydrous milk fat) required for producing one kilogram of whole milk powder, divided by 8.25 to convert it to its fresh milk-equivalent under the mixing ratio conversion rates. The import tariff and exchange rate are set at their 1994 levels.

4.2.4. Modelling Scenarios

Eight scenarios has been constructed for the simulations, as presented in Table 4.4. They provide alternative assessments through various mixing ratio operations based on Indonesia's Uruguay Round commitments in the mid-term of the implementation period, as well as the import tariffs that will replace the mixing ratio policy at the end of the period.

As the Indonesian economy is likely to grow at a rate of 7-8 per cent per annum over the remainder of this decade and possibly at 6-7 per cent annually throughout 2001-2005, with corresponding increases in income and expenditure, it is reasonable to expect a substantial increase in dairy consumption per capita in Indonesia. The consumption projections, therefore, take account of changes over the projection periods in per person private consumption expenditure and in population size. Table 4.3 presents the projected private consumption expenditure and population size in 2000 and 2005.

Table 4.3. The Projections of Population and Private Consumption Expenditure to the Year 2000 - 2005

Items	Unit	1994	2000			2005		
			General	High	Low	General	High	Low
Population	million	190.7	210			225.3		
Private consumption expenditure	US$/capita	471.1		610	581		690	627

Notes: population and PCE growth based on Indonesian Central Bureau of Statistics (internet, 1996) and the 6th PELITA-targetted as well as the 2nd phase of 2nd Long-term Development Plan.

The population is projected to grow by 1.6 per cent per annum throughout the 6th Five Year Development Plan (1994-1999). Therefore, the population is estimated at about 210 million in 2000. As targeted by the second phase of the Second Long-term Development Plan, this population growth is expected to decline gradually from 1.6 per cent to 1.4 per cent in 2005. This would bring about an increased population from 210 million in 2000 to 225.3 million in 2005.

There are two different economic growth rates in each period of the scenarios, *i.e* high (A) and low (B) growth. Throughout the period 1994-2000, the high growth scenario (with an annual 8% GDP prediction) assumes a 6 per cent annual increase in per capita private consumption expenditure, while the low growth (with an annual 7% GDP prediction) assumes a 5 per cent annual increase in the expenditure. In the period 2001-2005, the high growth scenario with an annual 7% GDP assumption predicts a 5 per cent increase in per capita private consumption expenditure per annum, whereas the low growth (with an annual 6% GDP assumption) predicts a 4 per cent increase in the expenditure per annum. The resultant projected values of expenditure per capita are given in Table 4.3.

In addition, with Indonesia's commitment to gradually phase-out her mixing ratio policy, various operations of the policy ranging from 2 to 3.5 are exogenously made in every single scenario to explore the likely levels of domestic fresh milk price in 2000, as well as the likely import tariffs for replacing such mixing ratio operations in 2005.

The eight scenarios are described below:

Scenarios I A and I B: what if the rise in world dairy prices as a result of global agricultural trade reform encourages past productivity growth rates in Indonesian dairy development to be continued?

In this scenario, projected world dairy prices carried out by the OECD (1996) will be employed. OECD (1996) estimates that the world price for skim milk powder is likely to rise by 45 per cent from US$ 1.68/kilogram in 1994 to US$ 2.44/kilogram in 2000 or about 6.42 per cent per annum, whereas anhydrous milk fat (as a complementary product of SMP) for producing wholemilk powder is assumed to increase in the same rate. These higher prices are likely to continue till the end of implementation period. However, the rise in world dairy prices throughout 2001-2005 is likely to be slower than in the period 1994-2000 because industrialised market economies are scheduled to conclude their implementation period in 2000-2001, 4-5 years earlier than those for the developing countries. Therefore, annual increases in world dairy prices throughout 2001-2005 are assumed to be half of the OECD's annual projections throughout 1994-2000.

Along with the rise in the world dairy price and the greater stability of that price following the global reduction of support and protection as a result of the Uruguay Round Agreement, productivity growth is likely to be induced through technical change in developing countries, while slowing down it in industrialised market economies. Therefore to exhibit this characteristic in the model, the historical productivity growth rate induced by improved technology in Indonesian dairy development is assumed to be continued at a rate of 4.4 per cent per year resulting from equation 4.11.

Scenarios II A and II B: what if the rise in world dairy prices is followed by lower productivity growth?

The rates of increase of world dairy prices in this second scenario are identical to those of the first scenario. However, the productivity growth rate is assumed to be half that in the first scenario.

Scenarios III A and III B: what if the world dairy price increases are relatively low but the historical productivity growth rate continues?

As indicated by Anderson (1996), agricultural tariffications were "dirty" so that they could possibly lower expectations about a Round-induced rise in the relative price of farm products on international markets. This third scenario, therefore, assumes a rise in world dairy prices of only half of the average annual increase of scenarios I and II, whereas the productivity growth rate is identical to the first scenario.

Scenarios IV A and IV B: what if the slow increase in the world dairy prices is followed by a slow productivity growth rate?

In this fourth scenario, the slower increase in world dairy prices is identical to the third scenario, while productivity growth is assumed to be similar to the second scenario.

Table 4.4. The Scenarios' Assumptions

Scenario	Projected world price increases for skim milk powder and anhydrous milk fat (% per annum)		Projected productivity growth (% per annum)	Projected Growth of Private Consumption Expenditure (% per annum)	
	1994 - 2000	2001 - 2005	1994 - 2005	1994 - 2000	2001 - 2005
I A	6.4	3.2	4.4	6	5
B	6.4	3.2	4.4	5	4
II A	6.4	3.2	2.2	6	5
B	6.4	3.2	2.2	5	4
III A	3.2	1.6	4.4	6	5
B	3.2	1.6	4.4	5	4
IV A	3.2	1.6	2.2	6	5
B	3.2	1.6	2.2	5	4

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CHAPTER V
RESULTS AND DISCUSSION

This chapter reports on the results of simulations that examine gradual removal of mixing ratio operations (r) in the mid-term of implementation period, *i.e* the year 2000, and the implementation of tariff-only protection (t) at the end of the period, *i.e* the year 2005 (t reflects the combined level of protection caused previously by r, and the constant 1994 import tariff). Such simulations consider various r values (2, 2.5, 3 and 3.5), and also derive values for r that result in the domestic price of raw milk (DP) being equal to its base year value, and also equivalent to WPt. The discussion is focused on such values of r or t that result in domestic raw milk prices that are equal to or above WPt.

The solutions provide estimates of the resulting adjustments in consumption, production, trade, and domestic price. Apart from exogenous changes in productivity, consumption expenditure, population, and the world dairy price, it is assumed that all other conditions remain the same as in the base year 1994. This allows the analysis to isolate and identify welfare differences between the new solutions and the base situation. The results of scenario IIA are explained for illustrative purposes (either in 2000 or 2005), while the results of the rest of the scenarios are summarily presented (details are given in Appendix I).

5.1. Implications for Domestic Price and Trade

Figure 5.1 provides the changes in domestic prices of raw milk generated by the simulated mixing ratio (r) operations in 2000 and tariff-only protection (t) in 2005 under eight scenarios.

The changes resulting from scenario IIA are shown in Table 5.1A for 2000 and Table 5.1B for 2005. The 45% increase in the world dairy price by 2000 (OECD, 1996) which is reflected in this scenario means that a mixing ratio of 1:2.31 would produce a domestic price equal to WPt. Values of r greater than 2.31 would not result in any protection of the domestic dairy industry other than the existing 5% tariff. Should an $r = 2$ value be retained, as in the base year, the resulting domestic price of Rp.735/kg would provide protection equivalent to 5% plus 7.2% of the world price.

Table 5.1A. Scenario II A for 2000

High PCE growth/ high increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.5	2.82	3	3.5	2.31
NT Tariffied*)	%	31.3	7.2	-4.4	-11.1	-14.8	-24.2	0
Local price	Rp./kg	615	735	659	615	591	529	688
consumption	000 tons	737.025	860.4	950.66	1,003.06	1,031.86	1,105.28	916.65
local supply	000 tons	245.675	286.8	271.62	262.81	257.97	245.62	277.34
import	000 tons	491.350	573.6	679.04	740.25	773.89	859.66	639.31

Note: *) Total tariff equivalent equals these values plus the 5% import tariff

The annual increase of the world dairy price over 2001-2005 is only half that of the 1994-2000 period. By the year 2005, tariff-equivalent protection of 5% plus 11.9% deriving from scenario IIA could result in the volume of imports being double domestic production. Should this protection be 5% only, then the volume of import is estimated at about 2.5 times domestic production.

Table 5.1B. Scenario II A for 2005

High PCE growth/ high increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.5	3	3.28	3.5	2.51
NT Tariffied*)	%	31.3	11.9	0.2	-10.3	-15.8	-19.9	0
Local price	Rp./kg	615	806	726	653	615	587	724
consumption	000 tons	737.025	951.1	1,053.5	1,146.0	1,194.4	1,229.97	1,055.4
local supply	000 tons	245.675	317.0	301.0	286.5	278.9	273.33	300.7
import	000 tons	491.350	634.1	752.5	859.5	915.5	956.64	754.7

Note: *) Total tariff equivalent equals these values plus the 5% import tariff

Other scenarios in 2000 with the same increase in world dairy price (I and II), as shown in Figure 5.1, result in values of r of between 2 and 2.09 (scenario IA), 1.96 (scenario IB), and between 2 and 2.16 (scenario IIB). At any level above 2.09, 1.96, and 2.16 (scenarios IA, IB, and IIB, respectively), the mixing ratio policy would be redundant and domestic prices would equal WPt. The different ranges of r among these four scenarios derive from the different growth rates of consumption expenditure and productivity.

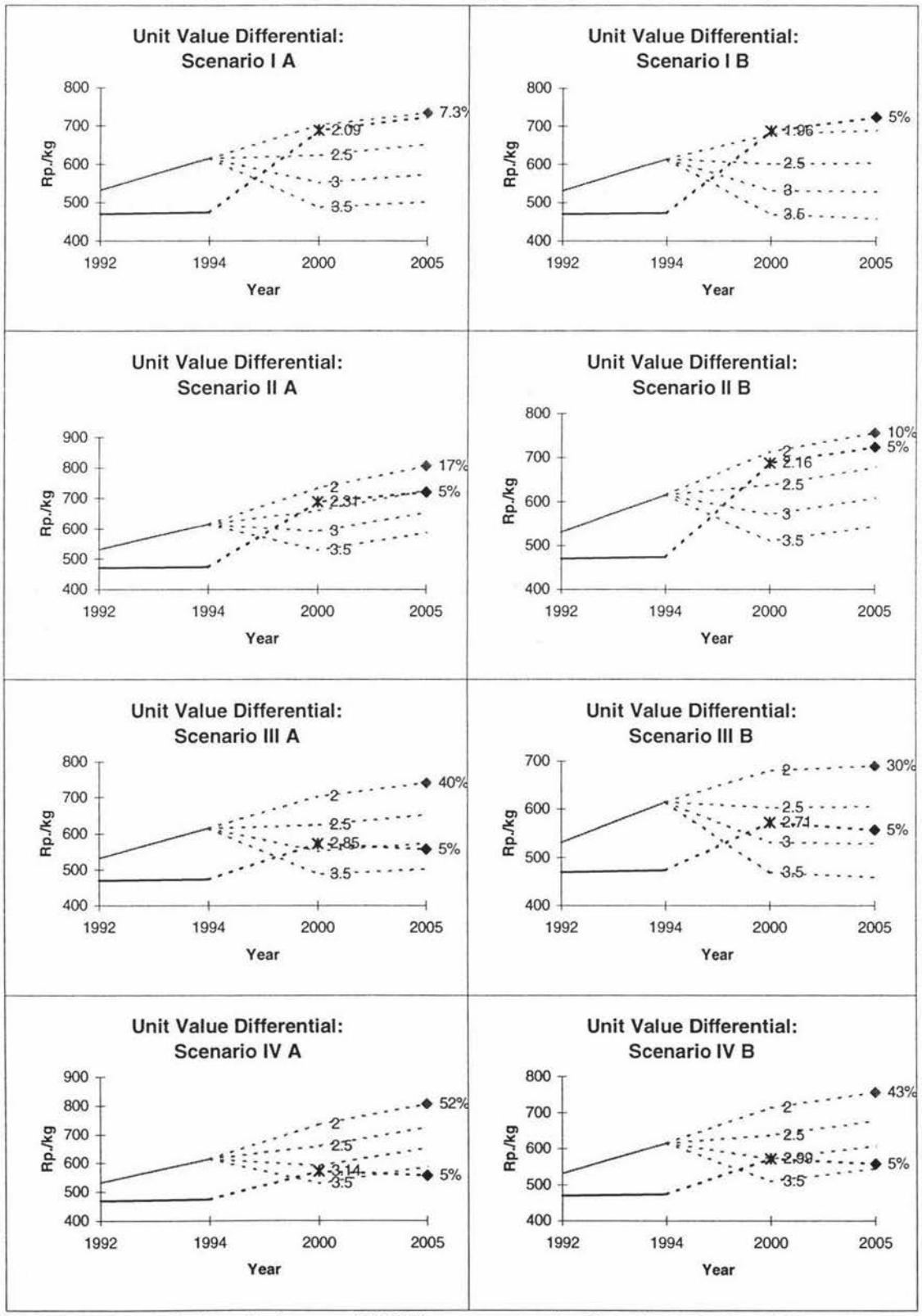
However, if the world dairy price increases by only half of the annual increase assumed in scenarios I & II, the range of *r* is larger. As seen in figure 5.1, the range of *r* in 2000 under scenarios III and IV spreads from between 2 and 2.71 (scenario IIIB) to between 2 and 3.14 (scenario IVA). Within this spread, *r* ranges between 2 and 2.85 (scenario IIIA), and between 2 and 2.99 (scenario IVB). Any further expansion of *r* from 2.85 (scenario IIIA), 2.71 (scenario IIIB), 3.14 (scenario IVA), and 2.99 (scenario IVB) results in the mixing ratio policy being redundant.

With the annual increase of the world dairy price over 2001-2005 is only half that of the 1994-2000 period, tariff-equivalent in 2005 resulting from scenario IIA (shown in Table 5.1B) varies between 5-17%[1] (equivalent to *r* of between 2.51-2) which produces DP between Rp.724/kg and Rp.806/kg. This result is lower than the 1994 tariff-equivalent, which combined the protection caused by *r* plus the 5% import tariff and totalled 31.3%. However, within the 2005 scenarios, scenario IVA (shown in Figure 5.1) comes up with the longest likely range of *t* that is from a high of 52% (equivalent to *r* of 2) to a low of 5% (equivalent to *r* of 3.14).

By comparing the range of *r* and *t* in scenarios I and II with scenarios III and IV, it appears that the lower the range of *r* and *t*, the closer the unit value differentials between domestic price and the world price becomes and, as a consequence, the less pressure is faced by the Indonesian dairy sector from the internationally-efficient pasture-based producers. Thus, the Indonesian dairy sector would be more secure if the world dairy price increased by more than 3.2% per annum throughout 1994-2000 and by more than 1.6% per annum during the period 2001-2005 (as in scenarios I and II).

[1] Such figures of *t* are obtained by adding *r*-tariffied (see NT tariffied in Table 5.1B) to 5% (the constant 1994 import tariff).

Figure 5.1. Changes in Local Prices of Raw Milk Compared to World Prices and Import Tariffs of Intermediate Dairy Products Required for Producing Powdered Milk (in fresh milk-equivalent): for 2000 and 2005.



Black lines: the world prices plus import tariff (WPt) Grey lines: the local prices (DP)
Broken lines: the scenarios' results with various mixing ratio operations in 2000 and ad-valorem tariff in 2005.
Note: asterix symbol marks the level of mixing ratio operations that results in DP equal to WPt

On the net trade side, the changes in the volume of production and consumption and, therefore, imports that would occur under the scenarios brings about a significant change in trade patterns. As the Indonesian economy continues to grow, with corresponding increases in private consumption expenditure combined with population growth, the projected domestic utilisation absorbed by local milk processors for producing milk powder would rise in all scenarios both in 2000 and 2005.

The results of scenario IIA (see Table 5.1A) for instance, indicate that as r is increased[2] from 2 to 2.31 in 2000, domestic price would fall and consumption would increase from 860.4 to 916.7 thousand tonnes. At $r = 2$, local supply and imports would be 286.8 and 573.6 thousand tonnes, respectively, while at $r = 2.31$, local supply and imports would reach 277.4 and 639.3 thousand tonnes, respectively. Compared to the base year 1994, changes in consumption, local supply and imports in 2000 at $r = 2$ are about 123.4, 41.1, and 82.3 thousand tonnes, respectively, whereas at $r = 2.31$ in the same year, such changes are around 180, 32, and 148 thousand tonnes, respectively.

It is clear that by lowering the value of r, with a corresponding increase in DP, consumption declines which results in reduced opportunities for imports but increased local production. However, within the 2000 scenarios and the r values that produce DP above or equal to WPt, changes in local production and imports are positive compared with the base year (see Figure 5.2A) due to the growth of productivity, consumption expenditure and population.

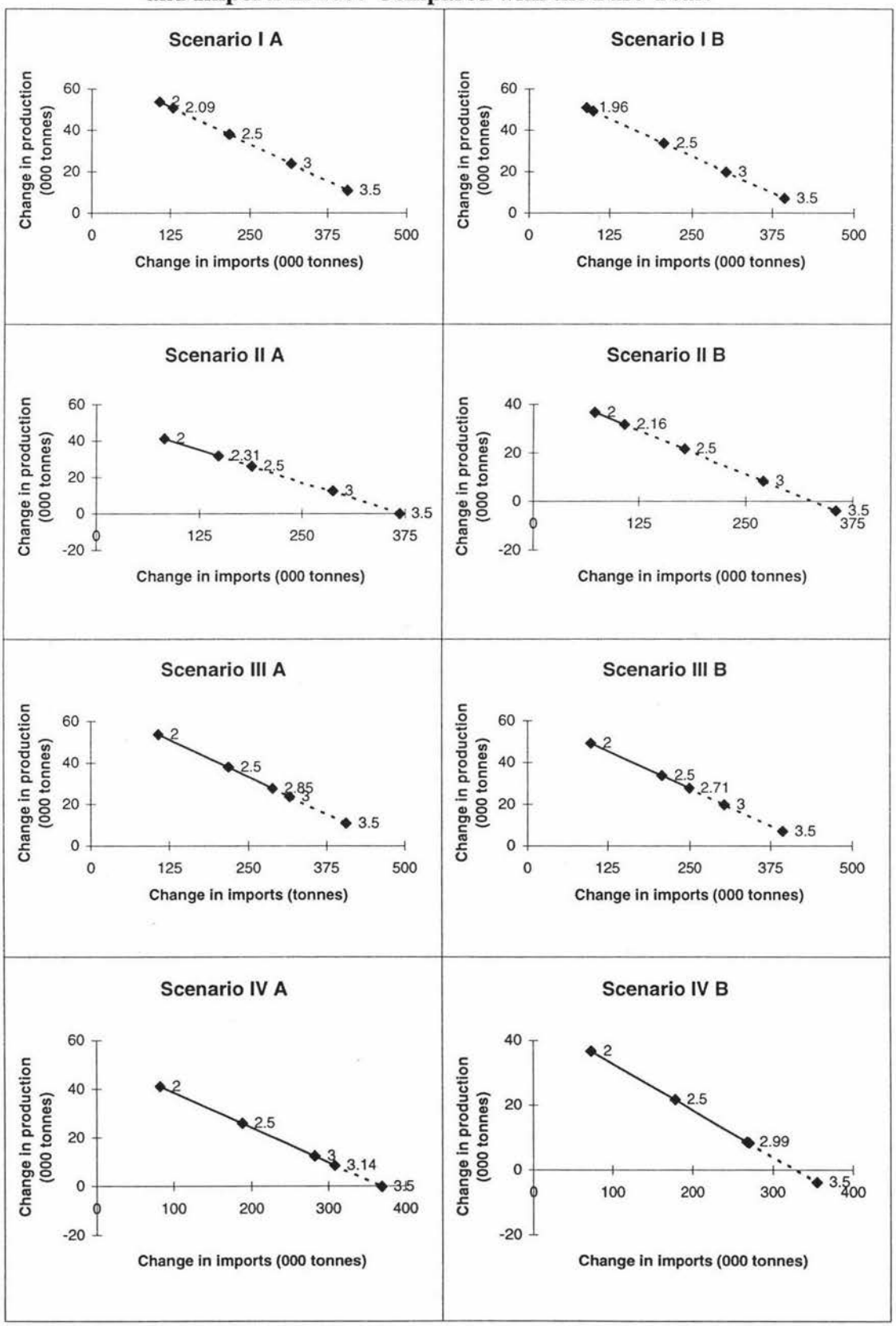
The results of scenario IIA in the year 2005 show that as t increases from 5% to 17% (equivalent to r values between[2] 2.51 - 2), consumption falls from 1,055.4 to 951.1 thousand tonnes as DP increases (see Table 5.1B). At $t = 5\%$, local supply and imports are expected to reach 300.7 and 754.7 thousand tonnes, respectively, while at $t = 17\%$, local supply and imports would be 317 and

[2] Any further expansion of r from that value makes the mixing ratio policy redundant.

634.1 thousand tonnes, respectively. In general, changes in local supply and imports in all 2005 scenarios with tariff equivalents equal to or above 5% are positive compared with the base year (see Figure 5.2B).

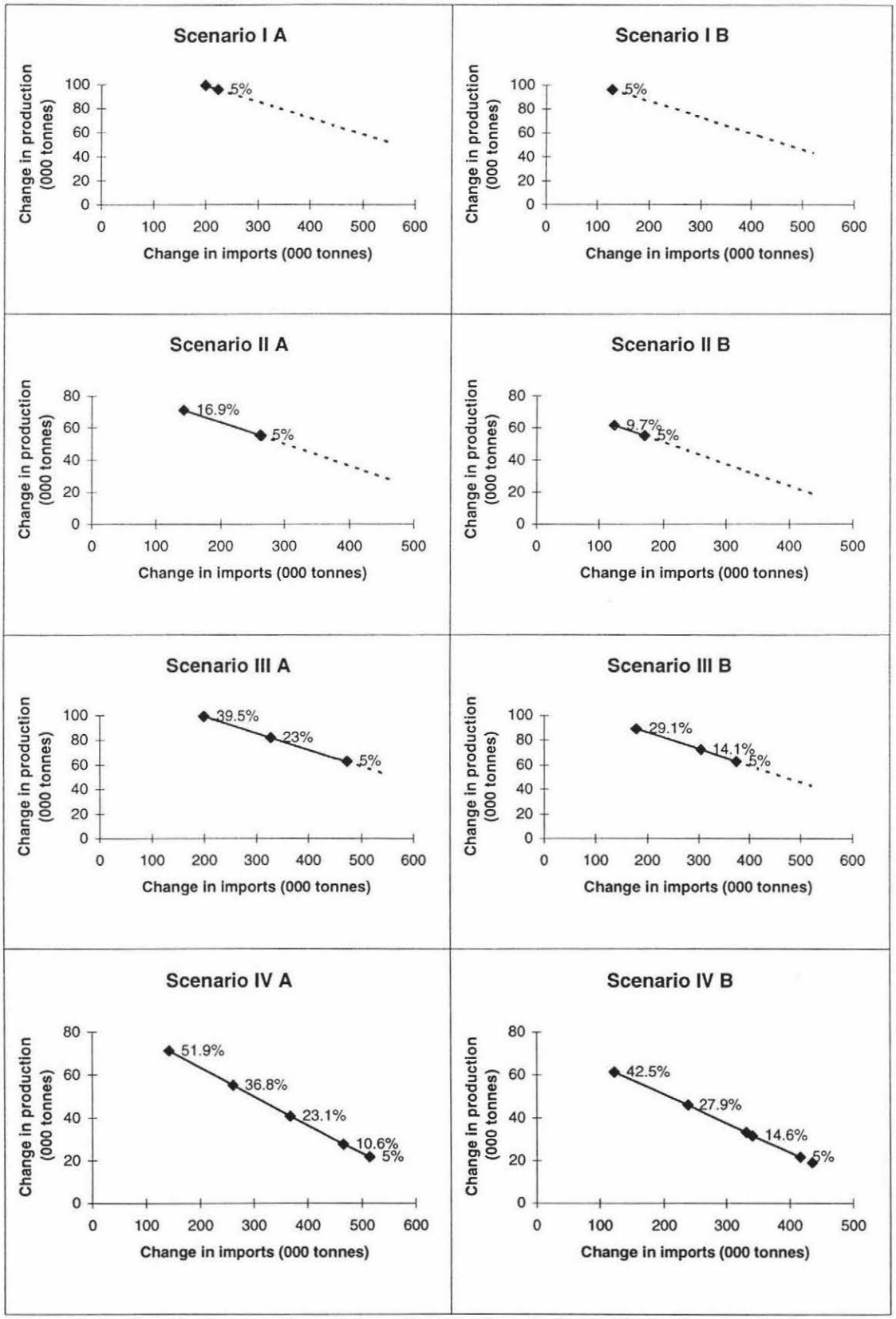
However, such increases in consumption both in 2000 and 2005 would be translated into new opportunities for international exporters of intermediate dairy products as the gap between consumption growth and the growth of local raw milk production seems to widen. Figure 5.2A and 5.2B show the changes in local production and imports compared with the base year. Under all eight scenarios, and considering only values of r (or their equivalent to t) that produce DP above or equal to WPt, changes in the volume of imports vary from a low of 73.4 thousand tonnes to a high of 308.2 thousand tonnes in 2000, and from a low of 123 thousand tonnes to a high of 514.2 thousand tonnes in 2005. Likewise, changes in the volume of production range from 9 to 54 thousand tonnes in 2000, and from 22 to 99.4 thousand tonnes in 2005. Therefore, it is clear from these comparisons that the flows of imported dairy products, particularly intermediate products, are likely to soar following the global agricultural trade reform.

Figure 5.2A. The Estimated Change in Local Raw Milk Production and Imports in 2000 Compared with the Base Year.



Note: - the markers in the graph lines show the mixing ratio operations (*r*)
- the broken lines indicate the value of *r* that produces DP below WPt

Figure 5.2B. The Estimated Change in Local Raw Milk Production and Imports in 2005 Compared with the Base Year.



Note: - the markers in the graph lines show *t* (total tariff equivalent) which reflects level of protection caused by r and the constant 1994 import tariff.

- the broken lines indicate the values of *r* that correspond to tariff equivalents less than 5%.

5.2. Welfare Impacts

One measure of the impact of the global agricultural trade reform resulting from the Uruguay Round Agreement on raw milk producers in Indonesia is the effect on producer revenues. Figures 5.3A and B provide the estimated changes in producer surplus compared with changes in consumer surplus. As shown in that figure, Indonesia's raw milk producers are still likely to enjoy greater welfare following the reform than in the base year. Gains come basically from improved productivity and domestic prices changes induced by the movements of world dairy prices which tend to outweigh the negative revenue impact of reduced import protection.

Table 5.2A. Scenario II A: Welfare Impact in 2000

High PCE growth/ high increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.5	2.82	3	3.5	2.31
NT Tariffied*)	%	31.3	7.2	-4.4	-11.1	-14.8	-24.2	0
Local price	Rp./kg	615	735	659	615	591	529	688
Producer surplus	Rpbillion	113.32	156.86	135.64	123.85	117.54	101.98	143.5
Consumer surplus	Rpbillion	251.82	311.64	380.46	423.55	448.22	514.28	353.72
Government revenues**)	Rpbillion	11.08	18.79	22.24	24.24	25.35	28.15	20.94
quota rents	Rpbillion	69.43	27.17	-19.45	-53.85	-75.07	-136.53	0

Note: *) Total tariff equivalent equals these values plus the 5% import tariff.
**) From the existing 5% import tariff only.

The results of scenario IIA on welfare impacts are presented in Table 5.2A for the year 2000 and Table 5.2B for the year 2005. With the value of *r* between 2 and 2.31 in 2000, producer surplus would reach between Rp 156.9 - 143.5 billion resulting in an increased welfare for local raw milk producers of between Rp 43.6 - 30.2 billion compared with the base year. In 2005, with

tariff equivalent (t) between 5% and 17% (equivalent to r between 2.51 and 2), producer surplus is estimated to reach between Rp 165.4 and 190.7 billion, resulting in increased welfare for local raw milk producers of between Rp 52.05 and 77.33 billion compared with the base year.

For values of r and t that produce DP above or equal to WPt, producer surplus generally increases in the remaining scenarios in 2000 and 2005, even when the domestic price becomes lower than that in the base year (see appendix I for scenarios IIIB and IVA in 2000, and scenarios IIIA, IIIB, IVA, and IVB in 2005). As shown in Figure 5.3A and 5.3B, compared with the base year, gains in producer surplus would vary between Rp 10.4 and 48 billion in 2000 (excluding scenario IVA and IVB) and between Rp 5 and 87 billion in 2005. Only in scenarios IVA and IVB in the year 2000, when productivity is simulated to grow at only 2.2% per annum combined with a 3.2% annual increase in world dairy prices throughout 1994-2000, do the local raw milk producers suffer a small decline in welfare of approximately Rp 0.5 billion at $r = 3.14$ (scenario IVA) and $r = 2.99$ (scenario IVB).

Consumer surplus in scenario IIA in 2000 at $r = 2$ is expected to reach Rp 311.64 billion, while at r = 2.31, consumer surplus increases to around Rp 353.72 billion due to lower prices and higher consumption (see Table 5.2A). Thus, compared to the base year 1994, gains in consumer surplus in 2000 under scenario IIA at $r = 2$ are about Rp 59.82 billion, whereas at $r = 2.31$, gains are around Rp 101.9 billion. In 2005, with the value of t between 5% and 17% (equivalent r between 2.51 and 2), consumer surplus is expected to be between Rp 437.07 and Rp 354.95 billion, which results in greater welfare for milk processors as consumers of between Rp 185.25 and Rp 103.13 billion compared to the base year (see Table 5.2B).

Milk processors as consumers would also become beneficiaries in all remaining scenarios. Figure 5.3A and 5.3B show that under all eight scenarios with the values of r (and their equivalent t values) that produce DP above or equal to WPt, gains in consumer surplus vary between Rp 50.2 and 215.64 billion in 2000, and between Rp 81.2 and 381.6 billion in 2005.

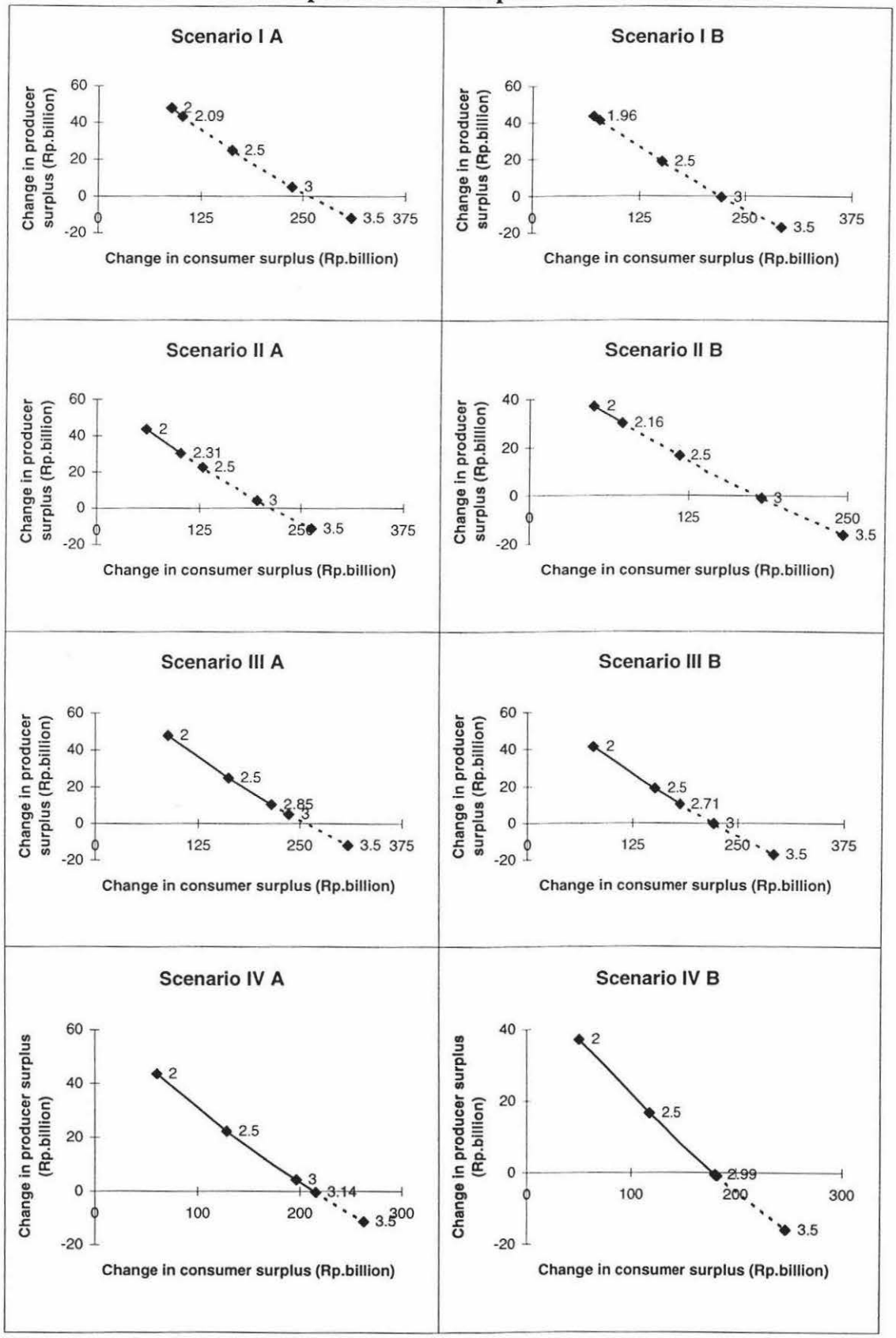
Table 5.2B. Scenario II A: Welfare Impact in 2005

High PCE growth/ high increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.5	3	3.28	3.5	2.51
NT Tariffied*)	%	31.3	11.9	0.2	-10.3	-15.8	-19.9	0
Local price	Rp./kg	615	806	726	653	615	587	724
Producer surplus	Rpbillion	113.32	190.65	165.82	144.50	133.75	126.05	165.37
Consumer surplus	Rpbillion	251.82	354.95	435.47	515.30	559.80	593.61	437.07
Government revenues**)	Rpbillion	11.08	21.86	25.95	29.64	31.57	32.99	26.02
quota rents	Rpbillion	69.43	51.90	1.14	-61.09	-99.89	-131.05	0

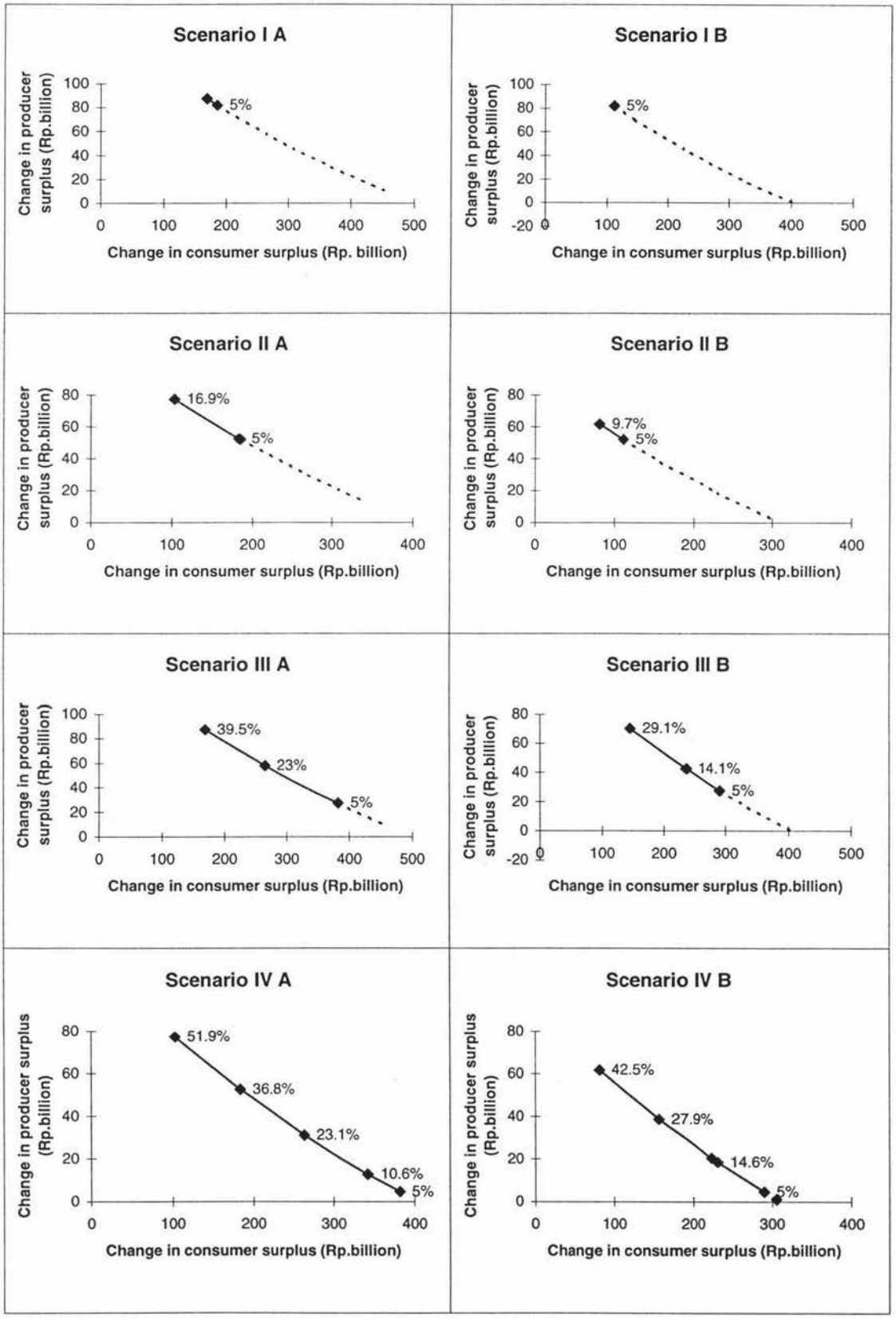
Notes: *) Total tariff equivalent equals these values plus the 5% import tariff.
**) From the existing 5% import tariff only.

Figure 5.3A. Estimated Change in Producer Surplus vis-a-vis Change in Consumer Surplus in 2000 Compared with the Base Year



Note: - the markers in the graph lines show the mixing ratio operations (r)
- the broken lines indicate the value of r that produces DP below WPt

Figure 5.3B. Estimated Change in Producer Surplus vis-a-vis Change in Consumer Surplus in 2005 Compared with the Base Year



Note: - the markers in the graph lines show tariff-only protection (t) which reflects level of protection caused by r plus the constant 1994 import tariff.

- the broken lines indicate the values of r that correspond to tariff equivalents less than 5%.

5.3. Alternative Measures for Gradual Dairy Reform

Quantitative controls such as the mixing ratio policy have been a characteristic feature of the Indonesian dairy trade regime pre-Uruguay Round. As required by the Round's Agreement, the mixing ratio policy will be gradually phased-out through an expansion of the ratio from a level of 1:1.6 over a 10 year implementation period (1995-2005). A tariff quota of 414,700 tonnes (fresh milk-equivalent) was set and within-quota tariffs were bound at 40% but applied rates range between 5%-25%. The outside-quota tariff rates were bound at 238%, reducing to 210% by the beginning of 2005. Over this 10-year period, actual imports are likely to differ from the quota, according to the expanding mixing ratio. From the year 2005, the import of dairy products will be governed by tariff-only protection, which cannot exceed the above bound rates.

Thus, with the gradual removal of the mixing ratio policy, the model in this study indicates that milk processors as consumers would be beneficiaries in all scenarios, while the local raw milk producers are still likely to enjoy greater welfare (compared with 1994) in most scenarios. A small decline in producers' welfare may occur only in the year 2000 at scenario IV with r of 3.14 (scenario IVA) and 2.99 (scenario IVB). However, such high levels of the mixing ratio are unlikely to occur because the local prices generated are estimated to be below the 1994 domestic price level and they are apparently unpopular options in the eyes of government and local raw milk producers.

Considering that the Round's Agreement requires an expansion of r from a level of 1:1.6, and that r was actually set at 2 in 1994, then r is more likely to be set above 2 in 2000 and 2005. As well, any domestic price which is produced by r - or its equivalent t - below the base year is unlikely to be acceptable to the government. Further, it is unlikely that government will impose a tariff of less than 5% in 2005. Currently, the lowest import tariffs in Indonesia are mostly set at 5% (MOF, 1994). Table 5.3 provides the likely

deregulated dairy policy following the global agricultural trade reform as a result of this study. For both years, the upper limit of r is the value that would result in DP = WPt when WPt > 615, or the value that gives DP = 615 (the real domestic price in 1994 was Rp 615/kg).

Table 5.3. The Likely Ranges for the Gradually Deregulated Dairy Policy

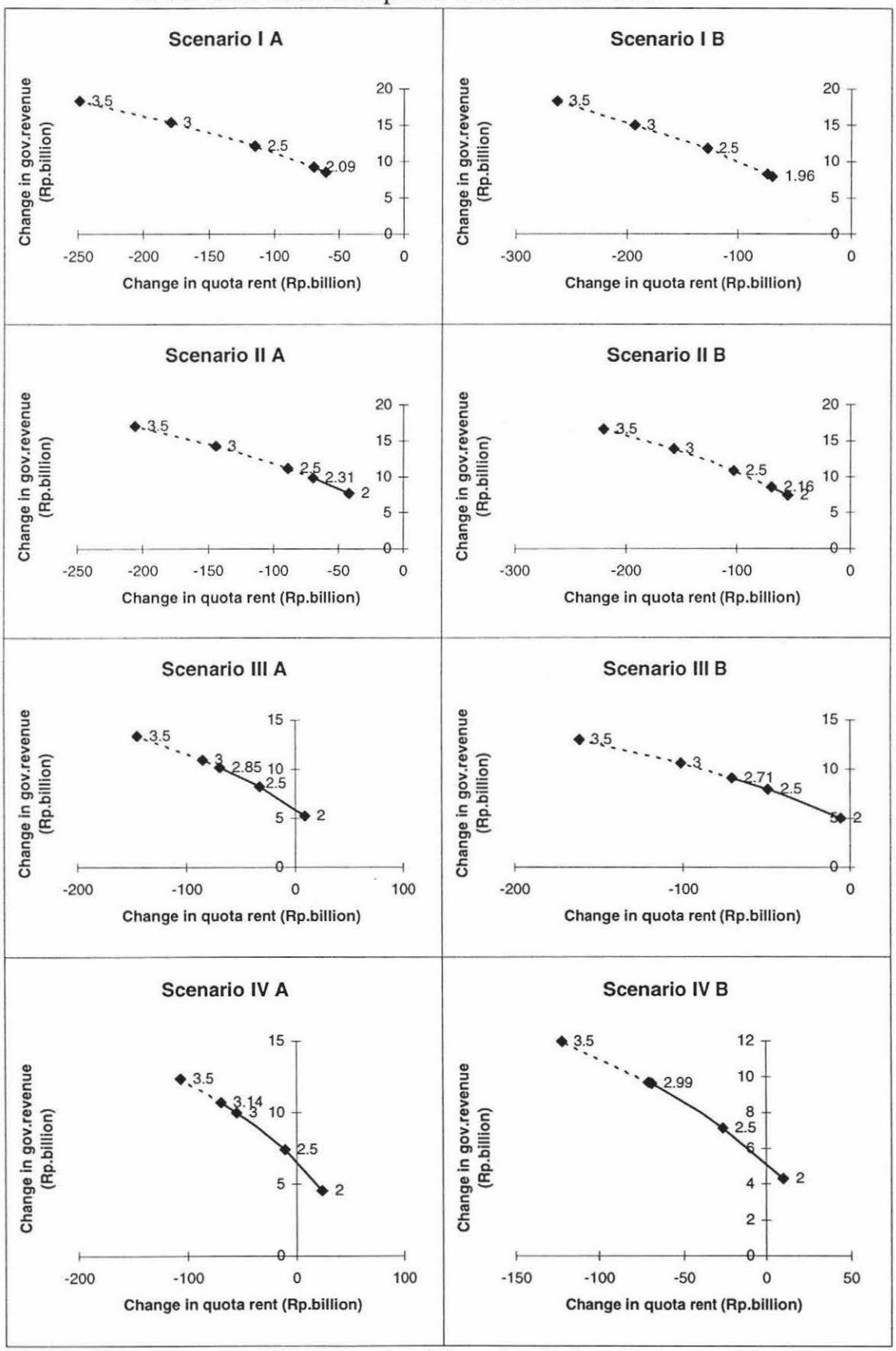
	2000	2005	
Scenario:	Ratio of import	ad-valorem tariff equivalent (%)	equivalent to ratio of import
I A	$2 < r < 2.09$	$5 < t < 7.3$	$2.09 > r > 2$
I B*	$r < 2$	5	$r < 2$
II A	$2 < r < 2.31$	$5 < t < 17$	$2.51 > r > 2$
II B	$2 < r < 2.16$	$5 < t < 10$	$2.2 > r > 2$
III A	$2 < r < 2.56$	$16 < t < 40$	$2.73 > r > 2$
III B	$2 < r < 2.42$	$16 < t < 30$	$2.44 > r > 2$
IV A	$2 < r < 2.82$	$16 < t < 52$	$3.28 > r > 2$
IV B	$2 < r < 2.66$	$16 < t < 42.5$	$2.95 > r > 2$

Note: *under the circumstances of scenario IB in 2000, r appears to be in effective. A low value for r of 2 produce in the model DP below WPt.

As the r ratio increases within the ranges shown in Table 5.3, the quota rents would decline in 2000 compared with the base year (see figure 5.4) and continue downwards to zero at the end of the implementation period in 2005 as a result of tariffication of r.

The results for scenario IIA indicate that quota rents in 2000, shown in Table 5.2A, would be about Rp 27 billion at $r = 2$, while in the base year the rent was Rp 69.4 billion. As simulated in the scenario, an expansion of r from 2 to 2.31 (which produces DP equivalent to WPt) would make the rents in 2000 zero. For some specific scenarios and values of r, quota rents in 2000 are above those of the 1994 base year. As shown in Figure 5.4, by maintaining r at a level of 2 in the year 2000, the rents may possibly increase by Rp 8.9 billion (scenario IIIA), Rp 24 billion (scenario IVA) and Rp 9.9 billion (scenario IVB). This could occur due to the movements of world price, productivity and consumption

Figure 5.4. Changes in Quota Rent vis-a-vis Changes in Government Revenue in the Year 2000 Compared with the Base Year



Note: - the markers in the graph lines show the mixing ratio operations (r)
- the broken lines indicate that the value of r would produce DP below WPt

expenditure. The slower increase in world price coinciding with the slower growth in productivity and the higher increase in consumption expenditure, can combine to actually increase the quota rent.

For all indicated ranges of options for *r*, government revenues collected from import tariffs are expected to increase compared with the base year. Changes in revenues would come basically from increased quantities of imports and changes in world dairy prices.

For instance in scenario IIA, within the indicated range of options for *r* in 2000, government revenues from the 5% tariff would reach between Rp 18.8 and 20.9 billion at *r* values between 2 and 2.31, or higher by Rp 7.7 to 9.9 billion compared with the base year (see Table 5.2A). Meanwhile, within the indicated range of options for *t* in 2005, the revenues would be between Rp.26 and 74 billion at *t* between 5 and 17% or higher by Rp 15 to 63 billion compared with the base year (see Table 5.4).

Table 5.4. Change in Government Revenues in 2005 within the the Likely Ranges for the Gradually Deregulated Dairy Policy

	Government revenues (Rp.billion) from *t* within the indicated range of options in Table 5.3			
Scenario	r - tariffied (indicated by NT tariffied)	The constant 1994 import tariff (5%)	Total Revenues	Change in government revenues compared with the base year
I A	0 - 11	24.6 - 23.8	24.6 - 34.8	13.5 - 23.7
I B	0	21.4	21.4	10.3
II A	0 - 51.9	26 - 21.9	26 - 73.8	14.9 - 62.7
II B	0 - 19.7	22.8 - 21.2	22.8 - 41	11.7 - 29.9
III A	50.6 - 126.2	23.2 - 18.3	73.8 - 144.5	62.7 - 133.4
III B	45.1 - 89.2	20.7 - 17.8	65.8 - 107	54.7 - 95.9
IV A	53 - 157.8	24.3 - 16.8	77.3 - 174.6	66.2 - 163.5
IV B	47.6 - 122.3	21.8 - 16.3	69.4 - 138.6	58.3 - 127.5

With the indicated range of options for r in 2000, the revenues (as seen in Figure 5.4) would generally increase in all scenarios by between Rp 4.3 billion (scenario IVB) and Rp 9.9 billion (scenario IIA) compared with the base year. With the absence of the mixing ratio policy in 2005, the change in government revenue from a low of Rp. 10.3 billion (scenario IB) to a high of Rp. 164 billion (scenario IVA) would be received by the government within the indicated range of options for t in 2005 (see Table 5.4).

Although the indicated range of options for t in 2005 appears to widen, particularly in scenario III and IV (see Table 5.3), the level of t selected for intermediate dairy products for making local wholemilk powder should be assessed carefully bearing in mind that the current ad-valorem import tariff for wholemilk powder is set at 25%. With ad-valorem tariff-only protection, any variation in the world price will be transmitted directly into domestic prices. This leads to the question of whether the Indonesian dairy industry could profitably export locally-produced wholemilk powder after the year 2005. Therefore, further study is needed to investigate the appropriate import tariff for intermediate dairy products such as skim milk powder and anhydrous milk fat in order to make locally-produced wholemilk powder exportable. It can be noted that the maximum tariff-equivalent in Table 5.3, of 42.5%, is still well below the agreed bound tariff rate for 2005 of 210%.

To summarise, the quantitative analysis in this study suggests that global agricultural trade reform resulting from the Uruguay Round, coupled with expected changes in consumption expenditure, population, productivity, and world dairy prices would, over the mid-term of the implementation period, and at the end of the period generally be welfare-improving for local fresh milk producers, milk processors as consumers, and government. As well, these results leave a wide range of mixing ratio and tariff choices for the Indonesian government in mapping out dairy trade reform following its commitments in the Uruguay Round.

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CHAPTER VI

CONCLUSIONS

This study has provided a quantitative assessment of the ability of the Indonesian dairy sector to respond to global agricultural trade reform resulting from the Uruguay Round Agreement.

As required by the Agreement, the Indonesian government is committed to gradually phasing-out the mixing ratio policy over a 10 year implementation period (1995-2005). Over this 10-year period, actual imports are likely to differ from the quota, according to the expanding policy. From 2005, the import of dairy products will be governed by tariff-only protection. To deal with a relaxation and, finally, removal of the policy, the Indonesian government is exploring appropriate policy options.

Using unit value differential and dynamic partial equilibrium analysis, the gradual removal of the mixing ratio operations in the mid-term of the implementation period, *i.e* the year 2000, and at the end of the period, *i.e* the year 2005, was modelled with 1994 as a base. By assessing changes in consumption, production, and trade, as well as prices resulting from the scenarios' simulations over both period, the different welfare effects of the new solutions and the base can be identified and attributed to the likely gradual removal of the mixing ratio policy in 2000 and 2005.

The results of the model clearly showed that the expected increase in the world dairy price due to the results of Uruguay Round would make the Indonesian dairy sector more secure as it prepares to face international competition.

Significant changes in net trade occur under the scenarios modelled. As the Indonesian economy continues to grow, combined with population growth, the gap between consumption growth and the growth of local fresh milk production seems to widen. As a consequence, the flows of imported dairy products, particularly the intermediate ones, are likely to soar. This, coupled with changes in world dairy prices, brings about additional revenues collected by the government from import tariffs.

Even though such increased imports are estimated, Indonesian fresh milk producers are still likely to enjoy greater welfare following the reform than in the base period. Gains come basically from improved productivity and local price changes induced by the movements of the world dairy price. On the other hand, milk processors as consumers would indeed become beneficiaries as well under all scenarios.

This study concludes that the expansion, followed by the removal, of the mixing ratio policy would generally be welfare-improving to local fresh milk producers, milk processors as consumers, as well as government. These results leave a wide range of possible choices for the Indonesian government following her commitments in the Uruguay Round.

The products focused on in this study comprised local fresh milk and its imported substitutes in producing local wholemilk powder. Due to inadequate data on imported wholemilk powder, it proved impossible to include that product in this study. Although the likely range of the options for the 2005 tariff-only protection of intermediate dairy products such as skim milk powder and anhydrous milk fat appears to widen according to this study, these options should be assessed carefully bearing in mind that the current import tariff for whole milk powder is set at 25%. Also, with ad-valorem tariff-only protection, any variation in the world price will be transmitted directly into domestic price formation, leading to the question of whether the Indonesian dairy industry

could profitably export after the year 2005. Therefore, further study is needed to investigate the appropriate import tariff for intermediate dairy products such as skim milk powder and anhydrous milk fat in order to make locally-produced wholemilk powder exportable.

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REFERENCES

ABARE. (1990). *Proposed strategy for reducing agricultural protection in the GATT Uruguay Round.* Canberra: author.

ADB. (1995). *Key indicators of developing Asian and Pacific countries.* Manila: Oxford university press.

ADC. (1993). *Dairy compendium.* Glen Iris: author

ADC. (1995). *Dairy compendium.* Glen Iris: author

ADC. (1993). *Dairy market briefing, Part I: Asia.* Melbourne: Mimeo.

Alston, J.W., Edwards, G.W., & Freebarin, J.W. (1988). *Market distortions and benefits from research.* American Journal of Agricultural Economics, 70 (2).

Anderson, K. (1996). *Agricultural policy reform under the Uruguay Round: impact on Asian-Pacific developing countries.* Adelaide: CIES.

Anderson, K. (1995). *World trade developments from an East Asian perspective.* In Anson, G (ed) (1995). *China and East Asia trade policy.* Canberra: Australia-Japan Research Centre.

Anderson, K. & Tyers, R. (1990). *How developing countries could gain from agricultural trade liberalisation in the Uruguay Round.* In Goldin, I. & Knudsen,O.(eds.) (1990), *Agricultural trade liberalisation: implications for developing countries.* Paris: OECD/The World Bank.

Andrews, N., Roberts, I., & Hester, S. (1994). *The Uruguay Round outcome: implications for agricultural and resource commodities.* Canberra: ABARE

Bank Indonesia (1996). *Laporan bulan Juni.* Jakarta: author

Bappenas. (1990). *Dairy and milk industry study.* Jakarta: author.

Barichello, R.R. (1987). *Creative import control: the case of milk in Indonesia*. Invited paper, Australian agricultural economic society, University of Adelaide.

Brandao, A. S. P. & Martin, W. J. (1993). *Implications of agricultural trade liberalisation for developing countries*. Agricultural Economics, 8, 313-343.

Cahill, C. (1995). *OECD agriculture after Uruguay*. The OECD Observer, 196, 32-37.

Carson, C. (1994). *Agricultural commitments: Indonesia*. Unpublished paper, BULOG/ Ministry of Agriculture/ Ministry of Trade, Jakarta.

Central Bureau of Statistics (BPS). (1996). *Population, and national and regional income statistical tables*. Internet: author.

Central Bureau of Statistics (BPS). (1994). *Import statistics*. Jakarta: author

Central Bureau of Statistics (BPS). (1993). *Consumption of calorie and protein of Indonesia and Province*. Jakarta-author.

Central Bureau of Statistics (BPS). (1990). *Consumption of calorie and protein of Indonesia and Province*. Jakarta-author.

CIC Consulting Group. (1991). *Studi tentang industri dan pemasaran susu di Indonesia*. Jakarta: P.T Corinthian Infopharma Corpora.

Departemen Keuangan (MOF). (1994). *Buku tariff impor*. Jakarta: author

Departemen Penerangan (MOI). (1992). *Rencana Pembangunan Lima Tahun ke Enam*. Jakarta: author.

Departemen Perdagangan (MOT). (1994). *Laporan delegasi Republik Indonesia pada sidang Trade Policy Review Mechanism - GATT untuk Indonesia tanggal 29-30 Nopember 1994 di Jenewa*. Unpublished report, Jakarta.

Departemen Perdagangan (MOT). (1991). *Buku petunjuk perdagangan*. Jakarta: author.

Departemen Pertanian (MOA). (1995). *Laporan sub-sektor Peternakan.* Jakarta: author.

Directorate General of Livestock (DGL)-MOA.(1995). *Indonesia's dairy supply and demand: dairy consolidation programme.* Jakarta-author.

Erwidodo, & Hasan, F. (1993). *Indonesian dairy industry.* Jakarta:CPIS

Evans, P. & Walsh, J. (1994). *The EIU guide to the new GATT.* Research report, The Economist Intelligence Unit, United Kingdom.

FAO (1994).*Uruguay Round Agreement: a preliminary assessment.* Roma: author.

FAO. (1995). *The state of food and agriculture.* Roma: author.

GATT. (1990). *GATT: What it is and what it does.* Geneva: author.

GATT. (1993). *Modalities paper.* Geneva: author

GKSI (1996). *GKSI profile.* Jakarta: author

GKSI. (1990*). The growth and development of the Indonesian dairy cooperatives.* Jakarta: author.

Goldin, I. & Knudsen, O. (eds.) (1990). *Agricultural trade liberalisation: implications for developing countries.* Paris: OECD/ the World Bank.

Goldin, I., Knudsen, O., & van der Mensbrugghe, D. (1993). *Trade liberalisation: global economic implications.* Paris: OECD/ the World Bank.

Hakim, D.B. (1994). *Household food expenditures patterns in Urban Java-Indonesia.* Unpublished Master's thesis, Massey University, Palmerston North.

Hirshleifer, J. (1976). *Price theory and applications*. New Jersey:Prentice-hall.

Hufbauer, G.C. (1989).*The free trade debate: report of the 20th centuryfund task force on the future of American trade policy*. New York: Priority press publications.

Kasryno, R., Simatupang, P., Rusastra, I.W., Djatiharti, A., Irawan, B. (1989). *Government incentives and comparative advantage in the livestock and feedstuff sub-sectors in Indonesia*. Bogor: CAER.

Lipsey, R.G. (1983). *An introduction to positive economics*. London: Weidefield & Nicholson.

Magiera, S. (1989). *Indonesia and the agricultural negotiations of the Uruguay Round*. Unpublished paper, Ministry of Agriculture, Jakarta.

Martin, W. & Winters, L. A. (1995). *The Uruguay Round: widening and deepening the world trading system*. Washington: the World Bank.

Miller, G. (1988). *Agriculture in the Uruguay Round and developing countries*. Bulletin of peasce proposals, 1, 57-65.

Moreddu, C., Parris, K.,& Huff, B. (1990). *Agricultural policies in developing countries and agricultural trade*. In Goldin, I. & Knudsen, O. (Eds), *Agricultural trade liberalisation: implications for developing countries.* Paris: OECD/the World Bank.

OECD (1996). *The Agricultural outlook: trends and issues to 2000*. Paris: author

OECD (1995). *The Uruguay Round: a preliminary evaluation of the impacts of the agreement on agriculture in the OECD countries*. Paris: author.

OECD (1987). *National policies and agricultural trade*. Paris: author

OECD. (1982). *Problems of agricultural trade*. Paris: author

Oxley, A. (1990). *The challenge of free trade*. London: Harvester Wheat sheaf.

Rae, A.N. & Nixon, C. (1994). *Agricultural trade reform: the GATT outcome*. Wellington: NZIER.

Rae, A.N.(1995). *East Asian food consumption patterns: projections for animal products*. Palmerston North: Massey University.

Rae, A.N. (1995). *Implications of the Uruguay Round Agreement for Pacific islands countries*. Palmerston North: Massey University.

Raghavan, C. (1990). *Recolonisation GATT, the Uruguay Round, & the third world*. London: Zed Books, Ltd.

Remenyi, J.V. (1986). *Issues in smallholder tropical dairying*. Bulletin of Indonesian Economic Studies, 22 (1), 57-87.

Ruttan, V.W. (1982). Agricultural research policy. Minneapolis: University of Minnesota press.

Sadoulet, E., & de Janvry, A. (1990). *Growth and welfare effects of a GATT Agreement in agriculture on the low income countries: an integrated multimarket general equilibrium analysis*. In Goldin, I. & Knudsen, O. (Eds), *Agricultural trade liberalisation: implications for developing countries.* Paris: OECD/the World Bank.

Sazanami, Y., Urata, S., & Kawai, H. (1995). *Measuring the costs of protection in Japan*. Washington D.C.: Institute for International Economics.

Shaffer, C. E (1994). *State trading enterprises*. Unpublished paper, BULOG/ Ministry of Agriculture/Ministry of Trade, Jakarta.

Septiani, R.A (1988). *Analisa biaya sumber daya domestik (BSD) usaha menghasilkan bahan baku susu bubuk dalam negeri*. Unpublished thesis, Institut Pertanian Bogor, Indonesia.

Smith, D., & Riethmuller, P. (1995). *Dairy policy in Indonesia.* Adelaide: University of Queensland.

Soewardi, B. (1986). *Dairy development in Indonesia.* Extension Bulletin # 237. Food and Fertiliser Technology Center, Taipei.

Staff. (1990, September 22). *Nothing to lose but its chains.* The economist. After p. 66.

Taryoto, A.H, Rachman, B., & Sunarsih (1993). *Analisis perbandingan kelembagaan pada usaha tani susu sapi perah di Jawa Barat dan Jawa Timur.* Bogor: PPSEP, Balitbang - MOA.

UNCTAD/UNDP, & Wider (1990). *Agricultural trade liberalization in the Uruguay Round: implications for developing countries.* New York: UN.

Verheijen, Broekmans, & Zwanenberg (1994). *The world dairy industry: development and strategy.* Amsterdam: Agribusiness research.

World Bank (1994). *Indonesia stability, growth, and equity in Repelita VI.* Washington: author.

World Bank. (1992). *Indonesia, agricultural transformation: challenges and opportunities* (volume:II). Washington: author.

Zietz, J. & Valdes, A. (1988). *Agriculture in the GATT: an analysis of alternative approaches to reform* (Report No. 70). International Food Policy Research Institute.

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APPENDIX I

Scenario: I A

High PCE growth/ high increase in world dairy price/high productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.5	2.56	3	3.5	2.09
NT Tariffied	%	31.3	2.3	-9.8	-11.1	-20.7	-30.5	0
Local price	Rp./kg	615	703	624	615	552	488	688
consumption	000 tons	737.025	898.44	992.7	1,003.1	1,077.5	1,154.2	916.65
local supply	000 tons	245.675	299.48	283.6	281.9	269.4	256.5	296.42
import	000 tons	491.350	598.96	709.1	721.2	808.1	897.7	620.23
Welfare effects:								
Producer surplus	Rpbillion	113.32	161.19	138.05	135.59	118.32	101.34	156.62
Consumer surplus	Rpbillion	251.82	339.81	414.85	423.55	488.74	560.76	353.72
Government revenues	Rpbillion	11.08	19.62	23.22	23.62	26.47	29.4	20.31
quota rents	Rpbillion	69.43	9.18	-45.4	-52.47	-109.43	-179.5	0
Remarks								

Scenario: I A

High PCE growth/ high increase in world dairy price/high productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.5	2.73	3	3.5	2.09
NT Tariffied	%	31.3	2.3	-10.4	-15.8	-21.8	-32.2	0
Local price	Rp./kg	615	740	653	615	574	502	724
consumption	000 tons	737.025	1,035.2	1,146.6	1,194.4	1247.26	1338.7	1,055.4
local supply	000 tons	245.675	345.1	327.6	320.1	311.82	297.5	341.9
import	000 tons	491.350	690.1	819	874.3	935.45	1041.2	713.5
Welfare effects:								
Producer surplus	Rpbillion	113.32	200.65	171.25	159.09	145.99	124.13	195.20
Consumer surplus	Rpbillion	251.82	420.47	515.85	559.80	610.41	703.18	437.07
Government revenues	Rpbillion	11.08	23.80	28.24	30.15	32.26	35.90	24.60
quota rents	Rpbillion	69.43	10.96	-58.60	-95.39	-140.84	-231.47	0
Remarks								

Scenario: I B

Low PCE growth/ high increase in world dairy price/high productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.42	2.5	3	3.5	1.96
NT Tariffied	%	31.3	-1.1	-11.1	-13	-23.7	-33.5	0
Local price	Rp./kg	615	681	615	603	532	469	688
consumption	000 tons	737.025	885	963.1	977.9	1,061.41	1,136.93	876.68
local supply	000 tons	245.675	295	281.9	279.4	265.35	252.65	296.42
import	000 tons	491.350	590	681.2	698.5	796.06	884.28	580.26
Welfare effects:								
Producer surplus	Rpbillion	113.32	154.54	135.59	132.09	112.94	96.47	156.62
Consumer surplus	Rpbillion	251.82	329.74	390.47	402.56	474.26	544.16	323.54
Government revenues	Rpbillion	11.08	19.32	22.31	22.88	26.07	28.96	19
quota rents	Rpbillion	69.43	-4.15	-49.56	-59.52	-123.81	-193.77	0
Remarks								

Scenario: I B

Low PCE growth/ high increase in world dairy price/high productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.44	2.5	3	3.5	1.81
NT Tariffied	%	31.3	-4.9	-15.8	-17.2	-28.3	-38.5	0
Local price	Rp./kg	615	690	615	605	529	459	724
consumption	000 tons	737.025	1,005.4	1,101.3	1,113.6	1211.36	1300.15	962.25
local supply	000 tons	245.675	335.1	320.1	318.2	302.84	288.92	341.89
import	000 tons	491.350	670.3	781.2	795.4	908.52	1,011.23	620.36
Welfare effects:								
Producer surplus	Rpbillion	113.32	183.74	159.09	156.00	132.18	111.56	195.20
Consumer surplus	Rpbillion	251.82	396.62	475.88	486.58	575.78	663.28	363.32
Government revenues	Rpbillion	11.08	23.11	26.94	27.43	31.33	34.87	21.39
quota rents	Rpbillion	69.43	-22.69	-85.23	-94.47	-177.61	-268.15	0
Remarks								

Scenario : II A

High PCE growth/ high increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.5	2.82	3	3.5	2.31
NT Tariffied	%	31.3	7.2	-4.4	-11.1	-14.8	-24.2	0
Local price	Rp./kg	615	735	659	615	591	529	688
consumption	000 tons	737.025	860.4	950.66	1,003.06	1,031.86	1,105.28	916.65
local supply	000 tons	245.675	286.8	271.62	262.81	257.97	245.62	277.34
import	000 tons	491.350	573.6	679.04	740.25	773.89	859.66	639.31
Welfare effects:								
Producer surplus	Rpbillion	113.32	156.86	135.64	123.85	117.54	101.98	143.5
Consumer surplus	Rpbillion	251.82	311.64	380.46	423.55	448.22	514.28	353.72
Government revenues	Rpbillion	11.08	18.79	22.24	24.24	25.35	28.15	20.94
quota rents	Rpbillion	69.43	27.17	-19.45	-53.85	-75.07	-136.53	0
Remarks								

Scenario : II A

High PCE growth/ high increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.5	3	3.28	3.5	2.51
NT Tariffied	%	31.3	11.9	0.2	-10.3	-15.8	-19.9	0
Local price	Rp./kg	615	806	726	653	615	587	724
consumption	000 tons	737.025	951.1	1,053.5	1,146.0	1,194.4	1,229.97	1,055.4
local supply	000 tons	245.675	317.0	301.0	286.5	278.9	273.33	300.7
import	000 tons	491.350	634.1	752.5	859.5	915.5	956.64	754.7
Welfare effects:								
Producer surplus	Rpbillion	113.32	190.65	165.82	144.50	133.75	126.05	165.37
Consumer surplus	Rpbillion	251.82	354.95	435.47	515.30	559.80	593.61	437.07
Government revenues	Rpbillion	11.08	21.86	25.95	29.64	31.57	32.99	26.02
quota rents	Rpbillion	69.43	51.90	1.14	-61.09	-99.89	-131.05	0
Remarks								

Scenario: II B

Low PCE growth/ high increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.5	2.66	3	3.5	2.16
NT Tariffied	%	31.3	3.8	-7.6	-11.1	-17.9	-27.2	0
Local price	Rp./kg	615	713	638	615	571	510	688
consumption	000 tons	737.025	847	935.9	963.1	1,015.78	1,088.1	876.68
local supply	000 tons	245.675	282.3	267.4	262.8	253.95	241.8	277.34
import	000 tons	491.350	564.7	668.5	700.3	761.83	846.3	599.34
Welfare effects:								
Producer surplus	Rpbillion	113.32	150.50	129.93	123.85	112.39	97.31	143.5
Consumer surplus	Rpbillion	251.82	302.00	368.70	390.47	434.37	498.38	323.54
Government revenues	Rpbillion	11.08	18.5	21.9	22.93	24.95	27.72	19.63
quota rents	Rpbillion	69.43	14.11	-33.31	-50.95	-89.23	-150.61	0
Remarks								

Scenario: II B

Low PCE growth/ high increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.5	2.95	3	3.5	2.20
NT Tariffied	%	31.3	4.7	-6.6	-15.8	-16.8	-26.1	0
Local price	Rp./kg	615	756	678	615	608	544	724
consumption	000 tons	737.025	921.3	1,020.5	1,101.3	1,110.1	1,191.44	962.25
local supply	000 tons	245.675	307.1	291.6	278.9	277.5	264.77	300.69
import	000 tons	491.350	614.2	728.9	822.4	832.6	926.67	661.56
Welfare effects:								
Producer surplus	Rpbillion	113.32	175.13	151.84	133.75	131.83	114.52	165.37
Consumer surplus	Rpbillion	251.82	333.06	408.61	475.88	483.52	557.00	363.31
Government revenues	Rpbillion	11.08	21.18	25.13	28.36	28.71	31.95	22.81
quota rents	Rpbillion	69.43	19.73	-33.30	-89.72	-96.58	-166.67	0
Remarks								

Scenario : III A

High PCE growth/ low increase in world dairy price/high productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.5	2.56	3	3.5	2.85
NT Tariffied	%	31.3	24	9.4	7.8	-3.7	-15.5	0
Local price	Rp./kg	615	703	624	615	552	488	572
consumption	000 tons	737.025	898.44	992.7	1,003.06	1,077.48	1,154.15	1053.77
local supply	000 tons	245.675	299.48	283.63	281.89	269.37	256.48	273.36
import	000 tons	491.350	598.96	709.07	721.17	808.11	897.67	780.41
Welfare effects:								
Producer surplus	Rpbillion	113.32	161.19	138.05	135.59	118.32	101.34	123.73
Consumer surplus	Rpbillion	251.82	339.81	414.85	423.55	488.74	560.77	467.46
Government revenues	Rpbillion	11.08	16.32	19.32	19.65	22.02	24.46	21.27
quota rents	Rpbillion	69.43	78.33	36.46	30.8	-16.13	-75.87	0
Remarks								

Scenario : III A

High PCE growth/ low increase in world dairy price/high productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.5	2.73	3	3.5	3.13
NT Tariffied	%	31.3	34.5	18	10.9	3.1	-10.4	0
Local price	Rp./kg	615	740	653	615	574	502	557
consumption	000 tons	737.025	1,035.2	1,146.6	1,194.4	1,247.26	1,338.7	1272.8
local supply	000 tons	245.675	345.1	327.6	320.1	311.82	297.5	308.5
import	000 tons	491.350	690.1	819.0	874.3	935.44	1041.2	964.3
Welfare effects:								
Producer surplus	Rpbillion	113.32	200.65	171.25	159.09	145.99	124.13	140.90
Consumer surplus	Rpbillion	251.82	420.47	515.85	559.80	610.41	703.18	633.38
Government revenues	Rpbillion	11.08	18.31	21.73	23.20	24.82	27.62	25.58
quota rents	Rpbillion	69.43	126.18	78.14	50.60	15.35	-57,62	0
Remarks								

Scenario: III B

Low PCE growth/ low increase in world dairy price/high productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.42	2.5	3	3.5	2.71
NT Tariffied	%	31.3	19.9	7.8	5.5	-7.4	-19	0
Local price	Rp./kg	615	681	615	603	532	469	572
consumption	000 tons	737.025	885	963.1	977.9	1,061.41	1,136.93	1,013.8
local supply	000 tons	245.675	295	281.9	279.4	265.35	252.65	273.4
import	000 tons	491.350	590	681.2	698.5	796.06	884.28	740.4
Welfare effects:								
Producer surplus	Rpbillion	113.32	154.54	135.59	132.09	112.94	96.47	123.73
Consumer surplus	Rpbillion	251.82	329.74	390.47	402.56	474.26	544.16	432.67
Government revenues	Rpbillion	11.08	16.08	18.56	19.04	21.69	24.1	20.18
quota rents	Rpbillion	69.43	63.97	29.09	21.12	-31.91	-91.67	0
Remarks								

Scenario: III B

Low PCE growth/ low increase in world dairy price/high productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.44	2.5	3	3.5	2.81
NT Tariffied	%	31.3	25.1	10.9	9.1	-5.4	-18.5	0
Local price	Rp./kg	615	690	615	605	529	459	557
consumption	000 tons	737.025	1,005.4	1,101.3	1,113.6	1,211.36	1,300.15	1,175.0
local supply	000 tons	245.675	335.1	320.1	318.2	302.84	288.92	308.5
import	000 tons	491.350	670.3	781.2	795.4	908.52	1,011.23	866.5
Welfare effects:								
Producer surplus	Rpbillion	113.32	183.74	159.09	156.00	132.18	111.56	140.90
Consumer surplus	Rpbillion	251.82	396.62	475.88	486.58	575.78	663.28	541.75
Government revenues	Rpbillion	11.08	17.78	20.73	21.10	24.10	26.83	22.99
quota rents	Rpbillion	69.43	89.23	45.06	38.35	-25.92	-99.31	0
Remarks								

Scenario : IV A

High PCE growth/ low increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.5	2.82	3	3.5	3.14
NT Tariffied	%	31.3	29.9	15.9	7.8	3.4	-8	0
Local price	Rp./kg	615	735	659	615	591	529	572
consumption	000 tons	737.025	860.4	950.664	1,003.06	1,031.858	1,105.28	1,053.8
local supply	000 tons	245.675	286.8	271.618	262.81	257.965	245.62	254.3
import	000 tons	491.350	573.6	679.046	740.25	773.893	859.66	799.5
Welfare effects:								
Producer surplus	Rpbillion	113.32	156.86	135.64	123.85	117.54	101.98	112.81
Consumer surplus	Rpbillion	251.82	311.64	380.46	423.55	448.22	514.28	467.46
Government revenues	Rpbillion	11.08	15.63	18.51	20.17	21.09	23.43	21.79
quota rents	Rpbillion	69.43	93.39	58.95	31.61	14.28	-37.28	0
Remarks								

Scenario : IV A

High PCE growth/ low increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.5	3	3.28	3.5	3.76
NT Tariffied	%	31.3	46.9	31.8	18.1	10.9	5.6	0
Local price	Rp./kg	615	806	726	653	615	587	557
consumption	000 tons	737.025	951.1	1,053.5	1,146	1,194.4	1,229.97	1,272.8
local supply	000 tons	245.675	317	301	286.5	278.9	273.33	267.3
import	000 tons	491.350	634.1	752.5	859.5	915.5	956.64	1,005.5
Welfare effects:								
Producer surplus	Rpbillion	113.32	190.65	165.82	144.50	133.75	126.05	117.99
Consumer surplus	Rpbillion	251.82	354.95	435.47	515.30	559.80	593.61	633.37
Government revenues	Rpbillion	11.08	16.82	19.96	22.80	24.29	25.38	26.68
quota rents	Rpbillion	69.43	157.77	126.78	82.42	52.98	28.68	0
Remarks								

Scenario: IV B

Low PCE growth/ low increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2000					Mixing ratio=WPt in 2000
Mixing ratio	ratio to import	2	2	2.5	2.66	3	3.5	2.99
NT Tariffied	%	31.3	25.8	12	7.8	-0.3	-11.5	0
Local price	Rp./kg	615	713	638	615	571	510	572
consumption	000 tons	737.025	847	935.9	963.1	1,015. 79	1,088.1	1,013.8
local supply	000 tons	245.675	282.3	267.4	262.8	253.95	241.8	254.3
import	000 tons	491.350	564.7	668.5	700.3	761.84	846.3	759.5
Welfare effects:								
Producer surplus	Rpbillion	113.32	150.50	129.93	123.85	112.39	97.31	112.81
Consumer surplus	Rpbillion	251.82	302.00	368.70	390.47	434.37	498.38	432.67
Government revenues	Rpbillion	11.08	15.39	18.22	19.08	20.76	23.06	20.7
quota rents	Rpbillion	69.43	79.3	43.87	29.9	-1.27	-52.91	0
Remarks								

Scenario: IV B

Low CPE growth/ low increase in world dairy price/low productivity growth

Items	Unit	1994 base level	2005					Mixing ratio=WPt in 2005
Mixing ratio	ratio to import	2	2	2.5	2.95	3	3.5	3.4
NT Tariffied	%	31.3	37.5	22.9	10.9	9.6	-2.4	0
Local price	Rp./kg	615	756	678	615	608	544	557
consumption	000 tons	737.025	921.3	1,020	1,101.3	1,110.1	1,191,438	1,175
local supply	000 tons	245.675	307.1	291.6	278.9	277.5	264.764	267.3
import	000 tons	491.350	614.2	728.9	822.4	832.6	926.674	907.7
Welfare effects:								
Producer surplus	Rpbillion	113.32	175.13	151.84	133.75	131.83	114.52	117.94
Consumer surplus	Rpbillion	251.82	333.06	408.61	475.88	483.52	557.00	541.75
Government revenues	Rpbillion	11.08	16.30	19.34	21.82	22.09	24.58	24.08
quota rents	Rpbillion	69.43	122.29	88.40	47.59	42.43	-11.95	0
Remarks								