Australia Indonesia Partnership

for Economic Governance

Non-Tariff Trade Regulations in Indonesia: Measurement of their Economic Impact

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Contents

Executive Summary

This report assesses the economic impact of a wide range of trade and related policies in Indonesia as of early to mid-2015. The focus is on non-tariff measures (NTMs) that impede trade.

Such measures have proliferated in Indonesia in recent years. Out of 10,025 total tariff lines, the number of tariff lines subject to NTMs on the import side grew from 3,714 in 2009 to 5,138 in 2015. Many of these tariff lines were subject to multiple regulations, as the number of NTMs grew from 6,537 to 12,863. On the export side, the number of tariff lines subject to NTMs grew from 386 in 2009 to 954 in 2014, while the number of NTMs grew from 485 to 1,782.

This study first measures the nominal rates of protection (NRPs) associated with many of these NTMs. It then incorporates these measurements into a comprehensive analysis of effective rates of protection (ERPs) in 140 tradable goods sectors of the Indonesian economy.

Measurement of the Effects of NTMs

The NTMs with the greatest potential to distort market conditions are quantitative restrictions on exports and imports—including quotas (on wheat flour imports), bans (such as on exports of unprocessed or semi-processed mineral products and rattan), and mandatory licensing (for sugar, rice, alcoholic beverages, fresh and processed fruits and vegetables, livestock and livestock products, basic steel products, cellular telephones, and tablet computers, among others).

Also included among NTMs are procedures that impose additional costs on importers or exporters—such as pre-shipment inspections and port restrictions for imports of certain products (*produk tertentu*), which include processed foods and beverages, personal care products, traditional medicines, virtually all apparel and other finished textile products, footwear, many household electrical appliances, consumer electronics products, and children's toys. A requirement that exporters of many resource-based products finance their exports through letters of credit imposes a similar type of burden.

Given the extensive coverage of some of the regulations, detailed examination of all covered commodities was not possible. My focus was on regulations with evident economic objectives, and not so much on regulations based in national security or health concerns—such as restrictions on imports of weapons or narcotics.

Non-tariff measures in general are not transparent, and require special methods of analysis to measure their effects. This study uses four different methods to estimate NRPs, which indicate the percentage by which policies raise the producer price inside the country relative to the border price.

Difference of Differences in Prices Over Time and between Countries

An ideal approach is to look at the difference between a domestic price in Indonesia and an external price during a period in which a policy was applied in Indonesia versus a period in which trade was unimpeded. Data limitations allow this approach to be used to estimate NRPs for only four imported commodities—beef (17.2 percent), chicken meat (29.7 percent), shallots (red onions, 61.9 percent), and wheat flour (22.0 percent).

Retail Price Comparisons at a Point in Time

For many other consumer products, and a few construction materials, comparisons of retail prices of identical products in Jakarta and Singapore were conducted by our team in early 2015. Singapore has zero import tariffs on almost all items, and is relatively free of non-tariff trade regulations. Given differences in price levels and distribution margins between the two cities, I adjusted these comparisons by looking at the prices of regulated commodities relative to prices of certain commodities that were mostly unregulated in Indonesia. The comparators used for the adjustments—Xiang Lie pears for non-durables and semi-durables (22.2 percent less expensive in Jakarta), and monochrome laser printers for durables (11.5 percent less expensive in Jakarta)—were conservative and could easily lead to understatement of NRPs for other commodities. I also adjust as necessary for commodity taxes in Indonesia and Singapore.

Among the regulated commodities for which NRPs were estimated on this basis are yoghurt (18.8 percent), butter (4.4 percent), cheese (6.9 percent), honey (33.4 percent), carrots (67.3 percent), lemons (23.6 percent); grapes (17.8 percent), apples (24.6 percent), sausages (26.9 percent), chocolate candies (28.2 percent), malt products (7.3 percent), tomato paste (21.4 percent), tomato juice (79.5 percent), soy sauce (26.1 percent), still mineral water (6.3 percent), sparkling mineral water (39.5 percent), washing machines (13.8 percent), laptop computers (16.2 percent), food processors, blenders, and juicers (21.3 percent), hair dryers (43.6 percent), clothes irons (5.0 percent), microwave ovens (27.2 percent), toaster ovens (16.9 percent), instant household water heaters (112.8 percent), television receivers (19.3 percent), DVD and Blu-Ray players (8.7 percent), optical media (31.2 percent), color inkjet printers (11.0 percent), color laser printers (6.9 percent), top-end video game consoles and equipment (22.4 percent), and various other toys and games (18.2 percent). Smartphones (49.0 percent) and tablet computers (63.7 percent), subject to strict import restrictions in Indonesia, exhibited among the most consistent patterns of price differentials.

I was also able to conduct retail price comparisons for four construction products. Given that these products are largely sold in bulk transactions, I omitted the adjustment for distribution margins for these products, and corrected only for commodity tax differences between Indonesia and Singapore. NRPs were estimated for cement (12.7 percent), an imported product in Indonesia, and on the export side, construction sand (-56.7 percent) as well as smaller (-76.2 percent) and larger (-65.8 percent) split granitic rocks used to make concrete.

For a number of imported commodities, adjusted prices were lower in Jakarta than in Singapore, and so the retail price comparisons could not be used. These included Bombay onions, organic potatoes, chile peppers, papayas, fresh milk, ice cream, canned fish, virtually all personal care products and most apparel, refrigerators, rice cookers, pocket radios, and optical disk reader-writers. For the food products, it is possible that subtle product differences or differences in country of origin may have contributed to these negative price differentials. It could also be that import restraints were not binding for all horticultural commodities.

Comparison of Domestic Prices with Border Prices

Sugar, rice, and alcoholic beverages have long been subject to NTMs in Indonesia in the form of quantitative restrictions on imports in addition to import tariffs. For the first two of these commodities, detailed data are available from the Ministry of Trade on the costs and other margins that come between the border price and the retail price within Indonesia. I used these data—with a few

modifications and with prices and exchange rates updated for early 2015—to estimate nominal rates of protection for these two heavily protected commodities. I calculate the NRP to be 54.8 percent for sugar as of May 2015 and 64.3 percent for milled, polished rice on average over the first six months of 2015. These rates were considerably higher than the rates of 35.6 percent for sugar and 36.9 percent for rice calculated by Marks and Rahardja in a study of rates of protection in Indonesia in early 2008.

For alcoholic beverages, unregulated and untaxed sales by the embassies of Australia and the United States in Jakarta presented an opportunity to estimate the border price. Data gathered on retail prices in Jakarta then allowed comparison of domestic prices with these border prices to estimate NRPs.

Among the alcoholic beverages for which I obtained NRP estimates are beers and ales (119.4 percent), sparkling wines (130.3 percent), other wines (182.1 percent), gins (285.1 percent), vodkas (283.8 percent), liqueurs and cordials (72.9 percent), and rum (72.1 percent). Imported rum was unique in that it sold at a price below the sum of the import duty and excise tax applied to it.

In July 2015 the government replaced the specific tariff rates on wines and stronger liquors (fixed in rupiah per liter) with ad valorem tariffs at rates of 90 percent for alcoholic beverages with no more than 20 percent alcohol content and 150 percent for those with higher alcohol content. Given problems that occurred just a few years ago with the under-invoicing of alcohol imports to avoid payment of import tariffs at rates identical to these, one can question whether these rates will be fully reflected in product prices in the future.

Imputation of Import Tariff and Export Tax Equivalents

Price data are not available for many imported and exported commodities subjected to strict quantitative trade restrictions within the past few years—notably imported horticultural and livestock products and exported mineral products. For a number of these item, I was able to use simulation methods to impute import tariff equivalents (ITEs) or export tax equivalents (ETEs) of the NTMs.

For imported products, I used the change in the quantity imported between a base year and a policy year, along with a credible estimate of the price elasticity of import demand from an independent study, to impute the ITE of the quantitative restriction. The analysis takes into account the initial import tariff rate on the commodity, and corrects for any change in the border price relative to an international price index, which would itself cause the quantity of imports to change, but assumes that changes in the amount of imports to Indonesia are too small to affect the external price. The border price is proxied by the unit value of imports, which in some cases I replaced by the unit value of U.S. imports or exports of the relevant commodity, if the Indonesian data appeared suspect. The base year was 2011 and the policy year 2014 for horticultural products; the years 2010 and 2013 were used for livestock and livestock products.

I impute ITEs of 21.8 percent for live bovine animals not imported for breeding, 130.6 percent for offal and 23.6 percent for meat of bovine animals. For bovine meat, in the ERP analysis I use the 17.2 percent estimate of the NRP obtained directly from price data, but note that the estimates obtained by these very different methods were not very different.

For chicken meat and offal the imputed ITE is negative, even though the value of imports decreased by almost 86 percent, though from a small base. The negative rate implies that this simple model could only explain the change in imports if there were an import subsidy rather than a tariff, though in this particular case the negative value is mostly a consequence of the large magnitude of the import

demand elasticity estimate used. I defer to the 29.7 percent NRP for chicken meat imports estimated directly from price data.

For fresh horticultural products, among the ITE estimates for commodities with relatively large import values are 52.6 percent for potatoes, 78.5 percent for shallots (though I defer to the earlier 61.9 percent figure instead), 12.5 percent for oranges, 38.0 percent for mandarins, 74.2 percent for durians, and 30.0 percent for longans.

ITEs for processed horticultural products with notable levels of imports are 50.0 percent for preserved longans, 51.9 percent for grapefruit juice, 14.9 percent for less concentrated and 49.9 percent for more concentrated apple juice, 79.0 percent for mixtures of fruit juices, 13.9 percent for other fruit or vegetable juices, 153.1 percent for frozen potatoes, 138.8 percent for processed potato chips and sticks, and 28.4 percent for chile sauce.

For some horticultural products, notably frozen processed potatoes, which are used extensively in fast food establishments, imports actually increased and the estimated ITE was negative. For others—fresh apples, grapes, chiles, and Bombay onions—the estimated ITE was negative for 2011-14 but positive for 2011-13, consistent with a relaxation of the policy after its initial year.

I use a similar method to estimate export tax equivalents (ETEs) of mineral export restraints, with 2011 or 2012 used as the base year and 2014 the policy year—given that the export bans and other limitations went into effect in January 2014. There are some differences in the analysis. First, there was no initial export tax or other impediment to trade, and so the base NRP is zero. Second, I assume an exponential inverse export supply curve, and that the export supply elasticity estimate applies at the initial price-quantity combination along it. While the functional form is arbitrary, it has attractive features. In particular, it allows exports to be driven to be zero by an export tax of less than 100 percent. It also implies that unit costs of exports increase at an increasing rate as exports are expanded.

Among metallic ores and concentrates initially exported in large amounts, the estimated ETEs are 28.7 percent for copper, 15.4 percent for nickel, 39.7 percent for aluminum, 25.8 percent for iron, 92.2 percent for manganese, and 72.9 percent for zirconium. The ETEs for other notable exports are 43.2 percent for unwrought refined copper; 11.6 percent for aluminum ingots or bars; 94.7 percent for marble and travertine cut into blocks; 100.0 percent for crude or roughly trimmed granite; 38.4 percent for cut or polished marble, travertine, and alabaster; and 97.8 percent for zinc oxide.

Similar to the analysis for imports, some of the ETEs are negative: the simple model could only explain the growth of exports if there had been an export subsidy. This is the case notably for lead ores and concentrates.

Some of the negative ETEs estimated, such as for nickel mattes, may reflect desired outcomes for the policy—that it led to increased downstream processing of the ores and concentrates. The negative ETE for pebbles, gravel, and crushed stone could possibly reflect misclassification of exports to circumvent the restrictions.

Finally, tin ores and concentrates were subject to an export ban much earlier, and exports have officially been zero for some years. Application of a similar methodology for these commodities with 2002 as the base year and 2004 as the policy year yields an ETE of 56.8 percent. This estimate may now be too high, however, as the effects of the policy may have diminished over time as downstream processing capacity has been built: if the export ban were ended, almost certainly exports would not return to their pre-ban level.

Commodity Subsidies

Various targeted commodity subsidies applied within Indonesia require both domestic and foreign trade restrictions. For example, fertilizer subsidies are only intended to apply for certain small farmers, not for agribusiness, industry, or the export market. Among petroleum products, kerosene and diesel fuel are officially subsidized, as is biodiesel fuel derived from palm oil, but low-octane gasoline and traditional diesel fuel are also unofficially subsidized in the form of losses incurred by the state oil company Pertamina selling at below-market prices.

I calculated subsidy rates for the various products through direct comparison of subsidized and non-subsidized prices. The trade-weighted subsidy rates applied in the calculation of effective rates of protection in this study are 62.5 percent for all fertilizers, 14.7 percent for oil-refining products, and 63.0 percent for liquid natural gas, but not all sectors were assumed to enjoy these subsidies, consistent with the targeted application of the subsidies. We should by no means assume that there were not leakages of these subsidized products to other users, however.

Information on Other Policies

I used price data from published sources and interviews with market participants to calculate NRPS for a few other NTMs, notably the complete ban on exports of unprocessed and semi-processed rattan (-29.7 percent) and the ban on exports of logs and other unprocessed timber (-6.6 percent). Interviews with market participants also revealed that restrictions on exports of coal via a domestic market obligations policy and on imports of cloves were not binding as of early 2015, and so I set the associated NRPs to zero.

Procedural Burdens on Imports and Exports

Quantification of the effects of mandated procedures like pre-shipment inspections (PSIs) that add to the costs of importation is not easy, because these costs are often fixed, so that larger shipments incur lower costs per unit. In addition, a container with one type of fruit could incur lower quarantine costs than a mixed shipment of several types of fruits, for example.

PSIs typically are used to verify the country of origin and the nature of the product being imported, and are now required across a wide range of products, particularly those subject to other import regulations. Based on input from one large importer, I estimate PSI costs to be 0.35 percent of the border price for items covered by the regulation on *produk tertentu*.

The application of Indonesian National Standards imposes a wide range of costs on market participants. These costs are very high for baby clothes and children's toys, for which foreign travel of government officials and complete laboratory examinations of the imported products are required for every shipment. Based on input from market participants, for a typical shipment, I estimate these costs at 15 percent for both kinds of products.

A 2015 regulation of the Ministry of Agriculture specifies quarantine guidelines for a wide range of products that contain organic material. Based on observations from one importer, I take the costs of quarantine to be 1.5 percent for all of these products, though certainly the costs are higher for livestock and plant products that require more investigation and maintenance time. NRPs for many of these products are estimated by other means, so this is not a serious issue.

Exports of coal, crude oil, crude palm oil, palm kernel oil, and an array of mineral products are subject to a 2015 requirement that exports be financed by letters of credit. The cost is estimated by industry insiders to be 0.215 percent of the border price.

Finally, Indonesia offers seven preferential import tariff schedules, in addition to the most favored nation schedule that it offers to members of the World Trade Organization. Based on input from a major importer, I estimate the documentation cost to obtain the preferential duty rate at 0.53 percent of the border price.

Aggregation of Nominal Rates of Protection

The nominal rates of protection estimated for NTMs apply mostly at the level of tariff lines, but then must be aggregated for the 140 tradable goods sectors in the 2005 input-output table in order to be incorporated into calculation of effective rates of protection.

This study aggregates rates of protection using tariff-line trade value weights for each of the input-output sectors. A well-known issue with trade weights is that the magnitude of the aggregated NRP may be biased toward zero, to the extent that the trade weights have been affected by the policies in question. For example, a prohibitive import tariff will be excluded from the aggregated total, even though the NRP may be very high, because the import value is zero. However, the trade data used in this study are from 2012, prior to application of many of the recent policies. For some commodity groups—notably meats, sand and related materials, and rattan—I have replaced the 2012 data with data from other years in which trade was relatively unimpeded. The procedure is ad hoc but effective.

For each tariff line, exports are used to weight the NRP on the export side, and imports to weight the NRP on the import side. This makes sense if exportable and importable commodities within each tariff line are not substitutable with each other. For a commodity with a high NRP on the import side, the presence of substantial exports will dilute the overall NRP for the tariff line, given that all commodities have a zero or negative NRP on the export side.

Calculation of ERPs requires a comprehensive database of all trade and related policies—not just the NTMs of particular interest. This is complicated by the proliferation of preferential trade agreements in recent years—since ERP calculations require a single NRP on the import side for each sector. I have resolved this issue by forming a composite of the various applicable import tariff rates, which I call the marginal rate of protection (MRP). The MRP is defined as the highest applicable import tariff rate such that imports from the particular region of origin were positive. Under the assumption that imports of a given commodity from various countries are perfectly substitutable with each other and with the domestic import-competing product, but that the quantity of imports from the various source countries is limited, the MRP will set the domestic price.

Calculation of Effective Rates of Protection

The effective rate of protection for a sector is defined as the percentage by which value added per unit of output is increased by trade policies relative to free trade. A positive ERP for a sector thus indicates that the price of its output is increased relative to the prices of the intermediate inputs it uses. A negative ERP indicates the opposite. Under certain assumptions, the ERP shows the effects of the policies examined on the incentives to produce more of a good.

In ERP analyses, external prices are given: the country is assumed to be too small to affect world market prices. Domestic and imported products are assumed to be perfect substitutes, so that the domestic price for each tradable commodity is determined by its external price and the NRP for that commodity. All ERP studies must handle the problem of how the prices of non-tradable services are determined, however, since that price determination occurs within the economy. This paper uses two approaches—the Humphrey method, and the Corden method. The first of these is useful in that it includes calculation of a cost of living index from the prices of all tradables and non-tradables, which is assumed to determine wage demands by workers. The second is particularly useful if one wishes to calculate domestic resource costs by sector, which indicate the pattern of comparative advantage in the economy.

In the calculation of ERPs, in addition to the NTMs and subsidies previously mentioned, this study incorporates the latest import tariffs, including the increases through July 2015 in most favored nation tariff rates on steel, textile products, processed foods, alcoholic beverages, motor vehicles, motorcycles, and other products; export taxes; contingent protection in the form of temporary anti-dumping and safeguards duties in effect in 2015; and the excise taxes on alcohol and cigarettes. Alcohol excise taxes are calculated on an ad valorem basis in this study. For the cigarette excise taxes, I use an estimate of the average rate of 45.7 percent from the Ministry of Finance.

In order to reveal the effects of the NTMs, I calculate ERPs for two scenarios—one in which all of the policies apply, and one in which only import tariffs and export taxes apply. I also aggregate the calculations for 17 broader tradable goods sectors. For tradable sectors overall, the NRP is 6.0 percent, the ERP with the Humphrey method is 17.7 percent and the ERP with the Corden method is 12.9 percent. With only import tariffs and export taxes in effect, these numbers fall to 2.6, 5.5, and 4.5 percent, respectively.

In terms of the NRP, the most heavily protected broad sector is food crops (31.8 percent), followed by food, beverages and tobacco (13.2 percent), livestock and their products (8.8 percent), machinery and transport equipment (7.8 percent), and metals and metal products (6.7 percent). These figures indicate that policies are tending to hold resources in food sectors, despite considerable rhetorical emphasis on promotion of industrialization. Two broad sectors have negative percentage NRPs overall—mining other than oil and gas (-18.1 percent) and forestry (-4.1 percent).

The picture is a bit different if we look at ERPs. Based on the Humphrey method, the highest ERP goes to food crops (78.4 percent), then to metals and metal products (62.6 percent), chemicals (57.6 percent), food, beverages, and tobacco (23.8 percent), and non-metal products (16.1 percent). Food crops benefit not only from the protection of rice, fruits, and vegetables, but also from the fertilizer subsidies, which in 2015 are supposed to apply only for farming of rice, corn, and soybeans. Basic metals, chemicals, and non-metal products (particularly ceramic and clay products) benefit greatly from the restrictions on unprocessed and semi-processed mineral exports. Negative ERPs are recorded for mining other than oil and gas (-21.5 percent) and forestry (-4.8 percent).

The government has focused many protective policies in recent years on consumer products sectors—especially fresh and processed foods. One concern is that higher costs of living could impact the competitiveness of labor-intensive sectors. The Humphrey method reveals a 7.4 percent increase in the cost of living due to the full array of policies examined in this study. Much of this is driven by the rice import restrictions: if the non-tariff restrictions on rice imports were allowed to lapse, and only rice import tariffs were maintained, the increase in the cost of living due to trade policies would drop to 4.7 percent, so the rice policy really affects living costs. With all trade policies applied, if the subsidies and

excise taxes are dropped, the increase in the cost of living rises to 7.7 percent, mostly due to ending the oil and gas subsidies. Finally, if only import tariffs and export taxes remain in effect, at their present levels, the increase in the cost of living falls to only 2.9 percent: a lot of the effect on the cost of living is coming from NTMs.

Examination of the more detailed sectors shows that escalation of nominal rates of protection from upstream to downstream is evident in some but not all sectors. For example, meat and viscera (sector 49) are well protected, but processed and preserved meats (sector 50) have negative ERPs. Similarly, wheat flour (sector 58) is well protected, but bakery products (sector 60) and noodles (sector 61) have negative ERPs. Although textile sectors like spinning (sector 75) and weaving (sector 76) have positive NRPs and ERPs, apparel (sector 79) has negative ERPs.

The large negative NRPs for metallic ores and concentrates, along with the protective import tariffs on steel products, assure that basic iron and steel (sector 115) has large ERPs, but the consequences of the protective tariffs are borne by various downstream sectors whose NRPs are low and whose ERPs are low or even negative, like metal tools (sector 119), turbines and engines (sector 123), ship-building (sector 131) and railroad equipment (sector 132). With high NRPs, motor vehicles (sector 133) and motorcycles (sector 134) are exceptions to this pattern.

Comparison of the NRPs and ERPs of early 2015 with those from a study of policies in early 2008 by Marks and Rahardja indicates that the playing field is far less level now than it was then, with far greater variation in nominal and effective rates of protection from sector to sector.

Other Effects of the Policies

Many of the NTMs being applied currently not only distort market incentives but have had other harmful consequences. For example, some of the NTMs have been particularly hard on small and medium enterprises—such as sugar regulations that make it difficult for micro enterprises in the food sector to obtain refined sugar.

The import licensing regulations for horticultural products, beef, rice, and other products require that importers officially submit months in advance their intentions to import specific products from specific countries in specific quantities. If these plans are not at least 80 percent fulfilled for fresh fruits and vegetables, the importers can lose their import licenses, which adds greatly to the risks of importation. The regulations also prevent Indonesia from taking advantage of especially low prices in source countries as bargains become available.

Requirements that certain ports be used for imports of various commodities are a source of considerable inefficiency. Imports of fruit and vegetables for the Jakarta market in many cases must come through the port at Surabaya rather than enter the port at Jakarta directly, adding to costs for consumers in the vicinity of Jakarta and adding to pollution and road congestion between the cities.

Finally, virtually all of the non-tariff trade measures introduced in recent years have been highly complex and notable for their lack of transparency. The quality of economic governance in Indonesia is not merely a matter of peripheral interest: it is a crucial factor that may eventually determine whether Indonesia is able to keep pace with nations like Vietnam that have gone much farther to embrace global competition in recent years.

Effective law enforcement is critical to the reduction of corruption, but a fundamental and frequently overlooked component of the war on corruption is the avoidance of regulatory frameworks that are

radically inconsistent with market forces, and that thus create powerful incentives for the regulations to be circumvented.

Better coordination is required among government agencies, as well as strong leadership that represents the broad national interest above the narrower interests of the various regulatory entities and their clients throughout the society.

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1. The Recent Resurgence of Non-Tariff Measures

Non-tariff trade regulations have proliferated in Indonesia since 2011. Many of these new regulations have the potential to impede international trade. The number of tariff lines subject to non-tariff measures (NTMs) on the import side grew from 3,714 in 2009 to 5,138 in 2015. Many tariff lines were subject to multiple regulations, as the number of NTMs grew from 6,537 to 12,863. On the export side, similarly, the number of tariff lines subject to NTMs grew from 386 in 2009 to 954 in 2014, while the number of NTMs grew from 485 to 1,782.

This paper measure the effects of NTMs that impede trade in goods in Indonesia. These NTMs include various quantitative restrictions on exports and imports as well as procedures that impose costs on importers or exporters. Table 1 lists the major NTMs examined in this study on the import and export sides, along with the regulatory basis for each policy and the percentage of the total value of imports or exports it affects, based on 2012 trade data. The policies have caused trade levels to shrink, and thus the total coverage figures for the sectoral policies—8.14 percent on the import side and 32.58 percent on the export side—may be understated.[1] We must also keep in mind that prices are determined at the margin, and that imports and exports play key roles in that process.

The NTMs with the greatest potential to distort market conditions are quantitative restrictions on exports and imports—such as quotas (on wheat flour imports), bans (such as on exports of unprocessed or semi-processed mineral products, rattan, and timber products), and mandatory licensing (for imports of sugar, rice, alcoholic beverages, fresh and processed fruits and vegetables, livestock and livestock products, basic steel products, cellular telephones, and tablet computers, among others).

Procedural regulations that add to the costs of trade in multiple commodities, like the one on imports of certain products (*produk tertentu*) in Table 1, may have less impact per commodity, but are far more extensive in their coverage—in this case on imports of most processed foods and beverages, personal care products, traditional medicines, virtually all apparel and other finished textile products, footwear, many household electrical appliances, consumer electronics products, and children's toys.

Given the extensive coverage of many of these regulations, detailed examination of all included commodities was not possible. My focus was on regulations with evident economic objectives, and not so much on regulations based on national security or health concerns—such as restrictions on importation of weapons or narcotics. However, I did examine restrictions on imports of optical media and on equipment and raw materials usable for the manufacture of optical media (intended to address U.S. concerns about intellectual property rights violations) and on imports of color printers and copiers (intended to combat counterfeiting of currency).

A variety of approaches to measurement of the effects of the policies will be used; most involve some form of international price comparisons. I also draw upon information obtained from the business community in Jakarta about the costs of certain non-tariff measures. These data will be used to infer the nominal rates of protection (NRPs) for tradable items—the proportion by which their domestic producer prices exceed their border prices due to the effects of trade policies.[2]

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[1] The 2012 trade value data have been patched in some sectors with data from other years in which trade in the commodity in question was relatively free, or even with trading partner data. Section 4.1 below offers further perspectives on this point.

[2] The border price of an imported item is measured as its CIF (cost, insurance, freight) price just before it enters customs. The border price of an exported item is measured as its FOB (free on board)price after it has been officially cleared for export.

Table 1. Export Taxes and Major Non-Tariff Measures Examined in this Study and their Coverage

Imported Commodity or Group	Type of Regulation	Recent Regulation	Coverage of Imports (%)
Livestock and Livestock Products	Licensing	Minister of Trade Regulation 46 of 2013	0.93
Horticulture	Licensing	Minister of Trade Regulation 40 of 2015	0.45
Cloves	Licensing	Minister of Industry and Trade Decree 528 of 2002	0.06
Milled, Polished Rice	Licensing	Minister of Trade Regulation 19 of 2014	0.49
Wheat Flour	Quota	Minister of Trade Regulation 23 of 2014	0.10
Sugar	Licensing	Minister of Trade Regulation 19 of 2008	0.87
Alcoholic Beverages	Licensing	Minister of Trade Regulation 72 of 2014	0.01
Salt	Licensing	Minister of Trade Regulation 58 of 2012	0.06
Baby Clothes	Product Standards	Minister of Industry Regulation 72 of 2012	0.00
Plastic Raw Materials	Licensing	Minister of Trade Regulation 36 of 2013	0.67
Cement	Licensing	Minister of Trade Regulation 40 of 2013	0.11
Steel	Licensing	Minister of Trade Regulation 8 of 2012	2.70
Optical Media and Equipment	Licensing	Minister of Trade Regulation 35 of 2012	0.03
Color Printers and Copiers	Licensing	Minister of Trade Regulation 15 of 2007	0.08
Cellular Telephones, Tablet Computers	Licensing	Minister of Trade Regulation 38 of 2013	1.49
Children's Toys	Product Standards	Minister of Industry Regulation 24 of 2013	0.08
Total of the Above			**8.14**
Produk Tertentu (processed foods and beverages, personal care products, traditional medicines, apparel and other finished textile products, footwear, household electrical appliances, consumer electronics products, and children's toys)	Pre-shipment inspections, port restrictions, special importer registration, and additional documentation	Minister of Trade Regulation 36 of 2014	4.49
Quarantine (live anminals, and a wide array of primary and manufactured products containing animal or plant materials, including wooden packaging of imported goods	Quarantine requirements	Minister of Agriculture Regulation 12 of 2015	8.12

Exported Commodity or Group	Type of Regulation	Recent Regulation	Coverage of Exports (%)
Milled, Polished Rice	Licensing	Minister of Trade Regulation 10 of 2014	0.04
Cocoa Beans	Tax	Minister of Finance Regulation 75 of 2012	0.20
Rattan	Ban	Minister of Trade Regulation 35 of 2011	0.02
Palm Oil Products	Taxes	Minister of Finance Regulation 136 of 2015 Minister of Finance Regulation 133 of 2015	11.40
Sand, Clay, Top Soil	Ban	Minister of Trade Regulation 2 of 2007	0.02
Minerals	Bans, Restrictions, Taxes	Minister of Trade Regulation 4 of 2014 Minister of Finance Regulation 153 of 2014	5.45
Tin and Tin Ores	Restrictions, Ban	Minister of Trade Regulation 32 of 2013 Minister of Trade Regulation 44 of 2012	1.64
Coal	Licensing	Minister of Trade Regulation 39 of 2014	13.69
Animal Hides	Taxes	Minister of Finance Regulation 128 of 2013	0.00
Logs	Ban	Minister of Trade Regulation 44 of 2012	0.01
Wood Products	Taxes	Minister of Finance Regulation 128 of 2013	0.11
Total of the Above			**32.58**
Crude Palm Oil and Palm Kernel Oil, Coal, Crude Oil, Natural Gas, Certain Other Petroleum Products, and Certain Minerals and Metal Products	Requirement to finance exports through a letter of credit with a bank	Minister of Trade Regulation 4 of 2015	41.05

All of the measurements are done initially for tariff lines. I then aggregate NRPs to the level of input-output sectors to calculate the effective rate of protection (ERP) for each tradable commodity sector using the 175-sector input-output table for Indonesia. The ERP for a sector accounts not only for the effects of policies on the price of its output, but also on the prices of the goods and services it uses as inputs.[3] It provides a comprehensive picture of the economy-wide effects of trade and other policies on incentives to produce the various tradable outputs.

The ERP analysis presented in this paper includes not only the NTMs studied, but also the complete array of most-favored nation (MFN) and preferential tariff schedules to which Indonesia is committed,

[3] If domestic taxes, subsidies, and other policies are also included, the terms "nominal rate of assistance "and "effective rate of assistance" are sometimes used instead of NRP and ERP.

including the July 2015 increases in many MFN import tariff rates. It also includes specific tariffs set in rupiah for certain products as well as export taxes. Also included is "contingent protection" in the form of import duties applied under the Safeguards and Anti-Dumping Agreements of the World Trade Organization. Finally, excise taxes and commodity subsidies are also included, particularly given that the subsidies also entail domestic and foreign trade restrictions.

The next section discusses the economic logic of international price comparisons and outlines the methodologies to be applied. Subsequent sections present these methodologies in more detail and present the findings for the commodities examined. Aggregation issues are then discussed, and the effective protection calculations presented. A final section examines a few of the nuances of non-tariff policies that are not visible in the calculations of rates of protection but that are nevertheless among the crucial considerations for the future of economic governance in Indonesia.

2. International Price Comparisons

International price comparisons rest on the logic of the law of one price. For our purposes, this law states that, in the absence of impediments to trade, identical products should sell for identical prices in different countries. Otherwise, traders would buy commodities where their prices are low and sell them where their prices are high; the free play of such commodity arbitrage should drive prices into equality.

2.1. Barriers to Trade

International price differences constitute prima facie evidence of the existence of some sort of barriers to trade. Transportation, information, foreign exchange, and other transaction costs can impede trade in commodities in general. Moreover, branded commodities typically cannot be purchased in bulk in order to be resold at different locations, but rather must come through authorized wholesale and retail distribution systems within a country. The scope for international arbitrage in branded commodities thus may be limited, and this may allow the manufacturer to engage in some form of price discrimination between different national markets. In any case, distribution activities will add costs of their own, including labor, land and interest costs.

Trade and other policies clearly can also cause international price differences. Import tariffs, excise and other commodity taxes, export taxes, foreign exchange transaction taxes, or the various NTMs that are the focus of this study may all impede international commodity arbitrage. In particular, tariffs or restrictions on imports confer a positive NRP on competing domestic products, while taxes or restrictions on exports confer a negative NRP on the exportable domestic outputs. Indeed, only positive estimates of NRPs are considered viable on the import side, and only negative ones on the export side, as discussed further in Section 4.2.

2.2. An Outline of Methodologies to be Applied

Given all of the factors that can cause international retail price disparities, the ideal way to measure the impact of any policy on prices would be to have observations on prices in the country and some other country, before and after the imposition of the policy. This is seldom done, because researchers typically do not have the requisite data prior to the imposition of a policy, particularly policies that have been in effect a long time. In this study, this approach was feasible only for the NTMs on imports of beef, chicken meat, red onions (shallots), and wheat flour.

An alternative is to compare prices of identical commodities between countries at one point in time. This can be done to calculate a price differential for a commodity of interest versus the price differential for a comparator commodity; the former is subject to some NTM in one country while the latter is free of such policies. The idea is that the price differential for the comparator commodity will reflect differences in price levels and distribution margins between the countries. Appropriate comparators are difficult to find, however, in part because many commodities are now subject to some sort of NTM and also because, even if products seem to be similar, their markets can be quite different. Nevertheless, I will use this approach for an array of goods for which retail price comparisons between Singapore and Jakarta were possible.

For several other commodities, for which the policies have been in effect in Indonesia for many years, I compared local retail prices with border prices, using appropriate adjustments for the costs of importation and distribution. I applied this method to sugar, rice, and alcoholic beverages.

For other commodities, particularly industrial inputs, such methods were not feasible because of the absence of publicly-available price data. However, for policies that have been enacted recently, I used simulation methods to impute a percentage price change caused by a policy based on the recent change in trade flows. This method was applied to mineral exports and to imports of various horticultural and livestock products.

To measure the effects of domestic subsidies, I compared the subsidized and non-subsidized prices of the commodities directly. Finally, for certain other non-tariff measures I used information from market participants or other sources—such as for coal, cloves, and rattan. Interviews were also useful for getting a sense of the costs of compliance with various procedural regulations such as pre-shipment inspections, which can be very hard to detect through price comparisons.

3. The Methodologies and Findings for Various Commodities

We now work through each of these methodologies, and examine the commodities that can be handled by each approach. All of these methods of measurement require assumptions and are subject to potential errors. The bottom line is that researcher must be flexible in the approach applied, seeking out the best means to measure the nominal rate of protection for each commodity.

3.1. Time-Series Combined with Cross-Section Analysis

As noted above, the ideal analysis would compare prices of a commodity inside and outside Indonesia, before and after the policy change in Indonesia. This true difference-of-differences approach can filter out country-specific effects, which can cause prices to be higher in one country than the other for any number of reasons. It can also filter out developments over time in the commodity market that impact prices in both countries. The only factors that would not be filterable would be changes that occur in the Indonesian market relative to the foreign market at the same time that the policy is implemented, but that are unrelated to the policy itself. Even in this ideal case, moreover, there are issues, such as exactly which time periods should be compared, as we will see.

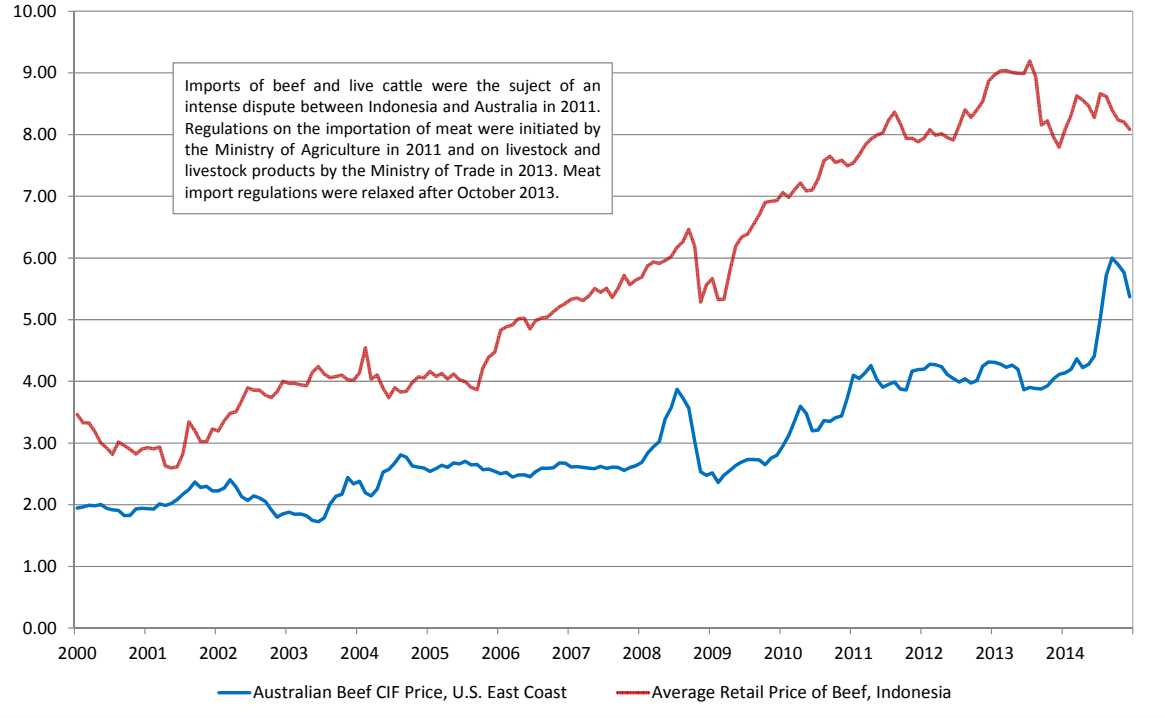
3.1.1. Beef

A dispute in 2011 over alleged inhume treatment of live cattle exported from Australia to Indonesia led to a temporary Australian ban on exports of live cattle to Indonesia. Indonesia retaliated with

restrictions on imports of Australian beef and cattle, and in 2013 promulgated general regulations to limit imports of livestock and livestock products. The import restrictions were eased in October 2013, but then were tightened once more at the start of 2015.[4]

Figure 1 below shows the monthly average prices of beef in Indonesia and in the United States over 2000-14. The U.S. price is given by the CIF (cost, insurance, freight) price of imported Australian beef at U.S. East Coast ports, collected by the World Bank for its "Pink Sheet" commodity price data set. The Indonesian price is the average price of beef throughout the country, collected by the Ministry of Trade. The wedge between these prices trended larger throughout most of the period.

Figure 1. Beef Prices in Indonesia and the United States, 2000-14 (USD/kg)



Do these data provide evidence that the livestock regulations in Indonesia actually boosted the price of beef? It is apparent that the periods for comparison matters. I decided to compare the price of beef in Indonesia relative to that in the United States during the peak period of livestock regulation in Indonesia, from June 2011 through October 2013, with the period *afterward* through the end of 2014, during which, by all accounts, import restrictions were relaxed. By this measure, the relative price of beef was 17.2 percent higher in Indonesia with the restrictions in effect.[5]

[4] For example, Global Trade Alert observed on 13 April 2015: "On 23 December 2014, the Indonesian government banned the import of offal beef meat with the exception of tongue and tail meat. Hence, Indonesian meat imports may only include prime-cut beef and manufactured beef." In August 2015, some meat retailers in Indonesia went on strike to protest scarce beef supplies.

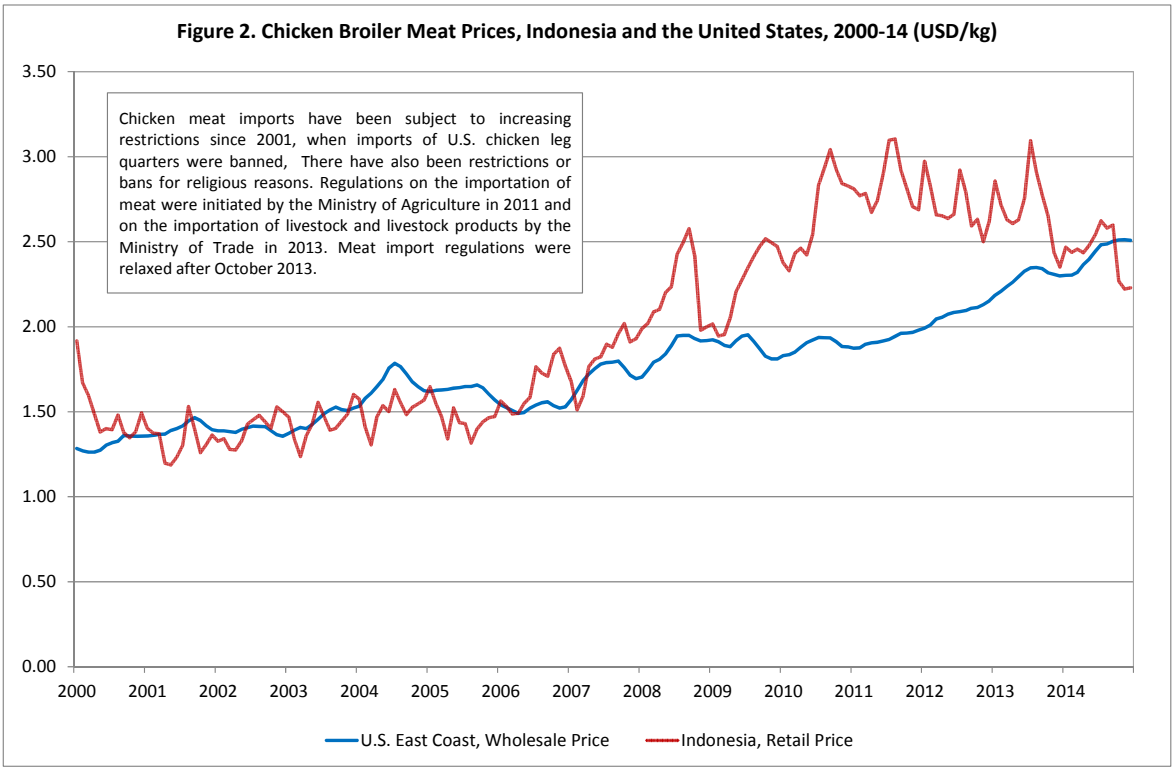
[5] Section 3.4.1 estimates the impact of the beef import restrictions at 23.6 percent, but I defer to the estimate in this section since it comes from actual price data rather than from a simulation approach.

3.1.2 Chicken Meat

The past 15 years have witnessed tightened restrictions on imports of chicken meat. In 2001, Indonesia banned the importation of chicken leg quarters from the United States. In subsequent years, imports of chicken meat were banned from various countries for religious reasons. Then the livestock regulations mentioned above also impacted the chicken market, particularly from 2011 to 2013.[6]

Figure 2 below shows the price of chicken broiler meat in Indonesia versus that in the United States, from the same data sources as were used for beef. Between June 2011 and October 2013, the price of chicken meat rose in Indonesia relative to the United States by 29.7 percent. In addition, the volatility of chicken meat prices was evidently greater than in prior periods.

Figure 2. Chicken Broiler Meat Prices, Indonesia and the United States, 2000-14 (USD/kg)



3.1.3. Shallots

The Ministries of Trade and Agriculture issued far-reaching horticultural import licensing regulations in 2012. Outcry against these led to postponement of their implementation and some revisions, but the policies went into effect at the start of 2013 mostly as originally envisioned.[7]

Shallots (red onions) have been one of the most controversial horticultural products in Indonesia in recent years. A principal rationale for shallot import restraints in 2012 was that one or a few traders

[6] A useful perspective is offered by U.S. Department of Agriculture (2013), which notes that the Ministry of Agriculture has officially permitted the import of slaughtered whole chickens since 2011, but that import permits were never issued.

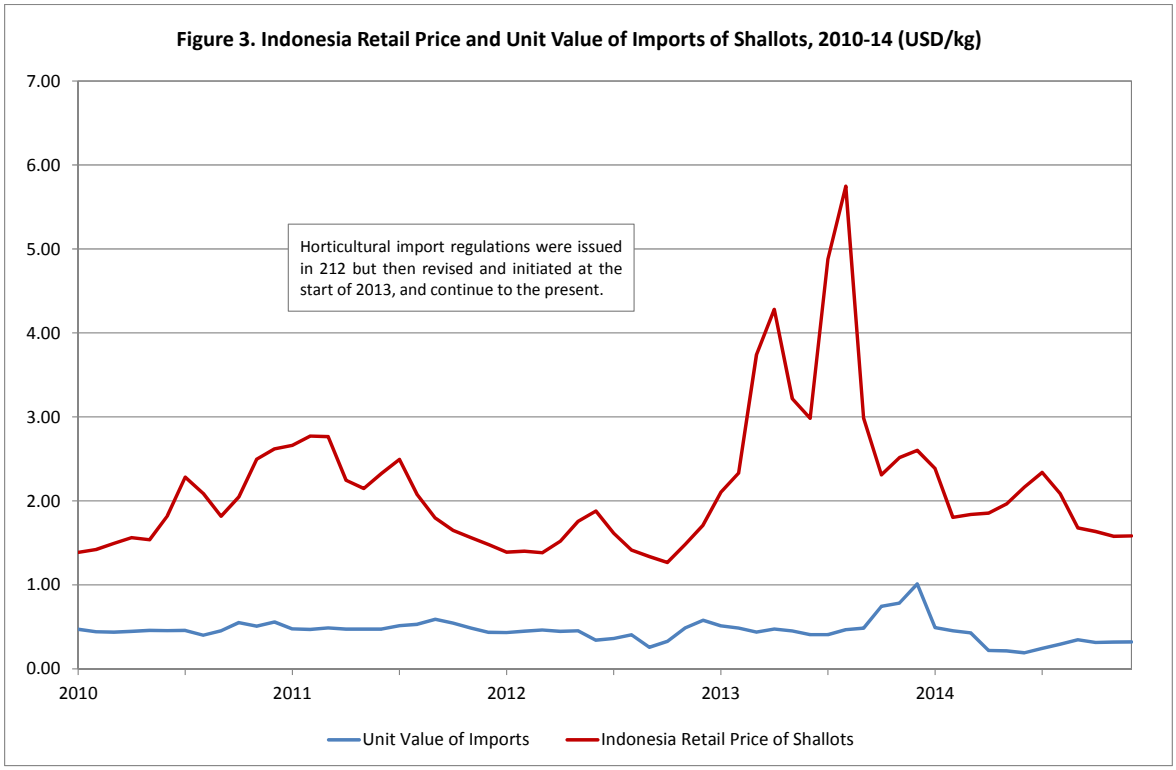
[7] Section 6.2 will investigate some of the more subtle problems created by these policies, as reported by traders.

were allegedly importing shallots at the peak of the harvest season, when the local price was low, with the intention of driving the price even lower so that the traders could buy the onions from local farmers at a deep discount, and then store them for sale later in the year. More recently the policy goal of thwarting this alleged strategy seems to have mutated into a goal of achieving self-sufficiency in shallots, without any real economic logic behind the changed stance.

Retail shallot prices have been monitored by the Ministry of Trade in recent years. There are no foreign shallot price data, but the unit value of imports into Indonesia seems to provide an acceptable proxy. Figure 3 shows these two data series over 2010-14, the period for which the retail prices are available.

Shallot prices were 63.5 percent higher relative to import unit values during 2013-14 than prior to 2013, and 61.9 percent higher relative to import unit values during 2014 alone versus prior to 2013. (Note that unit values of imports were lower in 2014 than in 2013, so that the price differential remained high, despite the evident dramatic decrease in the domestic price.) I will use the 61.9 percent figure to characterize the NRP due to the policy going forward.

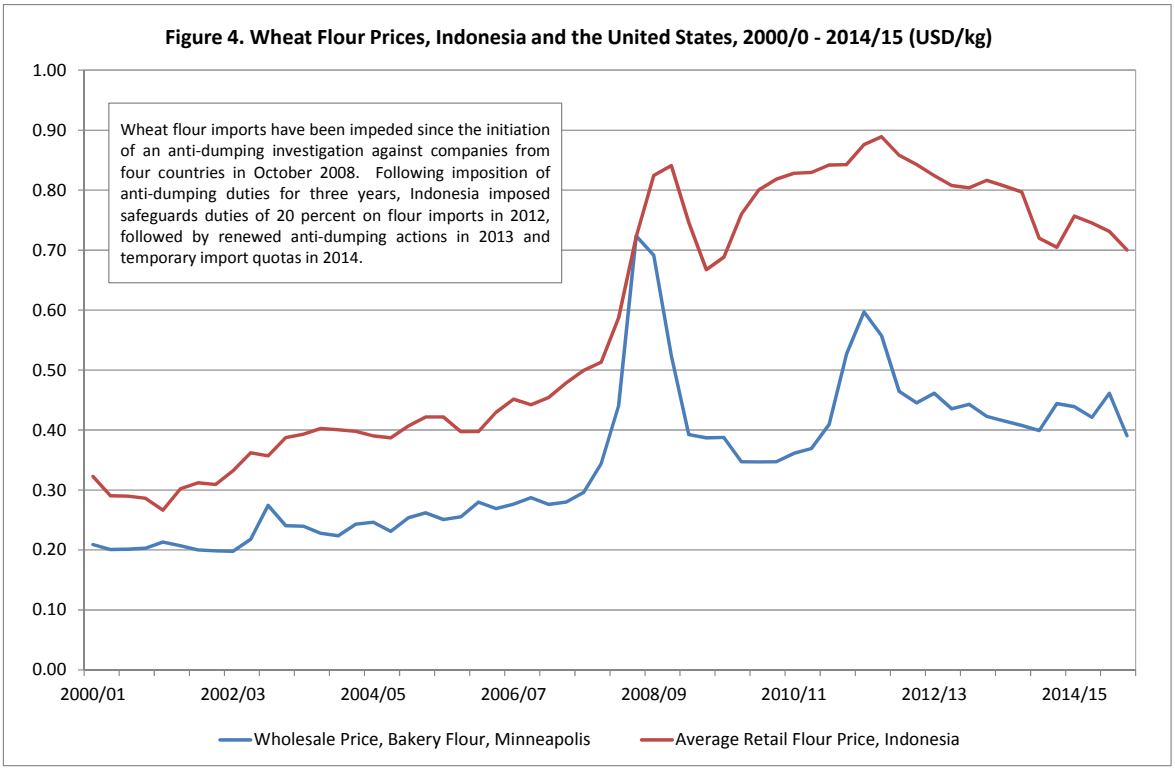
Figure 3. Indonesia Retail Price and Unit Value of Imports of Shallots, 2010-14 (USD/kg)



3.1.4. Wheat Flour

Figure 4 indicates a sharp increase, by 22.0 percent, in the margin by which the retail price of wheat flour in Indonesia exceeded the wholesale price of wheat flour in the city of Minneapolis in the United States in the period since late 2008, compared to the period from 2000 up to that time.[8]

[8] The U.S. price data are from the *Wheat Yearbook* of the U.S. Department of Agriculture, Economic Research Service, and are given on a quarterly basis. The Indonesian data are monthly data from the Ministry of Trade, which I aggregated to quarters.



This jump in the margin is understandable, given a series of policy actions taken by the government of Indonesia. Flour millers in Indonesia initiated an anti-dumping action against wheat flour from Turkey, Sri Lanka, and Australia in October 2008, and in 2009 the government imposed anti-dumping duties ranging from 18.69 to 21.99 percent on wheat flour imports from Turkey.[9] In 2012, a temporary 20 percent safeguard duty was imposed on all imports of wheat flour. Temporary anti-dumping duties were imposed on India, Sri Lanka, and Turkey in 2013, followed by across-the-board temporary import quotas in 2014. In 2014 wheat flour imports were 73.6 percent lower than in 2011.

It is of interest that the imposition of Indonesian National Standards (SNI) on wheat flour in 2002 appears not to have had much effect on prices.

3.2. Comparison of Retail Prices in Indonesia and Singapore

Comparison of price differentials between different commodities at a given point in time provides an alternative method to filter out some country-specific effects and focus on the impact of trade regulations.

3.2.1. Methodological Considerations

This study uses Singapore as benchmark against which the effects of non-tariff regulations in Indonesia can be measured for many commodities sold at the retail level with posted prices. Singapore is a great

[9] It is well known that anti-dumping actions may sometimes be used to intimidate exporters, even if duties are not actually imposed.

country for comparison in that it is nearby and, except for alcoholic beverages, does not apply import tariffs and has relatively few non-tariff barriers to trade. Its port facilities are also among the most efficient in the world. It is less attractive as a basis for comparison because its income per capita is much higher than in Indonesia. Indeed, Singapore is one of the most expensive cities in Asia, so that the labor and land costs of wholesale and retail trade are relatively high. Its more upscale consumers also tend to favor more upscale products: it is far easier to find a digital rice cooker in Singapore than in Indonesia.

For the sake of consistency, we compared prices from retailers with comparable amenities in the two locations. However, in apparel, consumer electronics, and electrical appliances, the products sold in both countries tend to be limited to relatively few global brands. In almost all cases, our retail price comparisons were of identical products, and thus we were confined mostly to these global brands, and to relatively few of the models sold by these companies. Moreover, the global brands tend to be oriented to more upscale consumers in both countries. Each country has various low-cost brands, but these are not sold in the other country.[10]

This analysis must handle somehow the reality that prices generally are higher in Singapore than in Indonesia. Among the sources for evidence on this is the International Comparisons Program being coordinated by the World Bank, and implemented in Asia by the Asian Development Bank (2014). These comparisons do not examine only identical products, and sample prices extensively in rural as well as urban areas. For 2011, in common currency units, prices of all items were 42.8 percent lower in Indonesia than in Singapore. The price differential was 47.1 percent for non-durables, 37.9 percent for semi-durables, and 34.4 percent for durables.

Comparisons by the *Economist* magazine of the prices of Big-Mac hamburgers sold by McDonalds restaurants around the globe similarly indicated that prices were 37.1 percent lower in Indonesia than in Singapore over 2 February-20 March 2015, the period during which most of our price comparisons were done.[11] Differences in the prices of Big Macs should reflect differences in rents, wages, and willingness and ability to pay in different urban settings.

It is clear that some adjustment for differences in wholesale and retail trade costs in Singapore and Indonesia is appropriate, but deciding on the best adjustment is not easy. Many markets differ between the two countries, not only due to the presence of NTMs in Indonesia, and there is no perfect method of comparison. Indeed, comparators that are free of regulation in Indonesia are difficult to find, particularly for the commodity groups covered by the procedural regulation on imports of *produk tertentu* noted in Table 1, because coverage of these NTMs is so widespread! Thus, there are literally no clothing or finished textile products not covered by the regulation, though the regulation is less comprehensive for electronics products.

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[10] One could envision an alternative econometric approach in which hedonic price equations (Rosen, 1974) are used to relate the prices that consumers are willing to pay for ascertainable product characteristics in each country. The price implied by a given product specification could then be compared between the two countries. One challenge would be to measure various essential product features quantitatively. Also, given the importance of brand name, one would want to compare identical brands in the two countries, but the role of brand name for brands sold in only one of the countries could not be identified separately from the role of the country itself. This would confine the actual comparisons to the global brands anyway.

[11] I assume constant prices in local currency units between January, when the *Economist* survey was done, and February-March, but adjust for exchange rate changes in the interim. The ICP study is critical of the Big Mac standard: the hamburger is not part of the consumption basket of the typical resident of many countries, and may even be considered a luxury good. Big Mac prices are also no doubt influenced by trade barriers—in particular barriers to importation of beef into Indonesia from Australia and other countries, although greater distance from Australia to Singapore may offset this to some extent.

I utilized two comparator commodities—one for non-durables and semi-durables, and one for durables. In both cases, identical products were sold in the two countries; neither was subject to major non-tariff measures in Indonesia.

For non-durables and semi-durables, I used the price of Xiang Lie pears from China; these were 22.2 percent less expensive in Jakarta than in Singapore in our price surveys, once prices were converted into U.S. dollars. This partly reflects that these pears were subject to the Goods and Services Tax (GST) in Singapore, which is applied at a uniform 7 percent rate for all products, but not to the 10 percent value added tax (VAT) in Indonesia, for which there are many exemptions. These pears are subject to zero import tariffs in both countries—in Indonesia under the ASEAN-China Free Trade Agreement.

For durables, the prices of identical monochrome laser printers are used. These printers are subject to zero most-favored nation (MFN) tariffs in both countries, and to the 10 percent VAT in Indonesia and the GST in Singapore, and so no separate adjustment for these taxes was required. These printers on average were 11.5 percent less expensive in Jakarta than in Singapore.

Each price differential in Tables 2 and 3 below shows the percentage by which the price of the indicated commodity in Jakarta exceeded the price in Singapore, minus the similar percentage difference for the relevant comparator commodity. For example, the price of mangoes in U.S. dollars was 53.8 percent higher in Jakarta than in Singapore. Relative to the U.S. dollar price of Xiang Lie pears, however, the price of mangoes was 76.0 percent higher (76.0 = 53.8 + 22.2), as shown in Table 2.

The only exceptions to the adjustment above were for construction products; we obtained retail prices for these products, but a preponderance of the market transactions in these commodities occurs at the bulk level, and so adjusting for differences in retail costs seemed inappropriate.[12] For all price comparisons, however, appropriate adjustments for VAT in Indonesia and GST in Singapore were made.

Not all of these commodity price comparisons in this section are used in the aggregation to calculate NRPs and ERPs by input-output sector.[13] Section 3.4.1 below offers an alternative, and in many cases superior, method to estimate price differentials for a number of horticultural commodities. One reason the alternative method may be superior is that country of origin was not discernible to us for many horticultural products used in the retail comparisons. It could be that Singapore imports from more desirable suppliers than does Indonesia, if the latter imports these products at all. There could also be subtle quality differences that would be appreciated only upon consuming the good.

3.2.2. Findings

Table 2 shows the adjusted percentage by which the price in Jakarta exceeds the price in Singapore, for non-durables and semi-durables, using Xiang Lie pears as the comparator, as noted above. The table is divided into two sections—commodities that are subject to the Singapore GST but not the Indonesia VAT, and commodities that are subject to both.

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[12] Under Article 22 of Indonesian income tax regulations, a 2.5 percent tax is imposed on imports of most products. It is reduced to 0.5 percent for soybeans, wheat, and flour. This charge is a prepayment of income taxes, and is refundable for businesses that properly file their taxes. Thus, I will not treat it as a surcharge on imports, though in some cases it may have that effect.

[13] For some regulated products we were unable to do price comparisons due to the absence of identical products or incompatible specifications in the two countries: beef, water pumps, air conditioners, water dispensers, ranges and stoves, tricycles, microphones and speakers, and stuffed animals.

Table 2: Adjusted Price Differentials Calculated through Retail Price Comparisons for Jakarta versus Singapore, Regulated Non-durable and Semi-durable Commodities, Early 2015 (Comparator: Xiang Lie Pears) (%)

Commodities Subject to Singapore GST but not Indonesia VAT		Commodities Subject to Singapore GST and Indonesia VAT	
Vegetables		**Livestock Products**	
Red Onions (MFN = 20%)	33.1	Butter	4.4
Bombay Onions	-1.6	Cheese	6.9
Potatoes (Organic) (MFN = 20%)	-13.2	Ice Cream	-26.9
Chile Peppers	-45.2	Yoghurt	18.8
Carrots (MFN = 20%)	67.3	Honey	33.4
Garlic (not regulated)	13.7		
		Processed Fruits and Vegetables	
		Canned Fruits	28.8
Fruits		Tomato Paste	21.4
Apples	24.6	Orange Marmelade	19.8
Xiang Lie Pears (not regulated)	0.0	Pineapple Marmelade	6.0
Bananas	1.0		
Grapes	17.8	**Processed Meat and Fish**	
Oranges	98.0	Sausage	26.9
Mandarins (MFN = 20%)	8.5	Canned Fish	-31.3
Lemons	23.6		
Mangoes (MFN = 20%)	76.0	**Other Processed Foods**	
Melons (Cantaloupes)	49.2	Chocolate Candies	28.2
Papayas	-14.0	Other Candies	-27.8
Pineapples	2.6	Malt Products	7.3
		Baby Food	-25.7
		Bakery Products	-3.8
Fresh Meat		Soy Sauce	26.1
Chicken Leg Quarters	40.2		
Chicken Neck	49.4	**Beverages**	
Chicken Liver	58.9	Imported Bottled Water	6.3
Chicken Gizzard	64.0	Imported Sparkling Water	39.5
Chicken Wing	-24.8	Processed Coffee	-0.8
Boneless Chicken Breast	-12.1	Processed Tea	-7.8
Whole Broiler Chicken	6.0	Apple Juice	49.6
Whole Village Chicken	37.3	Tomato Juice	79.5
		Orange Juice	9.9
Livestock Products		**Personal Care Products**	
Fresh Milk	-44.9	Cosmetics and Personal Care	-39.5
Eggs	24.1		
		Apparel, Footwear, Bags	
		Handbags, Wallets, Backpacks	-8.8
		Footwear	-8.0
		Men's Apparel	3.8
		Women's Apparel	-3.9
		Children's Apparel	-7.1

Indicated in the table are five fruits or vegetables subject to most-favored nation (MFN) tariff rates at a much higher rate than similar products, 20 percent. The regional or bilateral preferential tariff rates applied by Indonesia on these commodities are typically zero, so the high price differentials in four of the five cases may reflect that NTMs were used to replace lost tariff protection. All of the commodities apart from Xiang Lie pears are regulated, with the exception of garlic, which was included in the original version of the horticulture regulations in 2012 but was removed in 2013.

The price differentials vary considerably from commodity to commodity, which no doubt partly reflects the small number of observations we had for most commodities as well as the vagaries of market pricing. The differential for shallots seems roughly consistent with the price developments shown in Figure 3, though I defer to the 61.9 percent differential estimated earlier.

My instincts are that, among the other commodities in the table, the price differentials for juices and imported sparkling waters show genuine tendencies.[14] It is also striking how low the prices of personal care products and apparel are in Indonesia compared to Singapore.

The retail price comparisons between Jakarta and Singapore reveal an important nuance of the effects of the chicken import restrictions: the relatively less attractive parts of the chicken by Western standards are especially overpriced in Indonesia, while the relatively more attractive parts (breasts and wings) are underpriced. Whole village chickens (*ayam kampung*) are overpriced in Indonesia as well. Given the openness of the Singapore market, these comparisons are consistent with the poultry market in Indonesia being isolated from global markets. Differences in tastes could exist, but price differences would not persist in the absence of barriers to trade. These barriers could include transportation costs, but comments by market participants indicate that these are not a major factor. The bottom line is that chicken necks and gizzards are far more expensive in Jakarta than in Singapore, one of the most expensive cities in Asia.

Table 3 shows the adjusted price differentials for durable products, using monochrome laser printers as the comparator, as noted above. Among these products, some television receivers were subject to a luxury tax in Indonesia at the time the price data were gathered, and the price differentials were adjusted to remove the effect of the tax.[15] Televisions and most of the other electrical and electronic products are subject to the *produk tertentu* regulations. For many of these products, the price differentials seem not to follow a consistent pattern.

Table 3: Adjusted Price Differentials Calculated through Retail Price Comparisons for Jakarta versus Singapore, Regulated Durable Commodities, Early 2015 (Comparator: Monochrome Laser Printers) (%)

All Commodities Subject to Both Singapore GST and Indonesia VAT	
Large Household Appliances (Adjusted for Luxury Tax, if any)	
Televisions Receivers	19.3
DVD and Blu-Ray Players	8.7
Refrigerators	-9.0
Washing Machines	13.8
Electrical Appliances	
Food Processors, Blenders, Juicers	21.3
Hair Dryers	43.6
Laundry Irons	5.0
Microwave Ovens	27.2
Pocket Radios	-37.1
Rice Cookers	-22.2
Toaster Ovens	16.9
Instant Household-type Water Heaters	112.8
Vacuum Cleaners (not regulated)	28.3
Electronics	
Digital Pocket Recorders (not regulated)	-1.1
Laptop Computers	16.2
Computer Mouses (not regulated)	-27.9
Pocket and Other Cameras (not regulated)	-22.7
External Hard Drives	12.3
Optical Media and Drives	
Optical Disk Reader/Writers	-10.9
Optical Media	31.2
Personal Printers	
Monochrome Laser Printers (not regulated)	0.0
Cartridges	13.3
Color Laser Printers	6.9
Cartridges	2.9
Inkjet (Color) Printers	11.0
Cartridges	-23.2
Cellular Communications	
Smart Cellular Telephones	49.0
Tablet Computers	63.7
Toys and Games	
Multipurpose Top-End Video Games	22.4
Other Video Games	6.1
Other Toys and Games	18.2

[14] Section 3.4.1 below will provide alternative measurements of NRPs for many fruit juice products.

[15] A recent regulation eliminated the luxury tax on all items in Table 3; it limited the tax to a few major luxury items like yachts.

Optical media, subject to import regulation because of intellectual property concerns, are substantially more expensive in Jakarta than in Singapore, by 31.2 percent, but optical drives are less costly. Color printers, subject to the import regulation related to counterfeiting concerns, are slightly more expensive in Jakarta than in Singapore, compared to monochrome printers, but color ink-jet cartridges are less expensive in Jakarta.

Top-end video games—Sony PlayStation 4 and Microsoft Xbox One consoles and controllers—are more expensive in Jakarta, as are other toys and games. Some of these toys and games are covered under an Indonesian National Standards regulation, which Section 3.6.2 will argue imposes a substantial burden on toy importers. This is ultimately passed along to consumers.

By far the most economically significant price premiums in Jakarta relative to Singapore in Table 3 are the 49.0 percent for smartphones and 63.7 percent for tablet computers. These numbers are based on a great many price comparisons, especially for smartphones, which all showed similar tendencies. No doubt these premiums reflect the restrictive telecommunications import regulations in Indonesia.

Certain products not subject to any major regulations are noted in the table. Pocket and other cameras are included under electronics because they offer an alternative comparator for small, relatively high value electronic devices like smartphones and tablet computers. However, as noted earlier, different markets for products that appear to be closely related can differ greatly. This is apparent for vacuum cleaners, for example, which are relatively more expensive than monochrome laser printers in Jakarta versus Singapore, despite not being subject to major NTMs in Indonesia.

Indeed, the price differentials for some regulated products in Tables 2 and 3 could be due to factors other than the relevant NTMs. For example, although instant water heaters were covered under the *produk tertentu* regulation, the sizable price differential, 112.8 percent, which was consistent across numerous models, could be related to the fact that most of these models are from Singapore companies. The Singapore market could be saturated, while Indonesia may remain a high-end market able to command premium prices.

The data also are consistent with lower-cost products being discounted more in Indonesia relative to higher-cost products. For example, computer mouses are considerably less expensive in Jakarta than in Singapore, particularly compared to laptop computers.

Finally, as noted earlier, I did retail price comparisons for construction materials, but adjusted only for the Singapore GST and the Indonesia VAT. Table 4 thus shows the amount by which U.S. dollar prices of cement, construction sand, and large and small split rocks in Jakarta exceeded those in Singapore in early 2015. Import licensing was imposed for cement in 2013.[16] Indonesia banned exports of sand, clays, and top soils in 2007. Prices of sand in Singapore are especially high because Malaysia similarly banned sand exports, and other Asian countries have restricted their exports.[17] The 2014 mineral export regulations limited exports of granite rock.

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[16] Short time series of retail cement prices in Indonesia and Singapore in recent years are available, but do not indicate any increase in domestic cement prices following the imposition of import licensing. Indeed, it appears that prices were on a downward trend that was not halted by the import licensing. Nevertheless, cement is more expensive in Jakarta than in Singapore. According to an industry insider, 40 percent of the cost of cement of one major cement company in Indonesia is logistics cost, which partly may reflect illegal levies charged along the roadways.

[17] Construction sand differs from sand used for landfills. The latter may be dredged from the sea floor or river beds, but these sands are not appropriate for mixing with cement to form concrete.

Table 4: Price Differentials Calculated from Retail Price Comparisons for Jakarta versus Singapore, Regulated Commodities, Construction Materials, Early 2015 (adjusted only for VAT and GST) (%)

Portland Cement	12.7
Construction Sand	-59.7
Split Granite Rock, Small	-79.1
Split Granite Rock, Large	-68.8

3.3. Comparisons of Retail and Border Prices

Three sets of commodities—sugar, rice, and alcoholic beverages—have long been subject to government intervention and import restrictions in Indonesia. We can do better than retail price comparisons with Singapore, however, given the uncertainties of those comparisons. Specifically, it is possible to compare domestic prices within Indonesia with border prices in order to calculate nominal rates of protection for these commodities.

For sugar and rice, I draw upon data from the Trade Policy Research and Development Agency at the Ministry of Trade, which obtained some of the information on trading costs from the state trading company P.T. Rajawali Nusantara Indonesia for sugar and the National Logistics Agency Bulog for rice.

3.3.1. Sugar

Much of the sugar produced within Indonesia is crystal white sugar, which tends to be coarse grained and varies in color from almost white to rather brownish. This sugar is intended for sale to consumers. A purer form of refined sugar is produced from imported raw sugar. Under current regulations, it is intended for use by industry, but leakages of refined sugar into the retail marketplace have occurred.

Sugar is complicated because the variety of sugar for which retail price information is thus available, crystal white sugar, is not allowed to be imported under current regulations. The best way to handle this is to treat crystal white sugar as if it were imported from Thailand, even though it is not, drawing upon the free on board (FOB) export prices in Bangkok and other data on costs of importation and distribution of sugar in Indonesia. On this basis, I calculate the nominal rate of protection for sugar to be 54.8 percent using price data from May 2015. Details of the calculations are given in Annex A.

Under the sharing system between sugar factories and farmers, farmers are to receive 65 percent of the value of the sugar content of their cane. In principle, then, sugar cane should enjoy a rate of protection equal to that for sugar. In practice, it may be less for the farmers who supply state-owned sugar factories: the farmers do not know the sugar content of their cane, and thus cannot protect their interests vis-à-vis the sugar factories.[18] Also, the retail price of sugar may fluctuate independent of the auction price at which sugar is sold at the state-owned sugar factories. Absent quantitative information on such issues, I assume that the 54.8 percent NRP for sugar also accrues to sugar cane, but it is more properly viewed as an upper bound for the NRP for the latter.

[18] If the share of the sugar content of the cane going to farmers is constant, even if it is less than 0.65, the NRP for cane will still be 54.8 percent. It is only if the share going to farmers goes down, the higher is the domestic price of sugar, that the NRP for cane will be less, but this seems plausible.

3.3.2. Rice

Rice imports have been managed by the state in Indonesia for many years. Some decades ago, intervention in the rice market was directed more toward price stabilization, but in recent years the focus has been mostly on boosting the prices that farmers receive for their rice. Some regional governments also intervene in the rice market and ban rice imports around harvest times.

Based on price comparisons for 15 percent broken long-grain white rice that is importable from Thailand, and similar information on costs of importation and distribution, I calculate that the nominal rate of protection for milled, polished rice averaged 64.3 percent over the first six months of 2015. Details of the calculations are shown in Annex A.

The field rice produced by farmers does not necessarily continuously reflect changes in retail prices of milled, polished rice in Indonesia. Absent any quantitative information on how the prices might diverge, however, I simply assume that the rate of protection for milled, polished rice implies a similar rate of protection for field rice.[19]

3.3.3. Alcoholic Beverages

Alcoholic beverages are subject to a complex web of regulations, including import tariffs, differential excise taxes for domestic output and imports, and licensing requirements for imports. There is no inherent reason for different excise tax rates to be charged on domestic output and imports, so the extra taxes charged on imports can be viewed as an NTM.

Table 5 shows the import duties, domestic excise taxes, and import excise taxes for the three official ranges of alcohol content at the time of our price survey in February and March of 2015. At that time, specific import tariffs in rupiah per liter were applied for all three ranges. However, in July 2015 the specific tariffs were replaced by ad valorem duties at rates of 90 percent for wines and other alcoholic beverages with alcohol content of no more than 20 percent, and 150 percent for harder liquors. The specific tariff evidently was retained for beers and ales. Given that I collected the data when all the tariffs were specific amounts of rupiah per liter, I will present those tariffs in this section, but for the ERP analysis I will assume that the new ad valorem tariff rates apply, all else equal. I return to this point at the end of this section.

Table 5. Import Tariffs and Excise Taxes for Alcoholic Beverages, Early 2015 (Rupiah per liter)

Alcohol Content	Import Duty	Domestic Excise Tax	Import Excise Tax
5% or less	14,000	13,000	13,000
More than 5% up to 20%	55,000	33,000	44,000
More than 20%	155,000	80,000	139,000

[19] See the previous footnote on the NRP for sugar cane versus sugar; similar considerations apply to field rice versus milled rice. Also, because the field rice and milled rice input-output sectors each include small amounts of exports that dilute the impact of the import restrictions, I calculate the nominal rates of protection for these sectors overall at 63.7 and 64.2 percent, respectively. Likewise, because the sugar input-output sector includes varieties of sugar beside cane or beet sugar, the aggregate NRP for the sector is diluted to 48.1 percent.

In the empirical analysis, I utilized retail prices in Jakarta and retail prices that the United States and Australian embassies in Jakarta charge their employees. The embassies are not subject to import duties, excise or other taxes, or other trade regulations, and thus their prices can provide a measure of the border price inclusive of retail distribution costs.[20] However, the embassies tend to be high-cost operations, given their small volumes, so this approach could understate the actual markup of the domestic price over the border price. Details of the calculations are shown in an algebraic framework in Annex A.

Table 6 shows price differentials calculated for a variety of types alcoholic beverages, all measured as percentages of the estimated CIF price. The first column indicates the total percentage differential between the domestic consumer price and the CIF price, but with the retail margin and value added tax removed from the consumer price so that it is directly comparable with the CIF price. The second column shows the domestic excise tax. Subtracting that from the consumer price differential, we get the nominal rate of protection for domestic output, shown in the third column. The last two columns show the amounts of the producer price differential that are absorbed by the import duty and the extra excise tax on imports, respectively. As emphasized in Annex A, as long as the quantitative import restrictions are binding—such that the domestic price exceeds the CIF price with all import duties and taxes included—changes in these import fees will not influence the domestic price.

Table 6: Differential between Domestic Consumer Price and CIF Price, Alcoholic Beverages, Early 2015 (% of CIF Price)

	Consumer Price Differential	Domestic Excise Tax	NRP for Domestic Output	Part of Differential Absorbed By	
				Import Tariff	Extra Import Excise Tax
Beer and Stout Ale	145.0	25.6	119.4	27.6	0.0
Sparkling Wine	144.0	13.7	130.3	22.8	4.6
Wine	202.3	20.1	182.1	33.5	6.7
Vermouth	120.9	23.1	97.8	38.4	7.7
Brandy and Cognac	58.5	8.7	49.8	16.9	6.4
Whisky	151.7	28.6	123.1	55.3	21.1
Rum	120.7	48.6	72.1	94.1	35.8
Gin	331.2	46.1	285.1	89.3	34.0
Vodka	340.0	56.3	283.8	109.0	41.5
Liqueurs and Cordials	101.3	28.4	72.9	38.6	21.0

Thus, for example, for beers and stout ales, the domestic consumer price is 145.0 percent above the CIF price. Subtracting the domestic excise tax of 25.6 percent, we see that the domestic producer price is 119.4 percent higher than the CIF price. Of that amount, 27.6 percent is absorbed by import duties.

For a given category of specific import tariff, such as for alcoholic beverages with more than 20 percent alcohol content, the percentage (ad valorem) equivalent of the specific tariff tended to be higher for less expensive items. For example, vodkas, rums, and gins were relatively inexpensive, while whiskies

[20] Other duty-free stores are available to members of the diplomatic corps of other countries, but these are supplied by state-owned enterprises subject to import licensing requirements.

were relatively expensive. Indeed, the relatively small price differentials for brandies and cognacs may reflect some price compression among the more expensive brands.

It is of interest also that the NRP for domestic output of beer and stout ale (as well as sparkling wines) are much higher than the ad valorem equivalents of the specific tariff rates. However, note that the beers examined only include imported items, and do not include foreign brands produced within Indonesia. The alcoholic beverages commodity category is clearly one in which domestic output (particularly products not sold under foreign brand names) and imports are far from perfect substitutes.

Finally, rum presents an anomaly, as it appears to have been sold at a discount price. In particular, the consumer price differential, 120.7 percent, which is based on a price comparison, is less than the sum of the ad valorem equivalent of the specific tariff on rum (94.1 percent) plus the total excise tax on imports (84.4 percent, which includes both the domestic excise tax and the extra excise tax on imports).

The domestic excise tax rates calculated in Table 6 will be inputs into the effective protection analysis below.[21] Section 4 discusses aggregation issues associated with this sector in particular.

As noted earlier, as long as the quantitative restriction on imports is binding and remains constant, changes in import duties or taxes should not affect the domestic price. However, with the new ad valorem tariff rates on wines and stronger liquors, given the protection provided to domestic producers by the 150 percent ad valorem tariff plus the extra excise taxes on imports shown in Table 6, the quantitative restriction will remain binding only for gin and vodka. For all other hard liquors subject to the new import duties, the import tariff and extra excise tax will determine the domestic producer price instead. I should add that, even though I include the new ad valorem rates in the ERP analysis, I am skeptical that the full ad valorem duties will be collected, since in the recent past there have been problems with under-invoicing of imports when these same ad valorem tariff rates were applied.

3.4. Imputation of Price Changes Based on Trade Value Changes

For categories of imports and exports subject to major policy interventions in Indonesia in recent years, price comparisons are not feasible due to the absence of data on domestic prices or external prices or both. However, simple simulation methods can be used to impute the import tariff or export tax rate equivalents of non-tariff trade measures based on trade elasticity parameter estimates from other studies and the changes observed in trade quantities and unit values between a base year and a year with the policy in effect, under certain assumptions.

One such assumption is that that Indonesia is a small player in world markets for these products, so that changes in its levels of imports or exports do not on their own affect the external price.[22] However, the analyses do correct for the effects of changes in the external price on the level of imports or exports. It is also assumed that the observed change in the quantity of imports or exports is exclusively a function of the trade policy and of changes in the external price. In reality, income per capita increased between the base year and the policy year—which would cause imports to increase, all else equal, so that the estimates of the rates of protection implied by the policies could be too low. Also, the commodities included in certain combined commodity categories are assumed to be sufficiently homogeneous that

[21] The domestic excise tax rates are recalculated relative to the domestic producer price, however, rather than the CIF price.

[22] This is more questionable for a few major export commodities than for imported goods, and it will be addressed in the following section in that context. It is an assumption commonly made in effective protection analyses in any case.

their quantities can be aggregated directly.[23] Finally, it is assumed that smuggling is not significant, so that the official trade data more or less reflect the reality in these markets.

In some cases, the unit values calculated for imports or exports using Indonesian data seemed suspect, and I replaced them with unit values of imports or exports of similar commodities from the United States. Further details on the methods and data sources, in particular for the elasticity estimates utilized, are given in Annex B.

Deardorff and Stern (1998) argue that estimates of NRPs based directly on price comparisons should generally be favored over those that require the use of market parameter estimates. While I concur, I would add that the latter offer useful perspectives and yield plausible numbers based on the dramatic decreases observed in imports and exports of a number of commodities over the past few years, and so I favor many of the estimates in Section 3.4.1 over Jakarta-Singapore retail price comparisons, and include in that section discussions of which estimates I prefer for which imported commodities.

3.4.1. Calculations for the Import Side: Live Cattle, Meat, and Horticultural Products

Table 7 (in two parts) shows the basic data and imputed import tariff equivalents (ITEs) of the non-tariff barriers for imports of live cattle, beef, chicken meat and offal, and horticultural products included in the recent regulations. For livestock and livestock products, the percentage changes in imports values (%Δ imports) and ITEs are shown for a base year of 2010 and a policy year of 2013, since these policies were generally tightened in 2011 and temporarily relaxed in 2014. For horticultural products, the figures use a base year of 2011, prior to the issuance of preliminary versions of the regulations in 2012, and a policy year of 2014.[24]

The Harmonized System (HS) codes and descriptions of the various regulated commodities are shown first in Table 7. For the horticultural products, all tariff lines included in the 2013 version of the regulation appear in the table. For livestock and livestock products, it made sense to aggregate tariff lines into broader commodity categories: major changes in the composition among some of these categories were observed over 2010-13, and quantities imported for some tariff lines were zero in some years, which made the calculations impractical.[25] Thus, non-breeding bovine animals—oxen, buffalo, and others—were aggregated. This seemed like the best approach, since oxen imports were reduced and other bovine imports increased over 2010-13. Similarly, chicken meat and offal were combined.

Although I analyze changes in the quantities of imports, it is useful to see import values in order to compare the importance of the commodities. Thus, the table next shows the value of imports for each year over 2010-14 in millions of U.S. dollars, and indicates that in many cases a drastic drop in the value of imports occurred between the base year and the policy year. Next the elasticity of import demand used for the calculations is shown. The final column shows the imputed ITEs of the quantitative import restrictions. These are typically higher than the initial import tariffs: for imports to have contracted, the

[23] For categories that I form from more than one tariff line, unit values of imports can be compared to determine whether this assumption is problematic.

[24] Revised versions of the horticultural regulations did not go into effect until 2013, as noted earlier, but there may have been some anticipatory changes in imports in 2012, so it seemed fairer to use 2011 as the base year.

[25] The problem of aggregating quantities of different unit values clearly becomes more of a concern for these broader commodity categories.

Table 7.1: Imputed Import Tariff Equivalents of Restrictions on Imports of Live Cattle, Beef and Chicken Meat, and Horticultural Products

		Imports (million USD)					%Δ Imports	Import Demand	Import Tariff
HS	Description	2010	2011	2012	2013	2014	2011-14	Elasticity	Equivalent (%)
0102100000[1]	Live bovine, pure-bred breeding animals	3.0	-	74.2	3.2	6.9	5.7	-0.81	-61.4
010290[1]	Live bovine animals, other than pure-bred breeding	447.2	328.3	211.7	338.2	675.2	-24.4	-1.24	21.8
0201-0202[1]	Meat, bovine animals, fresh and frozen	289.5	234.3	139.2	211.2	346.8	-27.0	-0.89	23.6
02061-02062[1]	Edible offal, bovine animals, fresh and frozen	105.5	87.2	16.8	27.4	85.7	-74.0	-0.54	130.6
02071[1]	Chicken meat and offal, fresh and frozen	0.2	0.0	0.0	0.0	0.0	-85.9	-58.85	-10.3
0701900000	Potatoes, other than seed , fresh or chilled	14.6	46.4	28.7	32.6	21.8	-53.1	-3.46	52.6
0703101900[2]	Onions,fresh/chilled, other than bulbs for propagation	22.5	32.1	24.4	13.9	36.2	12.8	-2.51	-8.6
0703102900	Shallots, fresh/chilled,oth than bulbs for propagation	32.7	75.5	42.0	52.8	27.2	-64.0	-2.51	78.5
0706101000[3]	Carrots, fresh or chilled	17.6	21.9	30.7	13.3	41.3	88.4	-0.84	-80.9
0709601000	Chiles, other than giant chiles, fresh or chilled	1.3	5.0	2.1	0.2	0.1	-98.9	-18.05	4.1
0710100000	Potatoes, frozen	4.9	9.1	5.5	0.1	0.0	-99.8	-1.24	153.1
0803001000	Certain common banana varieties in Indonesia	0.9	0.5	0.8	0.3	0.3	-52.3	-51.39	11.9
0803009000	Other bananas, including plantains, fresh or dried	0.7	0.3	0.3	-	-	-100.0	-51.39	12.9
0804300000	Pineapples, fresh or dried	0.1	0.1	0.0	-	0.0	-100.0	-0.93	123.3
0804502000	Mangoes , fresh or dried	0.8	0.8	0.9	0.3	0.6	-28.0	-0.91	52.9
0805100010	Oranges, fresh	24.4	25.1	26.1	19.3	19.3	-23.1	-1.12	12.5
0805200000	Mandarins & similar citrus hybrids, fresh or dried	143.4	164.8	176.6	92.6	142.7	-13.4	-0.80	38.0
0805400000	Grapefruit, including pomelos fresh or dried	0.2	0.3	0.2	0.2	0.2	-40.2	-0.47	101.6
0805500000	Lemons and limes, fresh or dried	0.9	1.9	3.5	5.7	13.3	592.4	-0.47	-535.7
0805900000	Other citrus fruit, fresh or dried	0.1	0.2	0.1	-	-	-100.0	-0.47	339.5
0806100000[4]	Grapes, fresh	81.3	113.1	122.7	100.9	150.7	33.2	-0.91	-27.7
0807190000	Other melons, fresh	0.4	0.4	0.6	0.0	0.0	-97.3	-0.93	159.8
0807209000	Other papayas, fresh	0.4	0.1	0.1	-	-	-100.0	-0.93	107.7

Table 7.2: Imputed Import Tariff Equivalents of Restrictions on Imports of Live Cattle, Beef and Chicken Meat, and Horticultural Products

		Imports (million USD)					%Δ Imports	Import Demand	Import Tariff
HS	Description	2010	2011	2012	2013	2014	2011-14	Elasticity	Equivalent (%)
0808100000[5]	Apples, fresh	168.1	186.4	170.5	175.6	200.2	7.4	-0.73	-7.0
0810600000	Durians, fresh	34.7	38.2	28.8	7.3	11.4	-70.1	-0.94	74.2
0810901000	Longans, fresh	62.9	111.8	138.5	66.8	90.2	-19.3	-0.94	30.0
2001901000	Onions, prepared/preserved by vinegar or acetic acid	0.4	0.2	0.2	0.1	0.1	-67.0	-1.81	48.4
2004100000	Potatoes, frozen, not preserved by vinegar or acetic acid	10.9	15.8	22.7	39.0	37.7	138.8	-1.01	-129.9
2005201000	Potatoes chips & sticks, not frozen, not preservd by vinegar	4.7	6.6	6.0	0.3	0.0	-99.7	-0.90	138.8
2007910000	Citrus fruit, jams, jellies, marmalades, purees	0.1	0.2	0.1	0.0	0.1	-42.4	-14.79	22.9
2008200000	Pineapples, othwise prepared/preserved	0.0	0.0	0.0	0.1	0.0	10.2	-14.43	24.0
2008301000	Citrus fruit, added sugar, in or not in airtight container	0.2	0.9	0.5	1.1	1.7	93.0	-14.43	-4.3
2008992000	Longans, othwise prepared or preserved	2.3	3.2	2.5	0.3	0.2	-92.7	-0.69	50.0
2009290000	Other grapefruit juice of brix value exceeding 20	1.5	2.3	1.9	1.6	1.1	-54.0	-0.97	51.9
2009390000	Other juice of any other single citrus fruit of brix value > 20	0.3	0.4	0.6	0.9	0.5	35.5	-0.97	-36.2
2009410000	Pineapple juice, of brix value not exceeding 20	0.1	0.1	0.0	0.1	0.1	18.0	-0.97	-12.7
2009690000	Other grape juice of brix value exceeding 20	0.4	1.1	1.6	4.2	1.3	14.6	-0.97	-12.4
2009710000	Apple juice, of brix value not exceeding 20	0.4	0.4	0.5	0.4	0.3	-24.1	-0.97	14.9
2009790000	Other apple juice of brix value exceeding 20	2.0	2.5	3.1	3.1	1.5	-39.4	-0.97	49.9
2009809000	Other juice of any other single fruit or vegetable	1.2	2.7	2.5	1.4	2.0	-26.3	-0.97	13.9
2009900000	Mixtures of juices	6.7	6.3	7.9	3.3	2.5	-60.0	-0.97	79.0
2103901000	Chile sauce	2.7	2.7	1.3	0.1	0.1	-95.2	-3.31	28.4

[1] For livestock and livestock products, %Δ imports and imputed tariff rates are for 2010-13, to match the period of import restraint. Bovine animals include oxen, buffalo, and other.

[2] For fresh onions, the imputed tariff rate is 19.3 percent for 2011-13.

[3] For fresh carrots, the imputed tariff rate is 59.0 percent for 2011-13.

[4] For fresh grapes, the imputed tariff rate is 11.9 percent for 2011-13.

[5] For fresh apples, the imputed tariff rate is 7.5 percent for 2011-13.

rate of protection must have increased. These ITEs are typically positive, indicating that the relevant NTM evidently caused imports to contract. Some of the ITEs are negative. For these commodities, imports increased between the base year and the policy year, and this increase could not be explained by any drop in the external price of the commodity. Thus, in this model, imports of these commodities would have to have been subsidized to account for the increase in imports.[26]

For pure-bred bovine animals for breeding, for example, the ITE is negative. It is of interest that imports surged in 2012: there clearly was an initiative to increase the size of the domestic cattle sector. The ITE for live bovine animals imported for slaughter, however, is positive, at 21.8 percent. The beef ITE is measured at 23.6 percent, not far from the 17.2 percent measured using time series data, although in that case different years were being compared. The ITE for edible offal of bovine animals is much higher, however, at 130.6 percent. I will utilize the time series NRP for beef, but will use the ITE from Table 7 for offal from cattle, given particularly the sharp decline in imports of the latter.

The ITE for chicken meat is negative. This is explainable by two factors. One is that the 2010-13 comparison is not ideal. Figure 2 shows that chicken meat prices had already risen in Indonesia relative to international markets, and the import data in Table 7 show that imports were already miniscule by 2010. The other is that the Indonesian import demand elasticity estimate for chicken meat is large in magnitude. For these reasons, I use the time-series NRP estimates for chicken meat in the ERP analysis.

For the vast majority of the 37 horticultural products shown in the table, the ITE estimate is positive, but for ten products it is not. For four of these products, however, the ITE is positive if the policy year 2013 is used instead of 2014: these are fresh onions (19.3 percent for 2013), carrots (59.0 percent), grapes (11.9 percent), and apples (7.5 percent), indicating an apparent easing of policy after the first year. Similarly, imports expanded for some other horticultural commodities between 2013 and 2014, but nevertheless decreased over 2011-14, as is evident from the import data in the table. For three of the four fresh commodities for which the sign of the ITE switched between 2013 and 2014, the price differential from the cross-country retail price comparisons is positive, and I will use it in the ERP analysis: 67.3 percent for carrots, 24.6 percent for apples, and 17.8 percent for grapes. For onions, the measured differential was -1.6 percent, and thus that NTM will be excluded from the effective protection analysis. Given the increase in onion imports over 2011-14, this seems to make sense.

The other commodities with a negative ITE—lemons and limes, frozen potatoes, three categories of juices, and preserved citrus fruits—had considerable growth in imports over 2010-14. The increase in frozen potato imports is related to the spread of fast food in Indonesia. It is conceivable that the rate of growth of these imports would have been even higher, however, had imports not been regulated.

For other commodities for which the ITE in Table 7 was positive, I often had more confidence in that figure than in the retail price comparison, and so used it in the ERP analysis. One reason is concern that differences in country of origin of fresh produce could influence the cross-country comparisons, as noted earlier. Thus, the ITE for mangoes is 52.0 percent, considerably lower than the 76.0 percent NRP indicated by the cross-country retail price comparisons; given the relatively modest decline in mango imports, I will use the smaller of these figures. For potatoes, it is an ITE of 52.6 percent versus -13.2 percent; given that potato imports fell by more than half, the first of these figures seems more reasonable. For shallots, it is an ITE of 78.5 percent versus 33.1 percent from the price comparison

[26] These negative tariff rate equivalents are not utilized in the effective protection analysis, consistent with the approach discussed further in Section 4.1 and earlier in Section 2.1.

versus 61.9 percent from the time-series analysis. I will use the last of these figures, for reasons noted earlier. For bananas it is ITEs of 11.9 and 12.9 percent versus 1.0 percent from the price comparison; given the sharp drops in banana imports, I will use the ITEs, which also are small because of the relatively large elasticity of banana import demand. For oranges, it is an ITE 12.5 percent versus 98.0 percent; given the modest drop in imports, the ITE makes more sense. For mandarins, it is an ITE of 38.0 percent versus 8.5 percent; the drop in imports is modest in this case as well, but we would expect mandarins to be protected more than oranges, since it is mandarins that are produced in Indonesia, so I use the larger figure. For pineapples, it is an ITE of 123.3 percent versus 2.6 percent; given the almost complete disappearance of pineapple imports, the first figure makes more sense.

For almost all of the import categories featured in Table 7, exports are on a much lower order of magnitude than imports. However, for chiles (HS 0709601000), other citrus fruit (0805900000), melons (0807190000), and papayas (0807209000) exports are on a similar order of magnitude as imports and declined between 2011 and 2014. A decline of exports along with imports could indicate that the exports are substitutable in consumption with the imports. If that is the case, the implied increase in price could be less than that predicted on the basis of the decline in imports alone. Given this uncertainty, I do not include the estimated import tariff equivalents of these commodities from Table 7 in any further analyses. For melons, I use the 49.2 percent estimate of the NRP from Table 2 instead.

3.4.2. Calculations for the Export Side: Mineral Products

In the absence of domestic markets (or at least publicly available prices) for metallic ores and concentrates, and other upstream minerals, I employed a similar method for the export side. I use 2014 as the policy year, given that export bans and other restrictions were imposed in January of that year in an effort to force more downstream processing of minerals. For some commodities, there may have been anticipatory surges in exports in 2013, so I use 2012 as the base year. However, the government imposed export taxes at a rate of 20 percent on many mineral products in May 2012, and for these products I use 2011 as the base year instead. Full details are given in note 1 in Table 8.

As in the model for the import side, price is the only determinant of exports. In many cases, the price was in decline over 2010-14 due to the slowdown in growth of the global and regional economies.

Table 8 (in two parts) first shows the HS codes and descriptions of the 54 commodity categories examined. A number of other minerals were subject to the regulation, but their exports were sporadic or very small, and so these items were omitted from the analysis. Also omitted from the table is tin ore, which was subject to an earlier policy mandating domestic processing and is discussed below.

Table 8 next shows developments in the value of exports over 2010-14. Some of the tariff lines for minerals like “nickel ores and concentrates” can encompass a variety of products with different unit values, so that aggregation of physical quantities could prove problematic. Comparison of export quantity changes and export value changes for each of the tariff lines indicated similar trends for the most part, however, particularly for the major export items.

The table next shows the change in the value of exports between 2012 (or 2011) and 2014, the elasticity of export supply, and the imputed export tax equivalent (ETE) of the non-tariff measures.[27] Positive ETEs

[27] I substituted for five missing elasticities with elasticities for other products. In particular, for nickel ores and concentrates the elasticity for iron ores and concentrates was used, and for copper ores and concentrates the elasticity for aluminum ores and concentrates was used.

Table 8.1: Imputed Export Tax Equivalents of Restrictions on Exports of Mineral Products

HS	Description	Exports (million USD)					%Δ Exports 2012-14[1]	Export Supply Elasticity	Export Tax Equivalent (%)
		2010	2011	2012	2013	2014			
2507000000	Kaolin and other kaolinic clays, whether or not calcined	8.3	9.2	3.9	0.3	0.7	-92.8	3.14	89.8
2514000000	Slate, whether or not roughly trimmed or merely cut	0.2	0.2	0.1	-	0.0	-99.3	0.15	100.0
2515121000	Marble and travertine, merely cut into blocks	21.3	26.9	17.2	19.1	14.6	-45.7	0.15	94.7
2515122000	Marble and travertine, merely cut into slabs	0.2	0.1	0.2	-	0.0	-95.2	0.15	99.2
2516110000	Granite, crude or roughly trimmed	16.0	25.2	18.1	1.9	0.3	-98.6	0.01	100.0
2516121000	Granite, merely cut into blocks	-	-	0.0	0.0	-	-100.0	0.01	100.0
2516122000	Granite, merely cut into slabs	-	-	0.0	-	0.0	-100.0	0.01	100.0
2517100000	Pebbles, gravel, broken/crushed stone (granite)	2.1	0.6	27.8	60.9	71.5	157.3	0.74	-1761.4
2517490000	Granules, chippings & powder of stones of 25.15 and 25.16	11.3	16.9	17.4	24.9	1.5	-91.1	0.06	100.0
2522100000	Quicklime	1.8	1.3	1.1	1.0	-	-100.0	4.01	18.0
2529100000	Feldspar	0.2	0.3	0.0	-	0.0	-99.4	4.31	51.4
26011[2]	Iron ores and concentrates, agglomerated & non agglomerated	182.3	342.6	251.0	426.8	57.5	-83.2	1.15	25.8
2602000000	Manganese ores & concentrates, manganese content >= 20%	31.4	17.1	3.1	1.0	-	-100.0	0.59	92.2
2603000000	Copper ores and concentrates	6,882.2	4,700.4	2,594.7	3,006.8	1,683.6	-64.2	1.84	28.7
2604000000	Nickel ores and concentrates	532.4	1,428.0	1,489.1	1,685.2	85.9	-94.0	1.15	15.4
2606000000	Aluminium ores and concentrates	479.0	773.2	626.0	1,349.7	46.4	-94.0	1.84	39.7
2607000000	Lead ores and concentrates	2.9	2.6	1.2	3.9	5.0	95.9	2.16	-419.7
2608000000	Zinc ores and concentrates	2.9	1.1	0.7	1.4	1.0	-1.0	2.16	23.3
2610000000	Chromium ores and concentrates	1.4	0.8	3.2	1.8	-	-100.0	2.24	18.1
261400	Titanium ores and concentrates, ilmenite and others	2.3	1.3	1.1	1.2	0.0	-96.0	0.78	41.6
2615100000	Zirconium ores and concentrates	20.6	56.7	81.6	42.8	21.3	-62.5	0.78	72.9
2616100000	Silver ores and concentrates	0.0	-	0.9	-	-	-100.0	0.78	90.1
2620300000	Ash & residues containing mainly copper (copper telluride)	0.0	0.2	0.7	0.3	0.3	-53.3	0.31	94.9
2812100000	Chlorides and chloride oxides (zirconium oxychloride)	-	-	5.2	11.6	-	-100.0	0.05	100.0
2817001000	Zinc oxide	10.8	19.7	14.2	14.1	13.4	-5.6	0.20	97.8
2818300000	Aluminium hydroxide	0.1	0.0	0.1	0.1	0.0	-88.2	3.37	-29.9
2823000000	Titanium oxides	3.3	0.0	0.1	0.4	0.2	37.0	5.38	-38.9
2824100000	Lead monoxide (litharge, massicot)	1.5	2.4	2.0	1.2	-	-100.0	2.81	13.3

Table 8.2: Imputed Export Tax Equivalents of Restrictions on Exports of Mineral Products

HS	Description	Exports (million USD)					%Δ Exports	Export Supply	Export Tax
		2010	2011	2012	2013	2014	2012-14[1]	Elasticity	Equivalent (%)
2825400000	Nickel oxides and hydroxides	1.4	2.3	0.6	0.8	0.1	-82.5	0.01	100.0
2825900000	Other metal oxides and hydroxides	0.0	0.1	1.0	0.4	0.2	-76.8	0.01	100.0
2827390090	Other chlorides of iron & other materials (manganese chloride)	1.8	1.7	1.3	2.1	0.8	-36.9	0.02	100.0
2836990000	Other carbonates (hydroxide nickel, manganese, zirconium)	0.0	0.1	0.3	0.2	0.2	-44.0	0.02	100.0
3802902000	Activated clays & activated earth (processed kaolin)	22.4	25.7	28.2	34.7	24.9	-11.7	0.61	-46.6
6802100000	Tiles, cubes, similar articles, square (granite)	4.7	5.8	5.8	5.7	2.8	-51.9	0.52	74.0
6802210000	Marble, travertine & alabaster, cut or polished	15.4	14.8	13.0	11.2	9.7	-25.8	0.52	38.4
6802230010	Other buildng stones & articles thereof, granite polished slabs	0.3	0.1	0.1	0.0	0.0	-87.9	0.52	83.0
6802910000	Marble, travertine & alabaster, futher worked	11.4	12.4	9.3	8.0	6.0	-35.2	0.52	38.4
6806200000	Exfoliated vermiculite, expanded clays, foamed slag (perlite)	1.1	1.6	1.5	-	0.0	-100.0	0.40	91.4
7106	Silver, powder and unwroght	12.8	47.1	83.5	74.8	87.8	5.1	3.37	-125.7
7108	Gold powder, lumps, ingots, or cast bars	1,154.3	1,627.7	1,952.4	1,817.4	1,504.6	-22.9	0.05	-115.8
7112999000	Waste & scrap of other precious metal (anode slime)	0.2	0.1	940.6	619.4	793.9	-15.6	0.10	-335.1
7202290000	Ferro-silicon, containing by weight <= than 55% of silicon	0.0	0.1	0.0	0.0	-	-100.0	2.79	28.0
7202300000	Ferro-silico-manganese	18.3	12.1	25.0	17.5	38.5	53.8	2.79	-45.5
7202600000	Ferro-nickel	373.6	470.1	336.8	232.0	292.1	-13.3	2.79	-34.1
7203100000	Ferrous products obtained by direct reduction of iron ore	0.1	0.1	5.1	0.0	3.2	-37.8	3.71	26.9
7403110000	Refined copper for cathodes and sections of cathodes	1,192.4	1,168.9	544.8	524.6	755.8	38.7	1.35	-84.0
7403190000	Other refined copper, unwrought	1,066.2	1,374.4	10.2	-	0.0	-99.8	1.35	43.2
7406100000	Copper powders of non-lamellar structure	0.1	0.1	0.0	0.1	-	-100.0	2.48	31.2
7501100000	Nickel mattes	1,429.6	1,209.9	981.8	921.9	1,038.1	5.7	0.72	-20.9
7601100000	Aluminium, not alloyed (ingots or bars)	328.2	325.0	294.1	265.8	209.6	-28.7	8.32	11.6
7801100000	Refined lead	6.1	6.1	2.4	0.5	6.0	152.7	6.12	-31.1
7801910000	Other unwrought lead, antimony the principal other element	3.4	3.4	2.4	4.6	1.9	-19.1	6.12	6.9
7801991000	Other unwrought lead	2.6	3.4	2.1	2.8	3.0	43.3	6.12	-290.4
7901200000	Zinc alloys	0.3	0.3	0.1	0.4	0.3	232.1	5.70	59.4

[1] The following minerals in the table became subject to a 20 percent export tax starting in May 2012: HS 2507000000-2516122000 and 2522100000-2616100000. The period 2011-14 is used instead of 2012-14 for all of these except the three for which exports were zero in 2011 but positive in 2012 despite the export tax. For all other minerals in the table, 2012-14 is used.

[2] Iron ores and concentrates does not include roasted iron pyrites.

are shown as positive numbers, indicating that the NTM evidently caused exports to contract, although in the aggregation for the ERP analysis these ETEs are entered as negative numbers, since export taxes depress the domestic price.

For 40 of the commodity categories these ETEs are positive. For those with negative ETEs, exports grew by more than could be explained by external price trends, and thus the model indicates that exports would have to have been subsidized for exports to change in that way.

For a few commodity categories, such as activated clays (HS 3802902000), the imputed ETE of the policy was negative even though the value of exports contracted between 2012 and 2014. For this particular commodity, the quantity of exports increased between 2012 and 2014.

Lead ores and concentrates (HS 2607000000) is also a case of interest. The value of exports increased substantially between 2011 and 2014. If the unit value of imports from Indonesia had been used for the price series, the price increase would have been so large that the ETE of the policy would have been positive. However, the use in the calculations of the unit value of exports from the United States (which were more stable) instead creates a different picture: there appears to be an export subsidy of 419.7 percent. One possible explanation for this divergence is that, for this product category, the product exported may have been upgraded to a more concentrated and higher-priced form, as was the intent of the regulation, though such an outcome seems improbable in such a short period of time. Definitive resolution of the issue would require more detailed study of that export sector.

Given the substantial growth in exports of pebbles, gravel, and stones (HS 2517100000), in which granite rocks were the only regulated products, it is possible that certain minerals were diverted or reclassified into this category, perhaps illegally, in order to circumvent the export restrictions. The slight increase in the value of exports of nickel mattes (HS 7501000000), however, could reflect an intended effect of the policy, though new nickel processing capacity had not yet come on line.

A similar ban was imposed on exports of tin ores and concentrates years earlier. Application of a similar methodology, using 2002 as the base year and 2004 as the policy year, reveals almost a complete disappearance of exports (which since 2008 have officially been zero). The imputed export tax rate is measured at 56.8 percent, and I will use that in the ERP analysis.

If the tin ore export ban were lifted at this point, given the passing of many years, would exports return to their base-year level? Given that domestic processing capabilities have been developed in the mean-time, the answer is almost certainly no, in which case the imputed export tax rate calculated though this methodology would now be too high. Similar considerations could apply to other minerals with the passage of time, as well as to forest products for which exports have been banned in the past.[28]

3.5. Commodity Subsidies that Presume Trade Restrictions

The sharp decline in prices of petroleum products in late 2014 eased pressures for continuation of the subsidies on petroleum-based fuels. However, the state-owned petroleum company, Pertamina, was ordered to sell the traditionally subsidized grades of gasoline and diesel fuel at fixed prices, which were

[28] Elimination of the export bans would provide a wonderful test of the competitive viability of the processing industries. A necessary but not sufficient condition for policies of this sort to serve the broad national interest, economic efficiency in particular, is that the "infant industries" created through the policies should be able to survive on their own in the long run, without governmental support of any sort. If not, the industries will constitute a long-run burden on the economy.

not adjusted fully as petroleum prices increased. Thus, subsidies for these products remained, in the form of losses incurred by Pertamina. For late February 2015, I calculate the total subsidy for premium gasoline, with an 88 octane rating, at 17.8 percent, and for diesel fuel at 34.7 percent. These subsidies vary on a daily basis, as world energy prices and the exchange value of the rupiah vary.

The official subsidy for kerosene remains in effect as well, and small containers of liquified petroleum gas are now subsidized, presumably in an effort to promote a transition from kerosene as a household fuel. In addition, an array of fertilizers continue to be subsidized, and a subsidy for biodiesel fuel was introduced in July 2015. Table 9 shows the calculated subsidy rates for these commodities.

Table 9: Subsidy Rates for Various Commodities, Early 2015 (%)[1]

Fertilizers	
Urea	65.4
SP-36 (super phosphate)	63.6
ZA (ammoniated zinc)	46.1
NPK (nitrogen-phosphorus-potassium mix)	61.0
Organic	53.4
Oil and Gas	
Kerosene	81.8
LPG in 3 Kg Containers	63.0
Diesel Motor Fuel	34.7
Biodiesel Motor Fuel	46.4
Gasoline (low octane)	17.8

[1] All rates were calculated based on prices that applied sometime between January and March 2015, except for the biodiesel rate, which is calculated as of July 2015 based on a new policy.

These subsidies are mostly targeted, and have been accompanied by extensive, if historically porous, controls on domestic distribution and international trade, and are thus appropriate for inclusion in this analysis. Among the forms of leakages of subsidized commodities that have occurred in the recent past, huge illegal exports of gasoline have been recorded as consumption in official Indonesian data.

Among the targeted subsidies, kerosene is intended for households and small businesses, particularly in rural areas. The diesel subsidy is similarly not intended for large industrial users of diesel fuel.[29] Fertilizers are intended for small farmers but not industry, and as of 2015 were targeted only for cultivation of rice, corn, and soybeans. In practice, this meant that supplies of subsidized fertilizers were reduced relative to previous years, when other small farmers were eligible. There is anecdotal evidence from Central Java that subsidized fertilizers are scarce; in the ERP analysis, I will assume that subsidized fertilizer reaches only the targeted users, but without much confidence that this occurs.

Another question is about the extent to which the subsidies are associated with degradation of the quality of the product, such as through adulteration in the case of kerosene and urea, the

[29] Presidential Regulation 191 of 2014 indicates the users eligible for the subsidies on kerosene and diesel fuel.

inconvenience of buying subsidized products, such as LPG in subsidized 3 kg containers versus non-subsidized 12 kg containers, and the periodic absence of the subsidized products from the market.

Finally, how widely do the subsidies affect prices of related products? In general, in the absence of data on the market shares of subsidized and unsubsidized commodities, I assumed that the policies affect commodity prices broadly. Moreover, I applied the subsidy for fertilizers containing mixtures of potassium, phosphorus, and nitrogen more widely than for precise mixtures of these products, on the assumption that mixtures of two of these, combined with fertilizers based in the other element, could substitute easily for mixtures of all three, and thus would be priced similarly. Limited availability of subsidized fertilizers could call this approach into question, however.

Finally, a new set of export taxes on palm oil products was imposed in July 2015, to fund the new biodiesel fuel subsidy. For the ERP analysis, I include the tariff line that includes this fuel among oil refining products (input-output sector 104) rather than in other chemical products (sector 103), in which I otherwise would have located it.

Based on all these considerations, the trade-weighted subsidy rates applied in the calculation of ERPs are 62.5 percent for all fertilizers, 15.7 percent for oil-refining products, and 63.0 percent for liquified natural gas. These subsidies are not provided to all sectors in the ERP analysis, however, consistent with the official targeting of the policies.

3.6. Information from Other Sources

Information from market participants and other studies proved invaluable in this project. This section discusses several commodities in such terms, and then discusses perspectives from market participants on various procedures that have added to the costs of importing or exporting multiple commodities. In all cases, I endeavor to quantify in some manner the impact on costs.

3.6.1. Information on Other Policies

For the aggregation of trade policies for the ERP analysis to follow, regulations from the Minister of Finance provided details on the import duties updated through July 2015 under the most-favored nation (MFN) schedule as well as various preferential trade agreements: the ASEAN free trade agreement, along with the free trade agreements between ASEAN and China, South Korea, Australia and New Zealand, and India. (Indonesia has not to this point ratified the ASEAN-Japan agreement.) Also included are the Indonesia Japan Economic Partnership Agreement and the Preferential Trade Agreement between Indonesia and Pakistan.

Similarly, regulations from the Minister of Finance provided the requisite information on export taxes for various commodities (palm oil and related products, certain wood products, animal hides, and cocoa beans) as well as contingent protection in the form of anti-dumping import duties (primarily in the steel sector, but also for certain artificial fibers and ceramic tableware) and safeguards import duties (in textiles and a few steel products).[30]

[30] Monthly regulations from the Ministry of Finance set the export prices at which the export tax rates are applied; many of the rates vary with the export price. The safeguards duties typically have been set as specific tariffs, in rupiah per unit, and I used recent measures of import unit values to convert these to ad valorem terms.

Information on policies for other commodities came from diverse sources, which are detailed below.

Rattan: A recent study by the Trade Policy Research and Development Agency of the Ministry of Trade noted that the price of unprocessed rattan in the Katingan District of Central Kalimantan dropped because of the 2011 complete ban on unprocessed and semi-processed rattan exports, from Rp 1500 – 2200 per kg to Rp 1100 – 1500 per kg.[31] I take the midpoint of the implied percentage decreases, 29.7 percent, as the measure of the effect of the policy.

Prior to the complete ban, a partial ban on exports of certain types of unprocessed rattan had been in effect since 2007. Perhaps a figure based on the experience of one locality should not be generalized for all of Indonesia. However, no doubt the prior selective ban also had an impact on prices of other types of rattan. Trade data from Singapore since 2011 indicate not only an increase in imports of unprocessed rattan from Malaysia, but also continued imports of unprocessed rattan from Indonesia. The increase in rattan exports from Malaysia could be indicative of an increase in rattan prices outside Indonesia; such an increase would add to the appropriate price differential measure for the policy. It is also possible that rattan was being smuggled out of Indonesia through Malaysia, as well as evidently to Singapore. Industry insiders note that, for traders to undertake the risks and costs of smuggling, a considerable margin between internal and external prices should exist, on the order of 30 percent or more. So the percentage estimated may be in the vicinity of the truth.

The Ministry of Trade study noted that some of the varieties and diameters of rattan for which exports were banned in 2011 are not even used within Indonesia. One might expect that perhaps that could change over time, as the prices of these varieties become depressed by the ban. However, two considerations weigh against that. First, all unprocessed rattan exports were previously banned for years, prior to the intervention by the International Monetary Fund in Indonesia that began in 1997. Thus, there was a previous extended opportunity for domestic industries to begin to use these varieties. Second, a rattan trader in Singapore notes that the rattan furniture sector globally is in a long-term decline, as alternative products have become more fashionable. Thus, the advantages of the ban are in some doubt.

Timber: The International Tropical Timber Organization publishes semi-monthly data on timber prices in Indonesia and other countries, and until 2013 published similar data for Malaysia. For the most recent period for which comparable data exist, 1-15 December 2013, meranti logs sold for 6.6 percent less in Indonesia than in Malaysia, and so I take this as a rough measure of the impact of the ban on exports of logs and related timber products.[32]

Cloves: Established clove traders in Singapore reckon that clove prices inside and outside Indonesia in early 2015 were more or less at parity. Indonesia applies an import restriction, but the global price of cloves has been high enough recently that this policy has not been binding.

Coal: In recent years, exports have been limited under a domestic market obligations policy. However, the global decline in coal prices has reduced the impetus to export, and so the policy was not enforced as of 2014. Even before the price downturn, the former chair of the Indonesian Coal Mining Association

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[31] *Analisis Kebijakan Ekspor: Analisis Dampak Kebijakan Pelarangan Ekspor Rotan*, Badan Pengkajian dan Pengembangan Kebijakan Perdagangan Pusat Kebijakan Perdagangan Luar Negeri, Jakarta, 2012.

[32] It is possible that differences in the level of processing of the logs account for the difference: the Indonesia prices are internal market prices, while the Malaysia prices are FOB export prices. In any case, these differences appear to have persisted over a long period of time.

stated that, with the domestic market obligations, the export and domestic prices were about the same, although buyers had more clout and the national electric company, PLN, often delayed payment.

Salt: Salt is subject to import restrictions, but based on reports of frustration among officials over non-compliance of market participants I infer that the tariff equivalent of the policy is zero.

Oil palm: I estimate the NRP for oil palm fresh fruit bunches due to export taxes on palm oil and related products based on typical parameters of the revenue sharing scheme between the farmers and the factories that produce crude palm oil (CPO) and palm kernels.[33] The export tax for CPO is about 8.2 percent at current price levels. It was zero until a new export tax was introduced in July 2015 to finance the biodiesel subsidy. In addition, I use estimates from Nigeria of the yield of palm kernels into derivative products (crude palm kernel oil and palm kernel cake) to estimate the impact of export taxes on these derivative products on prices of palm kernels.[34] I also include a procedural measure (discussed in Section 3.6.2) that adds to the costs of exportation for certain resource-based products, including CPO. On this basis, I obtain an NRP for oil palm of about -8.5 percent.

Cinematographic film: The government now applies specific tariffs per minute of run-time for cinematographic film, which makes computation of ad valorem equivalents difficult. A source in the Fiscal Policy Agency in the Ministry of Finance estimates that the ad valorem rate is about 20 percent.

Plastic raw materials: A major manufacturer of plastic bottles states that it has had to adjust its approach to the acquisition of raw materials for plastic bottles, given two import regulations of the Ministry of Trade listed in Table 1: the 2013 regulation on plastic raw materials as well as the 2012 regulation on optical media.[35] Based on this input, I conservatively put the import tariff equivalent of these policies at 10 percent, which is no higher than the MFN import tariffs for some of these materials.

3.6.2. Procedural Burdens on Imports and Exports

This section make a few observations on various procedures that add to the costs of importation. The focus is on quantification of the effects of these policies, to the extent possible. This is not easy, because these costs are typically in the form of fixed costs. Thus, the larger the shipment, the lower the regulatory compliance cost per unit. Moreover, a shipping container filled with one type of product could incur lower inspection costs than one with several different products.

Indonesian National Standards (SNI): Promulgated by the Ministry of Industry, these standards are applied in different ways for different product. Importers we interviewed agreed that among the most burdensome are those for baby clothes and toys, which are applied for each shipment of imports. Thus, each shipment requires thorough laboratory testing of all product varieties, international travel by Indonesian officials, interest and other storage costs overseas while sample testing is being done, extra handling and transport costs, and so on. Domestic producers, in contrast, can have their product lines approved for six months at a time, and in some cases provincial governments have waived these costs.

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[33] Palm fruits are not much traded, so their prices likely are not depressed as much as their high export tax rate would imply.

[34] "Feasibility Study of Six Crushing Machines of 20 Metric Tons Capacity Of Palm Kernel Per Day (Medium Scale)", http://www.nairaland.com/963478/medium-scale-palm-kernel-oil, 13 June 2012.

[35] The company no longer imported these materials directly, but obtained them from a specialized importer. Different kinds of polycarbonate raw material are used for optical disks and for bottles, the difference being melting temperature. Difficulties in distinguishing the two kinds have led to problems in getting port clearance.

Given that these costs are incurred for every shipment, one prominent importer stated that compliance with SNI for baby clothes cost it 15-20 percent of the value of the shipment and for toys 15 percent. The company noted that, because of the shortness of the fashion season, it tended to make relatively small shipments for both types of products. Consistent with this assessment, another company that imports toys as a relatively small part of its product line states that it spreads the high cost of complying with SNI for toys over its other products, since marking up toy prices to cover the full SNI costs would tend to price the toys out of the market. Based on these reports, I assume that SNI costs 15 percent for baby clothes and toys.

SNI are applied for many other products—ceramic tableware and tiles, towels, major appliances, and mirrors, but a complete survey of these regulatory compliance costs is beyond the scope of this study.

Pre-shipment Inspections (PSIs): These inspections typically are intended to verify country of origin and the nature and source of the product being imported. They are required for a wide range of products nowadays, particularly those subject to other import regulations—like horticultural products (fresh products also require phytosanitary certificates) and all of the products covered under the *produk tertentu* regulations applied by the Ministry of Trade since 2012. Companies say that these inspections are not a major impediment to trade at this point. One company estimated that PSI costs were about 0.35 percent of its border price, and I will use that figure for items covered by the *produk tertentu* regulation.

For horticultural products, however, a fruit trader reports that the costs for PSIs plus compliance with the cold-storage protocols in recent regulations can be as high as 6 percent. Because the effects of the horticultural restrictions on prices were estimated previously in this study, it is not necessary to include this cost separately.

Quarantine costs: A 2015 regulation of the Minister of Agriculture specifies quarantine guidelines for a wide range of products that contain organic material. Quarantine processing for products like furniture (for their wood and natural fibers) is indicated to be one day, while live animals can take up to 21 days. Fresh fruits and vegetables typically are 3-day products. Wooden packing materials for other imports are also covered. Based on very preliminary impressions from one importer, I will take the costs of quarantine to be 1.5 percent for all of these products, though it certainly is more for livestock and plant products requiring more investigation and maintenance time. Further research is required.

Documentation costs: As noted earlier, Indonesia offers seven regional or bilateral preferential import tariff schedules, in addition to its most favored nation schedule offered to members of the World Trade Organization. Based on input from a major importer, I estimate the documentation cost to obtain preferential duty rates at 0.53 percent of the border price.

Letter-of-credit requirement: Exports of coal, crude oil, crude palm oil, crude palm kernel oil, and an array of mineral products are subject to a 2015 requirement that exports be financed by letters of credit, presumably to make evasion of royalties or taxes more difficult. The cost is estimated by industry insiders to be 0.215 percent of the border price. Based on 2012 trade data, this cost would have applied to a massive 41 percent of exports, as noted in Table 1.

4. Aggregation Issues: From Tariff Lines to Input-Output Sectors

Aggregation biases of various sorts are inevitable if one starts with detailed data but then must combine the data into broader sectors. Aggregation issues are present in this study in four different ways— in the forming of composite import tariff rates given the multiplicity of tariff schedules now applied, in the

combining of NTMs and import tariffs in a given tariff line, in the combining of the import and export sides of the market in a given tariff line, and in the weighting of tariff lines for which rates of protection are aggregated up to the level of input-output sectors.

4.1. Composite Import Tariff Schedules

Partial and general equilibrium models of trade can easily accommodate different import tariffs being applied to different source countries, if preferential trade agreements are in effect. Calculation of effective rates of protection, on the other hand, requires a single nominal rate of protection to be used for each sector.

This is problematic in general: there is no ideal way to aggregate imports different source countries. Marks and Rahardja (2012) use two different composites of the import tariff rates for a tariff line—the marginal rate of protection (MRP) and the average rate of protection (ARP).

The MRP is marginal in the sense that it is the highest tariff rate, MFN or preferential, that applies to a positive amount of imports from some source country or region. The MRP indicates the impact of the tariff system on domestic prices under the assumption that domestic products and products imported from various countries are perfectly substitutable—and thus sell for identical prices.

The logic is that it is this tariff rate that will set domestic prices, at the margin, in the presence of policy distortions. If it is attractive to import a product from the country subject to the highest tariff rate with the distortive policies in effect, then under free trade it would certainly be attractive to import from that country as well, given that import prices will be lower in general, but particularly for that country. Countries subject to lower tariff rates may have lower costs per unit, but may be limited in the amounts they can supply, or may have higher costs per unit so that they would be competed out of the market under free trade. In either case, the impact of the trade policies on domestic prices is best measured by the highest tariff rate that is actually applied in the distorted situation.

The ARP is a weighted average of the tariff rates applicable to various countries, with imports from each used as the weights. The ARP makes sense if the imports from each country are separate products that are not at all substitutable. The ARP is less consistent with ERP analysis, which typically assumes (rightly or wrongly) that imports and domestic output are perfect substitutes.

Given the ERP assumption that imports and domestic output are perfect substitutes, for the ARP approach to be correct, imports from each trading partner would have to be perfectly substitutable with a portion of domestic output, but not at all substitutable with each other. That would be rather strange. Thus, the ARP provides a mathematically (but not economically) plausible way to summarize nominal rates of protection on the import side. This paper will present findings based on the marginal rate of protection only.

4.2. Combining the Effects of NTMs and Tariffs

Modifying slightly the approach of Fane and Condon (1996), in the case of NTMs on the import side, if the percentage differential between the domestic and external price is positive and exceeds the composite import tariff rate plus the ad valorem equivalent of any tariff-like NTMs (such as pre-shipment inspections), then that differential is used to measure the NRP; otherwise the NRP is simply the composite import tariff rate plus the ad valorem burden of the tariff-like NTMs.

Similarly, in the case of NTMs on the export side, if the percentage price differential is negative and exceeds in magnitude the export tax rate plus the costs of any tax-like NTMs, then that differential is used to measure the NRP; otherwise the NRP is simply the export tax rate plus the ad valorem burden of any tax-like NTMs. In all cases, NRPs on the export side are negative numbers.

4.3 Combining Import and Export Policies

To combine the NRPs on the import and export sides of a given tariff line, I weight the NRP on the import side by the value of imports, and on the export side by the value of exports.

The logic is that even tariff lines can include commodities that are differentiated—even if just by geographical region or season. Indonesia might import certain agricultural products at some times of year and export them at others, for example. To rationalize the use of the weights, one must assume that these differentiated products are separate products that cannot be substituted for each other.

In some cases, this approach may present a rather distorted picture, because the estimated effects of an import (or export) policy are diluted by the presence of exports (or imports) in a tariff line or sector. An example is given by alcoholic beverages. Table 6 indicates very high nominal rates of protection due to tariff and non-tariff trade policies in that sector. In fact, if there were no exports of alcoholic beverages, the nominal rate of protection for the sector would be 179.7 percent.

Nevertheless, using import values to weight these rates of protection, and using export values to weight the zero rates of protection on the export side, one obtains a nominal rate of protection for the alcoholic beverages input-output sector of only 53.7 percent. It turns out that exports of beers, and especially of sparkling wines (mostly to other Asian countries), account for most of the difference. This amounts to an example of aggregation bias: we get a very different picture of this sector than if we were looking at whiskies, gins, and other harder liquors alone.

4.4. Weighting of Tariff Line Data

It is well known that the use of trade weights to aggregate rates of protection can bias nominal rates of protection toward zero.[36] For example, a ban on exports of a product will mean that the policy receives zero weight in the calculations, even if the nominal rate of protection is a large negative number. A high import tariff will similarly drive down imports, reducing the weight that the tariff receives in the calculations. This is no doubt part of the problem in the alcoholic beverages sector.[37]

The aggregation of tariff lines up to input-output sectors is done in this study mostly using import and export weights from the year 2012. This is convenient, because Indonesia introduced a new Harmonized System commodity classification in 2012 that was applied both to trade data and to the various import tariff schedules. Moreover, the year 2012 preceded some of the most draconian trade policies adopted in recent years, such as the ban on exports of unprocessed and many semi-processed minerals, and the horticultural import licensing policies. Thus, import and export values in that year were not distorted by the policies to be applied in the near future.

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[36] Even if output weights were a practical alternative, these weights would also be affected by trade policies, though almost certainly not to such a great extent.

[37] For some commodities, this is not a problem because all tariff lines within an input-output sector are subject to similar trade restrains, such as in the case of milled, polished rice and also field rice.

For some commodities, however, policies already had an effect on trade values in 2012, and for some of these I patched in trade values from a previous year or even a later year, in a rather ad hoc but effective manner, in order to account for these policies.[38] For beef, for example, I use trade weights from 2014, when import restraints were temporarily relaxed. For chicken meat, I similarly used the year 2008, prior to the constriction of imports. In the case of two export bans I also used earlier years. For rattan, I used the year 2011, the year in which ban on unprocessed and semi-processed products occurred, but before the policies had a discernible effect on export values. For sand, clays, and top-soil, I used 2006, since a ban on exports of these products was imposed in 2007. For tin ores and concentrates, I similarly use trade data from 2002.

I used a similar approach for imports of certain hot-rolled steel coils from Malaysia, for which high anti-dumping duties were applied in 2011.[39] For other dumping and safeguards actions, no adjustments were required.

Finally, for the long-standing bans on exports of logs and related wood products as well as certain tin products, I used 2012 values reported by all other countries as being imported from Indonesia, evidently via smuggling.

5. Effective Rates of Protection

The effective rate of protection (ERP) for a tradable item is defined as the proportion by which value added per unit of output with distortive policies in effect exceeds the level under free trade. Value added can be calculated as the difference between the value of output and costs of produced inputs.[40] Thus, a positive ERP for a sector indicates that policies on balance raise the domestic price of output relative to the prices of the goods and services used to produce it. The ERP can also be negative, which indicates that on balance the prices of goods and services used as inputs by a sector increase relative to the price of its output.[41]

As noted earlier, effective protection analyses typically assume perfect substitutability between domestic and foreign tradable goods. This means that the domestic price of a good, P_D, is locked in by the nominal rate of protection, t, and the border price, P^*:

$$(1) \qquad P_D = P^* \times (1 + t) \, .$$

Also as noted earlier, t is positive in the case of import tariffs or other barriers, and negative in the case of export taxes or barriers. It is also assumed that the border price is a given—that the country is not so

[38] Given a growing economy, one would expect that imports from the past would be lower than 2012 imports, absent the distortive policies, and that imports from the future would be higher.

[39] I did the adjustment for Malaysia only, under the assumption that domestic production rather than imports from other countries substituted for the imports from Malaysia. In reality, we could reasonably expect both to occur.

[40] Value added can alternatively be calculated as the incomes earned by primary factors of production like labor, land, and capital.

[41] A formula for the effective rate of protection can easily be given in the special case in which there are no non-tradable goods or services, but the assumptions are not realistic. In general, calculation of effective rates of protection typically requires some complex matrix operations, and there is not much to be gained by looking at a formula.

large that it can influence foreign prices of goods or services. Thus, the border price is identical to the free trade price. This is not realistic for all markets in Indonesia, but is intended as an approximation.

Effective rates of protection are comprehensive in that all sectors of the economy are involved in the calculations, but ERP analysis is nevertheless a partial equilibrium rather than general equilibrium approach. For example, the prices of primary factors of production like labor, land, and capital are typically taken as given, and the markets for non-tradable services are treated in a rudimentary manner, as we will see below.

In any case, if we can assume that input-output coefficients are constant, and perfect competition prevails, in all sectors of the economy, then a higher ERP unambiguously indicates stronger incentives to produce more of a good. If these assumptions are not met exactly, ERP estimates may nevertheless provide useful information on the effects of policies on incentives.

5.1. Non-tradable Inputs

A complex issue that one must address in effective protection analysis is how to handle non-tradable items such as services. The problem is that equilibrium prices of non-tradables are determined within the economy, rather than being locked in by an international commodity arbitrage condition like (1) for tradable goods.

For example, electricity is typically viewed as non-tradable. An increase in the prices of tradable goods like coal or natural gas will raise the costs of production and price of electricity, which in turn will raise the costs of production of tradable and non-tradable items for which electricity is an input. As noted, the prices of these tradable items are locked in by international commodity arbitrage, and thus cannot increase, although the higher electricity costs will reduce value added per unit in these sectors. However, the prices of these non-tradable items can increase due to the increased electricity costs, which will raise the costs of production of all sectors that use these non-tradable items.

Four methods have been proposed to handle this problem. Balassa (1965) assumed simply that prices of non-tradable items were fixed. This assumption is easy to implement, but is not attractive. Balassa (1982) assumed instead that prices of non-tradable items rise by just enough to cover the increased costs of tradable and non-tradable inputs for these items that are caused directly (in the case of tradable inputs) or indirectly (in the case of non-tradable inputs) by trade or other policies.

Humphrey (1969) included the mechanism of the Balassa (1982) method, but also added wage pressures under the assumption that the real wage remains constant. Thus, suppose for simplicity that there are only import barriers, which directly raise the prices of tradable goods and thus indirectly raise the prices of non-tradable services. With these policies in effect, workers will demand higher money wages to cover their higher costs of living, and this will add more cost pressure to non-tradables sectors, pushing their prices higher still, and thus also squeezing value added per unit in tradable sectors even more. This process will eventually settle down to an equilibrium, but some sort of non-linear optimization procedure is required to compute the solution.[42]

[42] Critics point out that the Humphrey method does not offer a general equilibrium framework for the determination of wages and other domestic prices. This is certainly true, but nevertheless the method does provide a useful way to account for higher costs of living implied by trade restrictions.

Corden (1966) proposed an alternative value added measure to calculate effective rates of protection. He observed that protection of a sector protects not only the primary factors of production that contribute value added directly to that sector, but also the non-tradable inputs used in it, and thus the primary factors of production that contribute value added to production of these non-tradable inputs as well. The Corden approach traces back through the IO table until all non-tradable inputs are solved out of the system: all that remains are direct and indirect tradable input costs and value added. The ERP is then calculated as the proportional change in both directly and indirectly contributed value added per unit of output in a tradables sector. This value added measure is calculated as the price of the output minus total direct and indirect tradable-input costs per unit of output. Because non-tradables are solved out of the system, the question of how to calculate their prices under free trade versus with the distortive policies in effect does not arise.

In this paper, I use the Humphrey method in large part because the effects of trade policies on wages are of considerable interest, given that many import barriers in recent years have been applied to consumer products, particularly fresh and processed foods.[43] I also use the Corden method, which is particularly useful if one wishes to calculate domestic resource costs by sector to identify the patterns of comparative advantage in the economy (Warr, 1992).

5.2. Domestic Policies

Domestic policies like commodity subsidies or taxes, sector-specific or general, can be included in the effective protection (or assistance) framework. I will do this for the excise taxes on alcoholic beverages and cigarettes, and the subsidies on fertilizers, kerosene, gasoline, LPG, and diesel motor fuels.

A key variable for each sector as a user of a given commodity is the ratio of the user price to the supplier price. If there is a subsidy at ad valorem rate s_D (the percentage rate divided by 100) for a particular sector, then the ratio of the user price, P_U, to the supplier price, P_S will be

$$(2) \qquad \frac{P_U}{P_S} = 1 - s_D \ ,$$

while with a commodity tax at ad valorem rate t_D the ratio becomes

$$(3) \qquad \frac{P_U}{P_S} = 1 + t_D \ .$$

As an example, consider beer, a commodity for which a number of global brands are produced locally in Indonesia. Import taxes, duties and other import barriers boost the prices paid by consumers of these products in Indonesia. However, the prices received by domestic producers of beer will have to be scaled back by the amount of the domestic excise tax per unit. Table 6 showed that the producer price of beer was 119.4 percent higher than the border price, while the consumer price was 145.0 percent higher, the difference being accounted for by domestic excise tax of 25.6 percent. The tax rate t_D in (3)

[43] In previous effective protection studies of Indonesia, Fane and Phillips (1991) and Fane and Condon (1996) favored the Humphrey method, while Warr (1992) and Marks and Rahardja (2012) applied the Balassa (1982) and Corden approaches.

is calculated relative to the producer price, while the excise tax rate in Table 6 is a percentage of the CIF price. To find t_D, then, we must rescale the tax in Table 6 as follows:

$$t_D \times 100 = \frac{25.6}{1+1.194} = 11.7 .$$

Thus, the domestic excise tax is 25.6 percent of the CIF price, but only 11.7 percent of the higher domestic producer price. This rescaling must be done for all of the domestic excise taxes on alcohol.

By rearranging (3) and substituting it into (1) (given that P_D in (1) is equal to P_U in (3), and applying these figures, we can then see the relationship between the price that domestic beer consumers pay and the border price of beer in an alternative way:

$$P_U = (1+1.450)\,P^* = (1+0.117)(1+1.194)P^* .$$

This rescaling will not have to be done for the subsidies, because they were originally calculated as percentages of the supplier price.

5.3. Other Policies

Two other kinds of policies studied by Fane and Condon (1996) and Marks and Rahardja (2012) are of interest, though not included in the analysis at this time. One is duty drawbacks and exemptions, and the other is differences in import tariffs between subcategories of products within a given input-output sector.

5.3.1. Duty Drawbacks and Exemptions

Duty drawbacks for imported intermediate inputs and raw materials are allowed for exporters in Indonesia; duty exemption for exporters is automatic in bonded customs zones (*kawasan berikat*) within the country. The policy was first introduced in 1986 as part of a package of trade reform to support export-oriented industries, particularly garments and textiles.

There is some question about how effective the duty facilities program has been, at least in the past, with anecdotal reports that drawback payments have been delayed, in some cases in order to extract commissions from applicants for the drawbacks.

For the analysis of duty drawbacks and exemptions, Fane and Condon (1996) developed a simple method, also applied by Marks and Rahardja (2012). It can only be applied at the level of input-output sectors, since it requires consistent trade and output data. Fane and Condon assume that 80 percent of the duty facilities is recovered. In the interest of brevity, the present version of this study assumes simply that duty drawbacks and exemptions offer no benefit.

5.3.2. Within-sector Tariff Escalation

Tariff escalation exists if import tariffs are set at higher rates on downstream products than on upstream products. Escalation may exist within certain input-output (IO) sectors. In Indonesia, the MFN rate on most finished footwear (sector 83) is 25 or 30 percent, while footwear parts have an MFN

import tariff rate of 5 percent. MFN tariff rates are 50 percent on fully assembled motor vehicles (sector 133), but typically only 10 percent for completely-knocked-down kits ready for assembly and for most vehicle parts.[44] There are similar differentials for motorcycles (sector 134), but the highest MFN tariff rate is 40 percent, versus 10 percent for kits and parts.

For agricultural products, seed or other material suitable for propagation typically enters at a zero tariff. The high costs of importation of these items often elicit complaints, however, such as from shallot growers, who say that a monopoly sanctioned by the Ministry of Agriculture dominates imports and adds about 27 percent to the costs of shallots imported for propagation (Marks, 2012, Section 5.2). This issue deserves further study across a wider range of commodities.

In any case, these differences in import tariff rates have an effect for the sector getting the input at a discount that is similar to that of an input subsidy on its own product, because the user prices for inputs that are also outputs of the sector are set artificially lower than the supplier prices of its final outputs.

Although the differences in MFN tariff rates within sectors are stark in some cases, these differences tend to be diluted as one looks at the marginal rate of protection (MRP) as a composite of the MFN and the various preferential tariff schedules. In addition, these differences are further diluted by the use of trade weights, because many products are exported with zero export NRPs on the export side, in addition to being imported.

It turns out that, because much of finished footwear is exported, the NRP for footwear inputs is actually higher than for footwear outputs, and both are low, so I do not include this effect for footwear. For motor vehicles, however, the sector effectively receives a subsidy of 16.4 percent relative to other sectors that utilize motor vehicles, and I do include that.[45] Similarly, for motorcycles, the sector effectively receives of subsidy of 12.2 percent relative to other sectors that use motorcycles.

5.4. Methodological Considerations and Findings

In the analysis that follows, nominal rates of protection are aggregated as described in Section 4 above, and in particular use the marginal rate of protection concept to combine the various tariff schedules. Although all the trade policies mentioned in this paper are included, the excise taxes on alcoholic beverages and cigarettes, and the various subsidies, are not reflected in the NRPs but are entered separately. As noted earlier, the subsidies do not necessarily apply to all sectors.

For the Humphrey method, one calculates a price index for consumption based on the consumption shares of all 175 input-output sectors:

$$w = \prod_{i=1}^{175} P_i^{s_i} \qquad \sum_{i=1}^{175} s_i = 1$$

The price index formula is a geometric average of prices in all sectors, P_i. Specifically, it is the product of the price index for each of the 175 sectors, each weighted by raising it to a power equal to the share of

[44] Some specialized assembled motor vehicles, such as ambulances and specialty trucks, have much lower tariff rates, however.

[45] The NRP for motor vehicle parts and kits works out to about 6.1 percent, while that for finished vehicles is 26.9 percent. These figures translate to the subsidy rate as follows: (1+0.061)/(1+0.269) = 0.836, and (1-0.836)×100 = 16.4 percent.

the sector in total consumption, s_i , with these shares summing to 1. The wage rate is then simply set equal to this price index. These calculations are done under free trade and then with the protective policies in effect.

Table 10 (shown in two parts) presents the findings of the ERP analysis for the 140 tradable goods sectors in the 175-sector Indonesia input-output table. The first set of three columns of data show NRPs and ERPs with all policies considered in this paper in effect. The second set of columns show these rates of protection with only import tariffs and export taxes in effect, as discussed below.

Recall that the Corden method allows calculation of the value added that accrues to all primary factors of production that are both directly and indirectly involved in production for a particular tradable sector, while the Humphrey method indicates the change in value added only for primary factors that are directly involved. It seems natural that the changes in value added measured by the Corden method, both positive and negative, tend to be smaller in magnitude than those measured by the Humphrey method,[46] as the effects become more diffuse.

The findings can be examined from a variety of different perspectives. One is simply that the sector that wins the prize for the highest ERPs is alcoholic beverages (sector 70) based on the Humphrey method or field rice (sector 1) based on the Corden method. If the fertilizer subsidies are as scarce as reported recently, perhaps field rice does not receive as much assistance as the official policies would indicate.

Basic chemicals (sector 94) is a major beneficiary of the mineral export restrictions, with very large ERPs despite its low NRP. Ceramic and clay products (sector 110) and ceramic and clay building products (sector 112) have higher NRPs than basic chemicals, and also benefit from the mineral export restrictions, thus enjoying quite high ERPs. Other metal products (sector 122) and basic iron and steel (sector 115) both have very high effective rates of protection as well. Both sectors are beneficiaries of the mineral export restraints. For basic iron and steel, the NRP is also high.

ERPs for meat and viscera (sector 49) are also high, as are those for milled rice (sector 57), sugar (sector 62), and sugar cane (sector 13). Fruits (sector 10), vegetables (sector 9), and livestock (sector 25) also have relatively high NRPs and ERPs. Other manufacturing sectors are discussed below.

For the mineral sectors subject to export restrictions (sectors 38-41, 43-45, and 48), NRPs and ERPs are all negative, and the ERPs are similar in magnitude to the NRPs for the respective sectors, indicating that costs in these sectors consist largely of value added, which makes sense for resource-intensive activities. Other forest products (sector 30) has a negative NRP and ERPs, due to the rattan export ban.

5.4.1. Rates of Protection in the Absence of Non-Tariff Measures

Given the focus of this study on non-tariff measures, it is of interest to examine nominal and effective rates of protection if NTMs were not used while all import tariffs and export taxes remain constant. Thus, the second set of columns of data in Table 10 shows nominal and effective rates of protection, but excludes the effects of all non-tariff trade measures. In addition to the MFN and preferential import tariffs, it retains contingent protection in the form of anti-dumping and safeguards duties, as well as all

[46] A criticism of the Corden method is that it implies that identical primary factors of production will earn different returns in different activities, which is inconsistent with the mobility of the factors across sectors of the economy.

Table 10.1. Nominal and Effective Rates of Protection Based on Trade Policies of Early 2015 (%)

		All Policies in Effect			Import Tariffs and Export Taxes Only		
		Nominal Rate	Effective Rate of Protection		Nominal Rate	Effective Rate of Protection	
Sector	Description	of Protection	Humphrey	Corden	of Protection	Humphrey	Corden
1	Field rice	63.7	190.0	143.5	8.4	35.6	30.9
2	Corn	6.2	27.9	25.1	4.8	25.9	23.1
3	Cassavas	0.5	0.2	0.3	0.1	0.0	0.1
4	Sweet potatoes	0.0	-0.1	0.0	0.0	0.0	0.0
5	Other tubers	1.3	1.2	1.3	1.1	1.1	1.1
6	Peanuts	6.4	6.8	6.6	4.9	5.3	5.1
7	Soybeans	1.5	10.8	10.1	0.0	8.9	8.3
8	Other beans & nuts	1.9	1.8	1.8	1.4	1.4	1.4
9	Vegetables	19.0	21.8	21.2	8.1	9.2	8.9
10	Fruits	24.5	27.2	26.4	7.9	8.6	8.4
11	Other grains	1.5	1.5	1.5	0.0	-0.2	-0.1
12	Rubber	4.6	5.6	5.4	3.5	4.3	4.1
13	Sugar cane	54.8	83.3	68.7	13.9	18.5	16.3
14	Coconut	0.1	-0.1	0.1	0.1	-0.1	0.0
15	Oil palm	-8.5	-13.3	-10.4	-8.5	-13.2	-10.5
16	Fiber plants	2.0	2.0	2.0	0.5	0.5	0.5
17	Tobacco	5.2	9.6	7.9	4.0	7.7	6.1
18	Coffee	0.5	0.3	0.6	0.4	0.4	0.4
19	Tea	0.0	-0.2	0.0	0.0	-0.2	-0.1
20	Cloves	5.3	6.1	6.0	4.1	4.7	4.5
21	Cocoa	-3.4	-4.3	-3.9	-3.6	-4.5	-4.2
22	Cashews	0.0	-0.2	-0.1	0.0	-0.2	-0.1
23	Other estate crops	0.7	0.1	0.5	0.5	0.0	0.2
24	Other agriculture	0.5	-0.2	0.0	0.4	0.2	0.2
25	Livestock & its products	13.4	16.3	15.3	0.6	0.4	0.4
26	Fresh milk	2.4	1.3	1.4	1.9	2.0	1.9
27	Poultry & its products	6.5	10.0	9.2	5.0	8.3	7.5
28	Other livestock products	2.9	1.5	1.5	1.4	1.1	1.1
29	Wood	-2.5	-3.0	-2.6	-2.3	-2.7	-2.4
30	Other forest products	-10.3	-12.1	-11.1	-5.1	-6.1	-5.6
31	Marine fish & products	0.5	1.6	1.6	0.5	1.7	1.7
32	Freshwater fish & products	0.1	-0.4	-0.3	0.1	-0.1	-0.1
33	Shrimp & prawns	0.1	-0.4	-0.2	0.1	-0.1	0.0
35	Coal	-0.2	-0.7	-0.4	0.0	-0.4	-0.2
36	Crude oil	0.1	0.1	0.1	0.3	0.2	0.2
37	Natural gas & geothermal	-0.2	-0.3	-0.3	0.0	-0.1	0.0
38	Tin ore	-56.8	-58.3	-57.6	0.0	-0.2	-0.1
39	Nickel ore	-15.4	-16.3	-15.9	0.0	-0.2	-0.2
40	Bauxite	-39.7	-50.6	-45.9	0.0	-0.8	-0.5
41	Copper ore	-27.6	-35.2	-32.2	0.0	-1.1	-0.8
42	Gold ore	0.5	0.2	0.3	0.5	0.3	0.3
43	Silver ore	-90.1	-91.7	-91.0	0.0	-0.4	-0.3
44	Iron ore & sand	-14.0	-19.5	-16.8	0.2	-0.2	0.0
45	Other mined metal products	-44.6	-46.5	-45.7	1.5	1.5	1.5
46	Non-metallic minerals	1.2	0.9	1.2	1.2	0.9	0.9
47	Coarse salt	9.9	11.1	10.8	9.9	11.1	10.7
48	Other mined products	-35.4	-40.6	-38.3	2.2	2.2	2.1
49	Meat & viscera	37.4	116.6	81.5	4.8	9.4	7.8
50	Processed & preserved meat	8.1	-12.2	-6.6	2.0	-1.1	-0.3
51	Milk products	6.2	2.7	2.5	4.8	10.4	7.2
52	Processed fruits & vegetables	11.2	8.3	6.9	2.3	-1.3	-0.8
53	Dried & salted fish	1.7	2.6	2.5	0.3	-0.2	0.1
54	Processed & preserved fish	0.4	-1.6	-0.3	0.2	-1.1	-0.4
55	Copra	0.0	-1.1	-0.2	0.0	-0.6	-0.2
56	Edible oils	-6.1	-8.0	-6.4	-6.0	-7.5	-6.2
57	Milled polished rice	64.2	97.1	71.1	8.8	12.5	10.4
58	Wheat flour	13.6	47.3	42.2	3.1	9.6	8.9
59	Other flour	3.7	-10.5	-6.5	2.8	1.8	1.5
60	Bread, biscuits & related products	2.7	-18.6	-13.4	2.6	-1.1	-0.5
61	Noodles & related products	1.1	-15.2	-12.1	1.1	-3.1	-2.3
62	Sugar	48.1	87.7	55.4	12.5	18.0	13.2
63	Processed seeds & nuts	1.9	-7.4	-5.8	1.3	-0.8	-0.5
64	Chocolate & candies	2.4	-7.0	-5.4	2.3	0.4	0.5
65	Milled coffee	3.7	5.5	4.8	3.6	6.6	5.2
66	Processed tea	4.0	7.1	6.0	3.7	7.2	5.8
67	Soybean products	2.2	-3.4	-2.3	0.7	-1.4	-1.0
68	Other food products	4.8	-0.6	0.2	4.2	13.3	9.2
69	Animal feeds	1.8	-3.5	-1.9	0.6	-2.7	-1.7
70	Alcoholic beverages	53.7	246.5	103.8	39.8	178.9	83.8
71	Other beverages	11.5	11.8	8.6	7.0	11.8	8.1

Table 10.2. Nominal and Effective Rates of Protection Based on Trade Policies of Early 2015 (%)

		All Policies in Effect			Import Tariffs and Export Taxes Only		
		Nominal Rate	Effective Rate of Protection		Nominal Rate	Effective Rate of Protection	
Sector	Description	of Protection	Humphrey	Corden	of Protection	Humphrey	Corden
72	Processed tobacco	9.7	22.1	16.4	8.4	20.0	14.5
73	Cigarettes & related products	0.8	-1.1	-0.6	0.8	-0.6	-0.3
74	Kapok	0.2	-3.2	-0.7	0.2	-1.5	-0.4
75	Spinning	4.6	8.3	6.5	4.6	9.7	7.1
76	Weaving	7.1	15.3	11.4	7.1	16.3	11.7
77	Textiles except apparel	6.1	10.5	7.9	6.1	11.6	8.1
78	Knitted items	3.3	1.8	1.9	3.3	2.2	2.0
79	Apparel	1.4	-3.4	-2.3	1.4	-3.0	-2.2
80	Carpets, cords & other textiles	5.4	8.5	7.5	5.4	9.8	8.4
81	Processed hides	1.5	-17.8	-12.8	0.4	-3.6	-2.3
82	Leather products	3.4	4.7	4.3	3.4	6.0	5.1
83	Footwear	1.6	-0.4	0.1	1.6	0.7	0.7
84	Sawn & preserved wood	0.4	1.5	1.8	0.1	1.0	1.0
85	Plywood & related products	0.4	-0.6	0.1	0.3	-0.1	0.1
86	Wood building materials	0.1	-1.2	-0.3	0.1	-0.6	-0.2
87	Household articles from wood etc.	1.1	1.9	2.0	1.0	1.9	1.6
88	Other articles from wood, cork etc.	0.8	8.8	7.0	0.7	4.7	3.7
89	Plaited items except from plastic	0.3	3.2	3.1	0.3	2.0	1.9
90	Pulp for paper	0.2	-2.7	-1.0	0.2	-0.9	-0.3
91	Paper & cardboard	0.6	-0.1	0.4	0.6	0.5	0.6
92	Paper & cardboard products	3.2	7.6	6.1	3.2	8.3	6.2
93	Printed materials	2.4	4.1	3.6	2.4	4.8	3.8
94	Basic chemicals except fertilizer	2.0	196.7	139.4	1.5	4.5	4.0
95	Fertilizers	0.5	0.8	0.9	0.5	0.8	0.8
96	Pesticides	2.9	5.0	4.3	2.9	5.9	4.7
97	Plastics & synthetic resins, fibers	6.5	21.6	17.8	6.3	18.2	14.9
98	Paint, varnish, lacquers	5.0	10.4	8.0	5.0	11.5	8.2
99	Pharmaceuticals	2.1	1.1	1.6	2.1	3.3	2.3
100	Traditional medicines	0.1	-14.6	-8.0	0.1	-5.8	-3.0
101	Soaps & cleaning products	0.8	4.5	3.8	0.8	4.4	3.2
102	Cosmetics	7.7	29.6	18.2	7.5	30.9	18.2
103	Other chemical products	1.7	1.3	1.5	1.7	1.8	1.6
104	Oil refining products	0.8	1.2	1.2	0.8	1.2	1.2
105	Liquid natural gas	-0.2	-0.4	-0.4	0.0	-0.2	-0.1
106	Crumb & smoked rubber	0.6	-7.8	-6.2	0.5	-5.7	-4.6
107	Tires	4.5	8.6	6.5	4.5	9.8	6.8
108	Other rubber products	3.7	7.5	6.1	3.7	8.5	6.4
109	Plastic products	7.6	21.4	14.3	7.6	21.8	14.0
110	Ceramic & clay products	13.0	70.0	48.5	13.0	29.0	21.6
111	Glass & glass products	2.5	12.1	9.9	2.5	3.1	2.6
112	Ceramic & clay building materials	10.4	172.1	78.5	10.4	33.1	20.9
113	Cement	11.6	46.9	33.2	0.2	-0.5	-0.2
114	Other non-metallic materials	-0.8	0.1	0.5	3.5	5.6	4.7
115	Basic iron and steel	17.0	140.0	70.0	17.1	96.4	52.3
116	Iron & steel products	13.1	31.8	19.5	13.1	33.4	19.8
117	Non-ferrous basic metals	-4.6	8.2	7.2	0.7	0.5	0.6
118	Non-ferrous metal products	3.9	25.9	18.9	3.9	12.8	9.5
119	Metal kitchen, craft & farm tools	3.7	2.9	2.7	3.7	3.2	2.7
120	Metal household & office articles	9.8	16.5	11.7	7.2	11.1	7.8
121	Metal building materials	7.9	15.4	11.8	7.9	16.1	12.0
122	Other metal products	7.5	150.2	80.3	7.5	10.6	7.8
123	Turbines & engines for propulsion	2.8	-0.8	0.0	2.8	0.4	0.5
124	Machines & related equipment	4.9	6.7	5.4	4.9	6.8	5.1
125	Generators & electric motors	5.7	8.1	6.5	5.7	8.4	6.3
126	Electrical machines & equipment	4.7	5.8	4.8	4.7	6.3	4.8
127	Electronic products & equipment	8.0	14.7	10.6	1.1	-1.6	-0.8
128	Electrical household items	6.2	9.7	7.4	5.9	10.3	7.4
129	Other electrical equipment	3.0	1.6	1.7	3.0	2.4	2.0
130	Batteries	3.1	4.1	3.6	3.1	5.0	3.8
131	Ships & repair services	0.6	-3.1	-1.9	0.6	-3.2	-2.3
132	Railroad cars & repair services	0.7	-6.2	-4.1	0.7	-5.5	-3.9
133	Motor vehicles except motorcycles	13.0	26.6	21.2	13.0	26.8	21.0
134	Motorcycles	9.3	15.9	13.4	9.3	16.2	13.4
135	Other transportation equipment	5.4	7.1	5.6	5.4	7.8	5.7
136	Aircraft & their repair services	0.1	-3.0	-2.1	0.1	-2.8	-2.2
137	Optics, measurement, time keeping tools	3.6	4.6	3.9	3.6	4.8	3.6
138	Jewelry	2.2	20.8	14.5	2.2	6.3	4.6
139	Musical instruments	1.5	-1.6	0.2	1.5	0.3	0.6
140	Sports equipment	6.1	10.8	8.5	6.1	11.8	8.8
141	Other manufactured goods	6.7	16.2	12.3	5.9	11.6	8.7

export taxes except those on semi-processed mineral products.[47] Subsidies and the excise taxes on alcohol and cigarettes are also retained.

The playing field is far more level with NTMs excluded: NRPs and ERPs are not nearly as divergent across sectors. In particular, the negative NRPs and ERPs in the mineral sectors are no longer present, and the large and positive ones in rice, sugar, sugar cane, fruits and vegetables are much reduced, though the ERPs for field rice continue to reflect the fertilizer subsidies. The NRP in basic iron and steel is about the same, but the ERPs in that sector are reduced, though still relatively large and second highest behind only alcoholic beverages. ERPs in cosmetics (sector 102) remain relatively high. This sector draws heavily from basic chemicals and other chemical sectors, which typically have low NRPs.

5.4.2. Broader Sectors

To provide a broader overview of the structure of protection in Indonesia, Table 11 shows value-added-weighted nominal and effective rates of protection for 17 tradables sectors and overall. The structure is similar to that of Table 10, in that it presents two scenarios—with all policies included, and with only import tariffs and export taxes included.

In terms of the NRP, with all policies in effect, the most heavily protected broad sector is food crops (31.8 percent), followed by food, beverages and tobacco (13.2 percent), livestock and their products (8.8 percent), machinery and transport equipment (7.8 percent, mostly due to motor vehicles and motorcycles), and metals and metal products (6.7 percent). These figures indicate that policies are holding resources in agricultural sectors, despite considerable rhetorical emphasis on promotion of industrialization. Two broad sectors have negative percentage NRPs overall—mining other than oil and gas (-18.1 percent) and forestry (-4.1 percent).

Table 11. Value-Added-Weighted Nominal and Effective Rates of Protection, Broad Sectors (%)

	All Policies in Effect			Import Tariffs and Export Taxes Only		
	Nominal Rate	Effective Rate of Protection		Nominal Rate	Effective Rate of Protection	
Description	of Protection	Humphrey	Corden	of Protection	Humphrey	Corden
Food crops	31.8	78.4	61.9	6.7	18.7	16.7
Estate & other crops	3.9	5.3	4.8	0.3	-0.1	0.2
Livestock & their products	8.8	12.0	11.1	3.4	5.4	4.9
Forestry	-4.1	-4.8	-4.3	-2.8	-3.3	-3.0
Fisheries	0.3	0.8	0.9	0.3	0.9	1.0
Oil & gas extraction	0.1	0.0	0.0	0.2	0.2	0.2
Other mining	-18.1	-21.5	-20.0	0.6	0.1	0.2
Food, beverages & tobacco	13.2	23.8	17.0	1.9	3.1	2.3
Textiles, apparel & leather	3.7	3.8	3.2	3.6	5.1	3.8
Wood products	0.6	0.8	1.2	0.5	0.8	0.8
Paper products	1.4	1.7	1.8	1.4	2.5	2.1
Chemicals	3.1	57.6	41.5	2.9	8.1	6.3
Oil refining & LNG	0.4	0.6	0.7	0.5	0.7	0.7
Non-metal products	4.8	16.1	11.1	3.7	7.9	5.3
Metals and metal products	6.7	62.6	35.1	7.2	17.6	11.3
Machinery & transport equipment	7.8	13.6	10.8	5.8	9.2	7.5
Other manufacturing	4.3	11.1	8.5	4.0	7.2	5.5
Overall	**6.0**	**17.7**	**12.9**	**2.6**	**5.5**	**4.5**

[47] Given the imputation of export tax equivalents for mineral exports, it is not possible to separate the effects of export taxes on mineral products from the export restrictions tied to minimum mineral content standards, particularly since none of these export taxes applied to an entire tariff line.

Based on the Humphrey method, the highest ERP goes to food crops (78.4 percent), then to metals and metal products (62.6 percent), chemicals (57.6 percent), food, beverages, and tobacco (23.8 percent); and non-metal products (16.2 percent). Food crops benefit not only from the protection of rice, fruits, and vegetables but also from the fertilizer subsidies. Negative ERPs are recorded by mining other than oil and gas at -21.5 percent as well as forestry at -4.8 percent.

The protection for foods, beverages, and tobacco is concentrated mostly in just a few sectors—milled, polished rice (sector 57 in Table 10), alcoholic beverages (sector 70), sugar (sector 62), wheat flour (sector 58), and processed tobacco (sector 72).

Among other manufacturing sectors, it is easy to understand why metals and metal products would have relatively high nominal and effective rates of protection, given the high rates of protection for basic iron and steel (sector 115 in Table 10) and other metal products (sector 122).

Across all tradables sectors, the nominal rate of protection averaged 6.0 percent, the Humphrey-method ERP 17.7 percent, and the Corden-method ERP 12.9 percent.

If only import tariffs and excise taxes are retained at current rates, the structure of protection again is flattened, with only metals and metal products really standing out, but even in that sector the ERPs are much lower due to the absence of the mineral export restraints. Across all tradables sectors, the nominal rate of protection averages only 2.6 percent, the Humphrey-method ERP 5.5 percent, and the Corden-method ERP 4.5 percent.

5.4.3. NRP Escalation and its Opposite

NRP escalation is evident if the nominal rate of protection is higher for downstream products than for upstream products, with the intention of promoting downstream development by lowering the prices of upstream products relative to downstream ones. Historically this practice has been called tariff escalation. To bring about escalation of rates of protection in excess of the rates that import protection could provide, however, upstream natural-resource sectors have also been subjected to export taxes, bans, or other restrictions to favor the development of downstream industries. There are the bans on exports of logs, minerals and rattan, for example, and the export tax on cocoa beans.[48]

Intermediate industries downstream from resource sectors in many cases are well protected, but industries farther downstream are not. High ERPs for basic iron and steel (sector 115) are a function of iron ore (sector 44) export restrictions as well as the high NRP on iron and steel. However, that sector is upstream to many others, such as turbines and engines for propulsion (sector 123) whose NRP is low and ERPs even lower. The ERPs for ship-building (sector 131) and railroad equipment (sector 132) similarly are negative.[49] However, the relatively high NRPs for motorcycles (sector 134) and especially motor vehicles (sector 133) hold their ERPs high as well, in part due to the more protective policies for assembled motor vehicles than for kits and parts.

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[48] The possibility that such policies could endanger the supplies of upstream inputs is one issue, as is the effect of the policy on upstream suppliers, such as cocoa farmers, the vast majority of whom are small landholders and many of whom are in eastern Indonesia. See Marks et al., 2005.

[49] Restrictions on imports of used capital equipment may be used selectively to protect various sectors such as ship-building. These restrictions are opaque, and have given rise to complaints from various industries ranging from cocoa processing to construction about high costs of importation of new capital equipment or spare parts. These restrictions deserve further study.

Meat and viscera (sector 49) similarly has high NRPs and ERPs, but processed and preserved meat (sector 50) has a lower nominal and negative effective rates of protection. Wheat flour (sector 58) has a high NRP and high ERPs, but both bakery products (sector 60) and noodles (sector 61) have negative ERPs. For spinning (sector 75) and weaving (sector 76), NRPs and ERPs are positive, but for apparel (sector 79), a labor-intensive sector, the NRP is low and ERPs are negative.

5.4.4. Effect of Policies on Costs of Living

With the Humphrey method fully solved, and with all of the examined policies in effect, the wage has to be 7.4 percent higher in the protected situation than under free trade, in order for living standards of workers to remain constant.[50] As noted earlier, this adds to the costs of production in all sectors, particularly labor-intensive ones, and causes higher prices of non-tradable services. With all trade policies retained, but subsidies and excise taxes eliminated, the cost of living is 7.7 percent higher.

If all NTMs, subsidies, and excise taxes are dropped, and only import tariffs and export taxes retained, the increase in the cost of living versus free trade is only 2.90 percent. Thus, more than half of the increase in costs of living is caused by NTMs. Much of the increase in the cost of living with the NTMs in effect is driven by the rice import restrictions: if the NTMs on rice imports were allowed to lapse, but rice import tariffs retained along with all other NTMs, subsidies, and excise taxes, the increase in the cost of living due to trade policies would be only 4.7 percent versus the 7.4 percent noted above.

I should add that import barriers, like commodity taxes in general, are regressive and hit those at the lower end of the income distribution harder than others, because consumption, particularly of daily essentials like rice, is a larger share of income for low-income families. Consumption of fruits and vegetables, moreover, is essential to the health not just of urban elites but also the rural poor.

5.4.5. Comparison with Previous Studies

I will just draw a few contrasts between this study and earlier ERP studies in Indonesia. Fane and Condon (1996) mapped the effects of trade reform in Indonesia over 1987-95, following an initial study by Fane and Phillips (1991) that established a benchmark prior to the reforms.

In their examination of the Indonesian economy as of early 2008, Marks and Rahardja (2012) found that patterns of nominal and effective rates of protection had become relatively flat, with a few notable exceptions like alcoholic beverages, rice, and sugar. For milled rice the nominal rate of protection was estimated to be 36.9 percent, and for cane sugar it was 35.6 percent—considerably less than the 64.3 and 54.8 percent, respectively, estimated for these products in this study for early 2015.

This study also finds a dramatic increase in the variation of nominal and effective rates of protection from sector to sector. One of the major differences with Marks and Rahardja is the ERPs in sugar, which were much higher in the earlier study. The decrease is not due to any reform in trade policy toward that commodity, since the NRP is even higher than before, but rather a better (though not perfect) method in this study for allotting the gains from sugar policy between sugar factories and sugar cane farmers.

[50] I am able to do all of the calculations in Excel, and obtain the full solution for the Humphrey method using the Generalized Reduced Gradient (GRG) non-linear optimization method in the Solver add-in.

On balance, this study finds the Indonesian economy subject to far more widespread, and in many cases more heavy-handed, interventions than in the not-so-distant past. As a descriptive measure of the distortions caused by trade policies, I calculate the square root of the weighted sum of squares of nominal rates of protection for all tradable sectors, based on the earlier study and this one.[51] Free-trade value added is used to weight each sector.[52] This index turns out to be 17.5 for 2015, versus 10.8 for 2008, indicating a substantial increase in the magnitude and variation of rates of protection across sectors.

6. Concluding Remarks: Other Effects of the Policies

The consequences of a number of the non-tariff policies examined in this paper go far beyond their effects on the nominal or effective rates of protection for various commodities. Although a detailed analysis of all of the non-tariff measures is beyond the scope of this paper, I will highlight a few major themes that deserve further study.

6.1. Effects on Small and Medium Enterprises

The extensive government interventions in trade in recent years have been especially hard on small and medium enterprises. In its efforts to try to prevent leakages of refined sugar into the open market, for example, the government requires companies that need refined sugar—such as food or beverage processors, hotels, and restaurants—to submit advance orders to sugar refineries. There is a distribution mechanism for small enterprises that use refined sugar, but the Ministry of Trade tightened controls on it at the end of 2014, and it has been a high-cost, low-quality source of supply. The problem in particular is that household or micro enterprises that require small but regular orders refined sugar are difficult to distinguish from consumers in general. Thus, the restrictions on distribution may impede development of an important sector of the economy that may be supportive of the economic empowerment of women in particular.

The bans on exports of unprocessed minerals have devastated smaller mining companies that do not have access to a smelter or other processing facility and do not have capital to build one.[53] Smaller companies have been invited by the government to form cooperative relationships with larger ones that do have such facilities to overcome this problem, but could then be subject to monopsonistic exploitation by the larger companies. This issue is complex, however, because in recent years numerous smaller companies have gotten permits to mine through district governments, may not be able to operate at an efficient scale anyway, and tend to less professional in their environmental and other practices than are larger established companies.[54]

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[51] The approach to the division of protection between sugar and sugar cane was adjusted for the previous study to comply with the approach in this one. See Section 3.3.1 above for details on the latter.

[52] This approach parallels calculations of trade restrictiveness indexes, but the value added weights used lack a rigorous theoretical rationale. See Kee, Nicita, and Olarreaga (2009) for further details.

[53] For instance, in the vicinity of Marowali, Central Sulawesi, one small nickel mining company, Mobi Jaya Persada, reportedly had laid off more than half its workers by mid-January of 2014 because of the export ban. Fergus Jensen, "Indonesia's Small Miners Feel Betrayed by Export Ban; Fear More Layoffs, Closures," Reuters, 12 January 2014.

[54] The issuance of mining permits has now been moved to the provincial governments, which are presumably accountable to the central government on these matters.

Finally, observers of the cellular telephone sector report that the market for repair services has been hit hard by recent regulations. Replacement of a broken glass cover for a smart phone may require importation of the spare part, for example, but the regulatory compliance burden can be astronomical because of the small scale of the transaction.

A corollary to the idea that many NTMs have harmed small and medium enterprises is the observation that these policies can facilitate the monopolization of economic activity. Thomas Lembong, who became Minister of Trade in August 2015, appears to understand this point. For example, he noted that, even if some feedlot owners were contributing to high prices by hoarding beef, the best way to combat them was to open the country to increased beef imports, driving down the price of their stocks.[55]

6.2. Inefficiencies and Risks in Trading

The import regulations for horticultural products, livestock and meat, rice, plastics raw materials, and no doubt other commodities require that importers officially submit their intentions to import months in advance. In the case of fruits and vegetables, the submissions must be during June or December for imports intended to arrive within the following six months. The submitted plans must specify the exact commodity and variety, quantity to be purchased, and source country. If less than 80 percent of the planned imports of fresh products is delivered, importers are under the threat that their future import permits will be cut off.

A fruit trader pointed out that it is very difficult to know market conditions months in advance for a particular commodity in a particular country. Thus, given the risks created by the regulation, importers hesitate to import as much as they would otherwise. The advance licensing requirement also means that traders are typically not able to take advantage of bargain prices in countries in which oversupply develops. The net effect is higher prices for Indonesian consumers.

The port requirements for imports of various commodities are also a source of considerable inefficiency. The horticultural regulations are among those that limit the ports of entry. This provision of the regulations has been rationalized on the basis that laboratory facilities for proper testing of food commodities are not available in all ports. Thus, imports of fruit and vegetables for the Jakarta market have in many cases come through Tanjung Perak at Surabaya rather than Tanjung Priok in Jakarta, adding to costs for consumers in the vicinity of Jakarta, and adding to road congestion and air pollution between the cities. It strains credulity that adequate testing facilities cannot be provided at Tanjung Priok. Meanwhile, ports in eastern Indonesia, which presumably is a geographic area of emphasis of government policy, are forced out of the game. The port at Makassar, South Sulawesi, cannot be used as an entry point for horticultural products, for example.

Finally, horticultural product importers are not allowed to distribute their products directly, but must have three separate distributors contracted to dispense the imports within the country. It is common practice that importers who do not already have relationships with three separate distributors will set up separate companies themselves or find companies that sell their names as distributors. In either case, economic efficiency is undercut. More thought goes into the nominal compliance with regulations, and less into providing more competitive products.

[55] Grace D. Amianti and Khoirul Amin, "New Trade Minister Learns His Real Job," *Jakarta Post*, 19 August 2015.

6.3. Interaction Effects and Collateral Damage

Policies designed with a particular objective often impose costs on others not involved in the sector. For example, the tight restrictions on imports of rice, sugar cane, and shallots intensify the competition for agricultural land, particularly on Java, driving up land rents and thus adding to costs in these and other agricultural sectors.

A broader issue in this regard is how much Indonesia should favor agriculture in its trade and subsidy policies. A problem is that, even as industrial productivity has increased over the years, productivity gains have been elusive in agricultural sectors in which small landholdings prevail. Thus, the unit costs of rural commodities have risen relative to those of industrial sectors. Perhaps policymakers wish to avoid dislocation of residents of rural areas, through increased protection of food sectors, particularly if a consequence of such dislocation would be increased crowding into urban areas. If so, this effects of the policies should be discussed more openly.

On the other hand, the higher land rents induced by protection, which as part of value added are reflected in the higher effective rates of protection for various agricultural commodities, can also add to the costs of industries that might wish to establish or expand their operations. In general, import barriers draw resources into the protected sectors but out of others, which may include export sectors. Higher sugar costs in Indonesia make it more costly for the country to export canned tropical fruits, for example.

An alternative form of interaction among sectors occurs due to the restrictions on imports of raw materials used for the manufacture of optical media like DVDs and compact disks. This policy is intended to support efforts to protect intellectual property, given the widespread pirating of copyrighted music and especially movies. It was undertaken at the behest of the United States, which wanted to see better compliance by Indonesia with the U.S. Super 301 intellectual property protection law. However, it also adds to the costs for the manufacture of plastic bottle, because the polycarbonate used for disks does not look much different from the polycarbonate used for bottles: the major difference is the melting point, and this can become a costly issue when one is trying to clear customs. Perhaps one could argue that plastic bottles are wasteful and environmentally harmful, but at this point safe drinking water is not otherwise available in Indonesia. Higher prices for plastic bottles amount to a tax on drinking water, which would tend to hit the poor especially hard.

One of the basic themes in policy economics is that measures that address a problem most directly tend to be the most efficient, or least inefficient, because the collateral damage is minimized. In this light, the restrictions on imports of plastics and machines for the production and copying of disks seem rather misplaced and ineffective. The real question is why law enforcement agencies do not simply shut down the countless retail outlets for pirated material—though reportedly there have been recent efforts to shut down Web sites that stream copyrighted material.

6.4. Complexity, Opacity, and Overstretch

Virtually all of the non-tariff trade measures introduced in recent years have been highly complex and notable for their opacity rather than transparency. In particular, all of the import and export licensing apparatuses put into effect since 2011 can be described in these terms. The opacity occurs at two levels. First, it is difficult for an observer to measure the impact of the policy on market prices, as this study has amply shown. Second, it is difficult to know how the regulations have been administered in practice. Discretion in policy implementation tends to facilitate corrupt behavior.

The quality of economic governance in Indonesia is not merely a matter of peripheral interest: it is a key factor that may eventually determine whether Indonesia will be able to keep pace with nations like Vietnam that have gone much farther to embrace global competition in recent years.

In some cases, the complexity arises because policies have multiple, conflicting goals. The selective subsidies administered by the government are examples of this. The policies are presumably intended to benefit the less well off in society, such as consumers of kerosene, for example, but budgetary resources must be conserved and so the portion of the population intended to be reached by the subsidies is explicitly limited. Regulatory limits on the distribution of subsidized commodities then create domestic and international price differentials that undermine good governance. These policies are examples of bureaucratic overstretch: the government is trying to achieve more than can reasonably be achieved, and the effect is to produce incentives for corruption.

Effective law enforcement efforts through the Corruption Eradication Commission and related institutions are certainly critical to the reduction of corruption, but a fundamental and frequently overlooked component of the war on corruption is the avoidance of regulations that are radically at variance with market mechanisms. Law enforcement alone is not enough.

Nowadays it seems that every governmental agency that can be involved in economic regulation—in the central government or even regional governments—wants to be involved as much as possible. But will the overarching national interest be represented, or rather only the narrower interests of the various governmental agencies and their clients throughout the economy? Strong leadership that represents the broad national interest and that better coordinates the actions of the regulatory entities will be required. History and the Indonesian people will be the judges.

Annex A: Margin Between Port Price and Retail Price, Sugar, Rice and Alcoholic Beverages

To find the NRP for sugar, rice, and alcoholic beverages—all subject to quantitative import restrictions—the differential between the domestic producer price and border price is calculated. Taxes that are borne by domestic as well as foreign suppliers are allowed into the calculations, but import duties or other import-specific regulatory fees are not: as long as the quantitative restriction on imports is binding, it will determine the domestic price, and these duties and fees will simply absorb part of the price differential created by the quantitative restriction. This point will be discussed further below.

A.1. Sugar

As noted in Section 3.3.1, the calculations for sugar apply to crystal white sugar (ICUMSA value of 100 or 150), even though it is not imported into Indonesia. Rather, raw cane sugar (typical ICUMSA value of 1000 or 1200) is imported, but it is difficult to obtain a market price for that or for refined sugar (ICUMSA value of 45) manufactured from it in Indonesia.

The assumptions and data in Table A.1 come from the Trade Policy Research and Development Agency at the Ministry of Trade, with four exceptions. First, an updated FOB price from Thailand was used, based on the median offer on Alibaba around 20 May 2015). Second, an average retail price for crystal white sugar in Indonesia was obtained from the Ministry of Trade for that date. Third, a more realistic interest rate was used—12 percent per annum rather than 16 percent.

Fourth, as noted toward the bottom of Table A.1, excluded from the calculations are the specific import tariff (Rp 790/kg), the prepayment of income tax (2.5 percent, which is standard for imports, under

Table A.1. Assumptions and Data Used to Calculate the Nominal Rate of Protection for Sugar, 20 May 2015

Cost Elements	Units	Value Used
FOB Price Thailand	USD/ton	350
Freight	USD/ton	40
Premium	USD/ton	40
Price with Cost and Freight	USD/ton	430
Insurance	%	0.37
Exchange Rate (Rp/USD)	Rp/USD	13,130
Landed (CIF) Price	Rp/kg	5,667
Value Added Tax	%	10
Port Handling	Rp/kg	150
Loss due to Shrinkage	%	0.5
Interest Cost (3 months @ 12% per annum)	%	3.0
Warehouse Cost (2 months plus insurance	Rp/kg	100
Profit	%	2.5
Distribution Margin	Rp/kg	2,000
Retail Price	Rp/kg	12,500
Not Included in Price Differential Calculations		
Import Duty	Rp/kg	790
Income Tax Article 22	%	2.5
Pre-shipment Inspection	Rp/kg	25

Article 22 of national tax regulations), and the pre-shipment inspection cost, since all of these are specific to imports and do not apply to domestic output.[56] This approach is used because the quantitative restriction on sugar imports is binding; otherwise, these fees would contribute to the NRP for sugar. However, the value added tax of 10 percent is allowed, since it is also borne by domestic suppliers.

The calculations in the table first work from the top down, starting with the FOB price in Thailand, until the CIF price of Rp 5,667/kg is derived. The remainder of the calculations work from the bottom up—given that the ideal comparison is between the CIF price and the border price implied by the domestic retail price.[57]

Thus, the Rp 2,000 per kg distribution margin is subtracted from the retail price of Rp 12,500 per kg to yield a price of Rp 10,500 per kg. This is then divided by (1 + 0.025) to remove the profit margin for the importer. Continuing in this way, an implied border price of Rp 8,772 per kg is derived. Comparison of this price with the CIF price reveals an NRP for crystal white sugar of 54.8 percent. Of this amount, 13.9 percent or about one-fourth is absorbed by the specific import tariff of Rp 790 per kg. An additional 0.4 percent is absorbed by pre-shipment inspections.

Table A.2. Assumptions and Data Used to Calculate Nominal Rate of Protection for 15% Broken Rice (Illustrative Data, for March 2015)

Cost Elements	Units	Value Used
FOB Price Thailand	USD/Ton	387
Freight and Insurance	USD/Ton	25
Landed (CIF) Price	USD/Ton	412
Exchange Rate	Rp/USD	13,071
Landed (CIF) Price	Rp/kg	5,385
Handling Cost & Transport	%	2.00
Warehouse	%	1.00
Insurance	%	0.20
Shrinkage	%	0.12
Interest (2.5 months at 9% per annum)	%	1.875
Importer Profit	%	2.00
Shrinkage	%	0.12
Transport & Warehouse	%	1.00
Distributor Profit	%	2.00
Transport & Handling	%	1.00
Retailer Profit	%	2.00
Retail Price	Rp/kg	10,327
Not Included in Price Differential Calculations		
Import Duty	Rp/kg	450
Income Tax Article 22	%	2.5
Pre-shipment Inspection	USD/ton	1.00

[56] Also, the 2.5 percent income tax prepayment is refundable, in principle, for taxpayers who follow all required procedures.

[57] See, for example, Deardorff and Stern (1997 and 1998). The first of these is available via the Internet in the OECD iLibrary.

A.2. Rice

The calculations are similar for rice. Table A.2 above shows assumptions used by the Ministry of Trade and obtained from input of the National Logistics Agency, Bulog, which manages rice importation. The only exception is that I use the Thailand FOB price for 15 percent broken rice, rather than 5 percent broken as used by the Ministry of Trade, because it better matches the medium quality of rice for which I have retail price data in Indonesia.

The data in Table A.2 are illustrative in that the FOB price, exchange rate, and retail price figures are for the month of March 2015, but the NRP that I report is the average over January through June of 2015, which was 64.3 percent.[58] Of that amount, an average of 8.5 percent was absorbed by the specific import tariff of Rp 450 per kg.[59] An additional 0.2 percent was absorbed by pre-shipment inspections.

A.3. Alcoholic Beverages

As noted in Section 3.3.3, retail prices of alcoholic beverages were compared with prices of these beverages offered by the U.S. and Australian embassies for their employees in Jakarta. It is useful to provide an algebraic framework for these calculations.

Let P_R be the domestic retail price, P_E the retail price at the embassy, and P_C the CIF price at the port. The import tariff t_M, the domestic excise tax t_D , and the extra excise tax on imports t_X are all set as specific rupiah amounts per liter, as shown in Table 5. The value added tax rate t_V is equal to 0.10 or ten percent, and is applied to both domestic output and imports. Finally, m_R is the ad valorem margin for other costs from the port to the retailer, and is assumed to be the same for the embassies and other distributors.

The embassies import directly without any taxes, duties or other regulations being applied, so that

$$P_E = (1 + m_R)\, P_C \,.$$

This implies that the "actual" CIF price can be computed as

$$(1) \qquad \hat{P}_C = \frac{P_E}{1+m_R} \,.$$

Other importers must pay import duties and excise taxes, and according to tax regulations must pay value added tax on the CIF value of the imports plus the import duties and excise taxes. Thus, the retail price can be calculated as

$$P_R = (1 + m_R)(P_C + t_M + t_D + t_X)(1 + t_V) \,.$$

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[58] The Thailand FOB price data are from the U.S. Department of Agriculture, Economic Research Service, *Rice Outlook*, July 2015. The Indonesian retail price is from data reported by the Ministry of Trade. I do not have a time series of data on the Thailand FOB price of crystal white sugar, and so use calculations for a single date.

[59] The negotiated import tariff rate for milled rice under the ASEAN free trade agreement is nominally 25 percent. However, the government honors the MFN rate, if it is lower than the rate negotiated in a regional or bilateral agreement.

Thus, we can solve for the CIF price that is implied by the retail price:

$$(2) \qquad \overline{P}_C = \frac{P_R}{(1+m_R)(1+t_V)} - t_M - t_D - t_X \ .$$

In parallel with the analyses of sugar and rice, as long as the quantitative restriction on imports is binding, the only taxes allowed for purposes of calculating the nominal rate of protection are the value added tax and the domestic excise tax, since these are also borne by domestic producers. Thus, the NRP is calculated as the percentage by which $\overline{P}_C$ exceeds $\hat{P}_C$, with t_M and t_X set to zero in the expression for $\overline{P}_C$ in (2). Parts of the differential between the domestic producer price and border price will be absorbed by t_M and t_X, however.

The ad valorem equivalents of the specific import tariff, the domestic excise tax, and the extra excise tax on imports—all relative to the CIF price as their basis—can be calculated by dividing the respective rupiah amounts per unit by $\hat{P}_C$ and multiplying by 100 to convert to percentages.

Adding the ad valorem equivalent of the domestic excise tax to the NRP, we obtain the total percentage differential by which the domestic consumer price exceeds the border price.

The consumer price differential is algebraically the percentage difference by which $(\overline{P}_C + t_D)$ exceeds $\hat{P}_C$: the domestic excise tax has to be added to the border equivalent of the producer price to obtain the border equivalent of the consumer price. It turns out that this consumer price differential is independent of m_R, under the assumption that this port-to-retailer margin for the embassies and other retailers (exclusive of all taxes) is identical, since the $(1 + m_R)$ terms in the denominators of expressions (1) and (2) factor out of the percentage calculations.

The NRP and the ad valorem equivalents of the tariff and the various taxes vary slightly as m_R is changed, but sensitivity analysis indicates that these are not very sensitive to the retail margin assumed. I assume a retail margin of 15 percent in the calculations shown in Table 6.

As noted in Section 3.3.3, because the embassies have low volumes of sales, their margin actually could be higher than for other distributors, which would mean that this method could be biased toward finding too low a rate of protection.[60]

[60] Evidently there is a distribution monopoly for regulated imports of alcoholic beverages. We might imagine that the monopoly could mark up retail prices relative to border prices, compared to a competitive market. Economic theory would say that as long as the quantities of imports of the various beverages are fixed by the quantitative restrictions, retailers will already be charging the highest prices that the market will pay for those quantities. However, the distribution monopoly could squeeze the margin going to retailers per se. If the distribution monopoly is able to reduce the amount of imports allowed into the country relative to the amount allowed by regulators, it could boost the distribution margin as well, but this would also add to the rate of protection for domestic producers.

Annex B: Imputation of NRPs Based on Trade Quantity Changes

This annex examines in detail the methods and data sources for the imputation of NRPs to quantitative restrictions on imports and on exports, as in Section 3.4

B.1. Calculations for the Import Side: Live Cattle, Meats, and Horticultural Products

Let P^* be the external price of the commodity, and let Q be the quantity imported. The domestic price of the imported commodity, P_D, is determined as $P_D = P^* \times (1 + t)$, where t is the ad valorem import tariff rate (it can be an actual tariff rate or the ad valorem import tariff equivalent (ITE) of an NTM). Let t_0 be the tariff rate in an initial base year and let t_1 be the new ITE following the imposition of a non-tariff barrier. Finally, let e be the elasticity of import demand for the commodity and let $\%\Delta$ denote the percentage change in a variable.

An assumption noted in Section 3.4, that Indonesia is a small country in the world markets for the various imported and exported products, means that on the import side it faces perfectly elastic export supply from the rest of the world. Thus, changes in imports into Indonesia will not affect the external price P^*, but P^* can change as world market conditions change, and will in turn affect imports.

The percentage change in the quantity imported is a function of the domestic price of the imported commodity. Specifically, by the definition of the elasticity of demand, the observed percentage change in the quantity of imports is given by

$$\%\Delta Q = e \times \%\Delta P_D = e \times \%\Delta\left[P^* \times (1+t)\right] \approx e \times \left[\%\Delta P^* + \%\Delta(1+t)\right]$$

$$= e \times \%\Delta P^* + e \times \frac{(1+t_1)-(1+t_0)}{(1+t_0)} \times 100 = e \times \%\Delta P^* + e \times \frac{t_1 - t_0}{1+t_0} \times 100 \ .$$

Solving this equation for t_1, the ITE in percentage terms is

$$(1) \qquad t_1 \times 100 = t_0 \times 100 + (1+t_0) \times \left[\frac{\%\Delta Q}{e} - \%\Delta P^*\right].$$

Intuitively, the greater the increase in P^*, the less that a given decrease in the quantity of imports should be attributed to an increase in the rate of protection and the more it was caused directly by the external price increase. As long as the term in square brackets is positive, it will be the case that $t_1 > t_0$. Indeed, for a constant external price, if imports decrease, it must be that the rate of protection increased.

For the various commodities, I form the initial tariff rate t_0 as a composite of the tariff rates offered by Indonesia under its most-favored nation (MFN) tariff schedule as well as various preferential schedules (specifically, the marginal rate of protection, or MRP, as described in Section 4.1). The import elasticities of demand are taken from a dataset formulated for Indonesia and many other countries at the Harmonized System (HS) 6-digit level by Kee, Nicita, and Olarreaga (2008).[61] Trade value and quantity data were obtained from the Ministry of Trade; values are measured in U.S. dollars.

[61] A few of the required elasticities were not available, and were replaced by their counterparts for Malaysia or Brunei.

The unit value of imports is used to proxy *P** in formula (1). For a number of commodities, these unit values were questionable for Indonesia, due to errors in the recorded value or quantity of imports or both. For these commodities, I replaced the unit value of imports for Indonesia with the unit value of either imports or exports for the United States, using online U.S. trade data from the U.S. International Trade Commission. I then recalculated quantities imported using the value of imports and these replacement unit values, so that all figures are consistent, even though some errors may remain.[62]

Finally, relative prices determine commodity demand, and thus I deflated the commodity unit values in the base year and policy year by the U.S. producer price index, intended to serve as a simple measure of the international price level in dollar terms.[63]

B.2. Calculations for the Export Side: Mineral Products

I use a similar approach for the export side. I assume that the external price can change due to external forces, but is not influenced by the quantity supplied by Indonesia. This may be questionable for certain ores like nickel, copper, and aluminum, at least in the short run, since Indonesia commands substantial market shares.[64]

The method is simpler than the method used for the import side in that we can assume that initially there was no export tax or other policy intervention. On the other hand, the structure of the model is more elaborate, so that the calculations can be done in the most reasonable manner possible.

Specifically, it is assumed that the inverse export supply function (which shows the price as a function of quantity supplied) is of exponential form, which can be written as

$$P = P_0 \, e^{B Q},$$

in which P is the supply price of exports, P_0 is the intercept of the curve along the vertical axis, as in Figure B.1 below, e is the base of natural logarithms, B is a scale parameter, and Q is the quantity of exports. It can be shown that BQ is equal to the inverse elasticity of supply, $1/a$, where a is the elasticity of supply. I assume that the inverse elasticity of supply is initially equal to BQ for the products exported, but due to price or policy changes the elasticity can change subsequently.

Despite the arbitrariness of the functional form, it does have two attractive features. First, it does not in general require a 100 percent reduction in price for there to be a 100 percent reduction in quantity, unlike a constant elasticity of supply curve.[65] Thus, in Figure B.1, the price would not have to drop any

[62] The commodities for which this was done were chicken meat (for which the U.S. port price shown in Figure 2 was used rather than a unit value), fresh chiles, both tariff lines for bananas, fresh pineapples, fresh mangoes, fresh oranges, fresh papayas, onions preserved with acetic acid, and chile sauce.

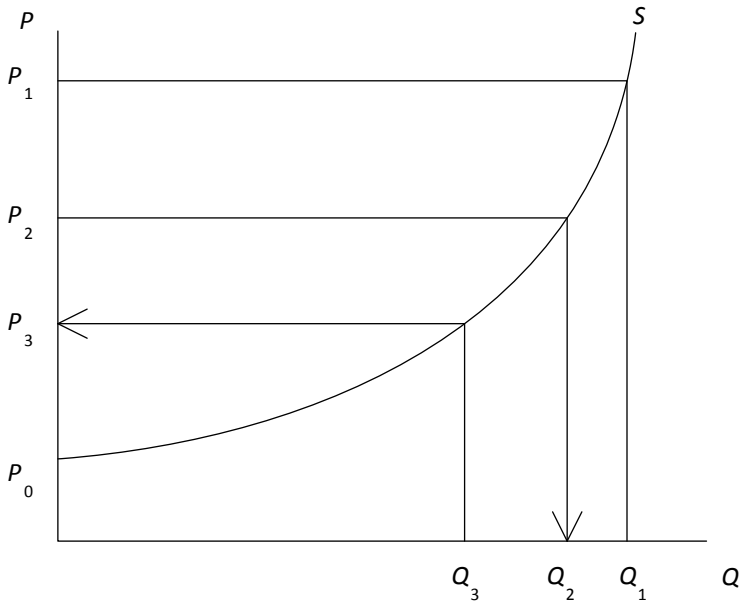
[63] The producer price index is from *Economic Indicators*, published online monthly by the U.S. government.

[64] According to the British Geological Survey (2015), Indonesia produced upwards of 34 percent of the global output of nickel ore and almost 19 percent of bauxite (aluminum ore) in 2013. Based on commodity price data from the World Bank, the nominal world market price of nickel increased by more than 37 percent in the first five months of 2014, evidently in reaction to the new policies, though most of the price increase had dissipated within the next five months and the nominal price by March 2015 was lower than it had been in January 2014.

[65] A constant elasticity of supply curve always runs through the origin of the diagram. I tried the constant-elasticity formulation as an alternative. In many cases, the estimated export tax equivalents are quite close. The exponential formulation avoided

further than P_0 for exports to contract to zero. Second, the price P_0 will necessarily be positive, although it can be very small. Third, the greater is the quantity supplied, the less elastic supply becomes, which could reflect that opportunity costs increase at a higher rate as the quantity is increased.

Figure B.1: Exponential Inverse Export Supply Curve



It is necessary to calibrate this supply curve to the base-year price P_1 and quantity Q_1, shown in Figure B.1, since the curve must go through the point (Q_1, P_1). Thus, it must be the case that

$$P_1 = P_0 e^{BQ_1} \qquad \text{such that} \qquad B\,Q_1 = \frac{1}{a}\,.$$

Solving, we obtain

$$P_0 = \frac{P_1}{e^{\left(\frac{1}{a}\right)}} \qquad \text{and} \qquad B = \frac{1}{a\,Q_1}$$

Therefore, the calibrated inverse supply curve becomes

some of the extremely high export tax equivalents that the constant-elasticity formulation entailed. Indeed, in some cases its estimates seemed to be on the low side.

$$(2) \qquad P = \left(\frac{P_1}{e^{\left(\frac{1}{a}\right)}} \right) e^{\left(\frac{1}{a}\right)\frac{Q}{Q_1}} = P_1 e^{\left(\frac{1}{a}\right)\left(\frac{Q-Q_1}{Q_1}\right)}$$

This calibration allows us to find prices and quantities along the curve that are consistent with the initial data and the initial elasticity of supply.

In parallel with the analysis for the import side, the domestic price can be written as a function of the external price and the export tax equivalent (ETE) rate, t:

$$P_D = P^* \times (1 - t)$$

Given that initially there was no export tax or restriction in effect, $P_1 = P^*$. We can now decompose the change in the domestic price into a change in the external price and a change in the ETE:

$$\%\Delta P_D = \%\Delta\left[P^* \times (1-t)\right] \approx \%\Delta P^* + \%\Delta(1-t) = \%\Delta P^* - t \times 100 .$$

Suppose, as shown in Figure B.1, that between the base year and the policy year the external price changes to P_2. We can then solve for the quantity Q_2 along the inverse supply curve, as the value of Q required for P to equal P_2. Suppose further that between these years the quantity exported changes to Q_3. We can then reverse the procedure and find the associated price P_3 along the inverse supply curve.

The percentage change between prices P_1 and P_2 reflects the change in the external price, and the percentage change between P_2 and P_3 measures the ETE of the export restriction in percentage terms.

I use 4-digit estimated export supply elasticities for the mineral sectors. Export supply elasticities are seldom calculated, particularly at such a detailed level of aggregation. The elasticities used are from Broda, Limão, and Weinstein (2008) and are those faced by the United States in its trade with the rest of the world over 1994-2003.[66] These could differ from the true export supply elasticities for Indonesia for various reasons. Nevertheless, one might reasonably expect that these elasticities are roughly comparable to those for Indonesia.[67]

I deflated the price figures using the same price index as for the import side, but applied it to the different years. As for the import side, some of the export unit values seemed questionable for

[66] Broda, Limão, and Weinstein also estimated elasticities of export supply faced by 15 countries that had previously not been members of the World Trade Organization, including China and Taiwan. I replaced U.S. elasticities with elasticities faced by China in four cases—quicklime, iron ore, refined copper, and zinc alloys— but otherwise favored the U.S. data, which seemed more reliable in general. (In some cases, elasticities for similar commodities had to be used due to missing data from the 2008 data set.) For iron ore and refined copper, the estimate of the export elasticity faced by the United States seemed too large. In the case of iron ore, for example, using that elasticity estimate, would a 72.6 percent drop in the quantity of exports from Indonesia be explainable by a 9.1 percent export tax, given that the external relative price of iron ore had fallen by 19.4 percent? I judged that this was not likely, and so used the smaller elasticity of export supply faced by China instead. In the case of zinc alloys, the export elasticity faced by the United States was so close to zero that the simulations could not be run, and so I used the elasticity faced by China instead. In general, export supplies for mining sectors tend to be relatively inelastic, reflecting the relatively large fixed costs in many cases.

[67] Broda, Limão, and Weinstein find a high correlations among the export supply elasticities faced by various countries.

Indonesia, such as if the unit value was much larger or smaller for one year compared to the others, and I replaced a number of these sets of export unit values for 2010-14 with export or import unit values for comparable commodity categories from the United States.[68]

[68] I did this for HS 2603000000, 2607000000, 2610000000, 2616100000, 2620300000, 2812100000, 2823000000, 2824100000, 2833299000, 6806200000, 7112999000, 7403190000, and 7406100000 for 2012-14, and for HS 2609000000 (tin ores and concentrates) for 2002-04. In parallel with the import side analysis, I rescaled the export quantity data using the export value data and these replacement unit values, so that the data would be consistent.

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