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# Non-Tariff Measures and Regional Integration in ASEAN

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**Abstract**

While tariffs have been substantially reduced under the ASEAN Free Trade Agreement (AFTA), little progress has been made in reducing non-tariff measures (NTMs), and as a result, there has been little increase in intra-regional trade.

An UNCTAD led study (Ing et al. 2016) has documented the current NTMs in the ASEAN region. While many NTMs are legitimate, such as sanitary and phyto-sanitary restrictions to protect health and the environment, many appear to function as protection of domestic producers from competition from imports. Six countries in ASEAN have 100 per cent of their imports covered by one NTM or another.

For technical NTMs (SPS and TBT), we measure the similarity in regulations between two different countries. If a country has similar regulations, for example regarding SPS rules, then it is likely that these rules are not an impediment to trade. Using a gravity model to explain trade unit values, we find that regulatory convergence can substantially reduce the costs effect of NTMs. For example, a regulatory reform to realign existing NTMs and to maximize regulatory overlap, but without increasing or decreasing the number of NTMs in any country, could reduce the current net effects of NTMs by 15 to 25 per cent. For non-technical barriers, such as quotas or price controls, we estimate an *ad valorem* equivalent.

In this analysis, we attempt to quantify the trade impacts of these NTMs using a computable general equilibrium model. Our results suggest that harmonising technical NTMs and eliminating non-technical NTMs altogether would increase ASEAN countries net welfare by $3 billion if the barriers are reduced on intra-ASEAN trade only. Furthermore, these gains could be increased to $12 billion if technical measures on non-ASEAN imports were reformed or further to $18 billion if ASEAN technical measures could be matched to international levels so that ASEAN exporters could access European, American and Japanese markets.

**Keywords**: ASEAN, non-tariff measures (NTMs), non-tariff barriers (NTBs), sanitary and phyto-sanitary (SPS) measures, technical barriers to trade (TBTs), trade in goods.

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# 1. Introduction

As tariffs have been steadily reduced through multilateral, regional and unilateral initiatives, non-tariff measures (NTM) are increasingly seen as the major impediment to international trade and the focus of attention in regional free trade agreements. While it is relatively straightforward to compile a list of NTMs, it is difficult to assess the trade impacts of their removal. Furthermore, many NTMs have a legitimate purpose relating to health and environmental protection, and it is not clear whether such NTMs should be removed.

NTMs are defined as policy measures, other than ordinary customs tariffs, that can have an economic effect on international trade (UNCTAD, 2010). NTMs thus include a wide array of policies. On the one hand, traditional trade policy instruments, such as quotas or price controls, which are often termed non-tariff barriers (NTBs). On the other hand, NTMs also comprise sanitary and phyto-sanitary (SPS) measures and TBT measures that stem from important non-trade objectives. While technical NTMs increase trade costs, their primary regulatory objectives make them indispensable. They ensure food safety, protect harvests against pests and invasive species, regulate the trade of hazardous substances and waste, and prohibit the trade of endangered species. These policies are necessary and elimination is not necessarily an option.

However, there are many examples of such regulations being unnecessarily strict or implemented over zealously. For many years Australia kept out imports of apples from New Zealand because of concerns about introduced diseases (e.g. fire blight) damaging the local industry. In a drawn-out dispute, the WTO ruled against Australia. This is an example of NTMs being used as a form of protection, much as tariffs had been used in the past. There are many such examples.

Reducing NTMs has proven difficult because countries have different conditions and preferences. The USA has limits on antibiotic levels in imported beef and pork that is 20 times less restrictive than the European Union levels. One approach, used here, to gauging the impact of reducing NTMs is to look at bilateral trade where the regulatory measures are significantly different. This involves measuring the similarity in regulations between two different countries. If a country has similar regulations, for example regarding SPS rules, then it is likely that these rules are not an impediment to trade.

In this paper, we quantify the price impact of domestic and foreign regulatory frameworks and estimate the trade and welfare enhancing effect of regulatory convergence.

In the next section we briefly present the classification and collection of the data on NTMs, using a global dataset that UNCTAD, in collaboration with ERIA, collected in 2014-2016. Section 3 elaborates on ways to measure regulatory convergence. A recently developed measure of distance in regulatory structures is introduced and visualizes the current level of regulatory convergence within ASEAN and with some other large trading partners. Section 4 estimates the quantitative impact of domestic and foreign technical regulations as well as regulatory convergence. In Sections 5 and 6 we specify the scenarios, simulate a partial reduction in NTMs on a regional basis and report the trade and welfare impacts. We conclude that the trade enhancing effects of converging regulations in the ASEAN region is far greater than removing the remaining tariffs.

## 2. Classification and collection of NTM data

An essential step in the collection of NTM data is internationally agreed and recognized classification system. UNCTAD began to identify and classify NTMs in 1994 but a substantial revision occurred in 2013 (UNCTAD 2014) with the help of collaborative organisations[2]. This is shown in table 1. There are 16 chapters (A-P). Chapters A to O refer to import-related NTMs, whereas chapter P covers measures that countries impose on their own exports. Another essential distinction is between technical measures (chapters A, B and C) and non-technical measures (chapters D to O). Technical measures have objectives that are not primarily trade-related, such as protecting plant and animal health, but have trade impacts nonetheless. The non-technical measures have objectives and mechanisms that discriminate against foreign producers. These can be considered non-tariff barriers as distinct from non-tariff measures.

**Table 1: UNCTAD-MAST classification of Non-Tariff Measures**

| | | | |
|---|---|---|---|
| **Import-related measures** | **Technical measures** | A | Sanitary and Phyto-Sanitary (SPS) measures |
| | | B | Technical barriers to trade (TBT) |
| | | C | Pre-shipment inspections and other formalities |
| | **Non-technical measures** | D | Contingent trade-protective measures |
| | | E | Non-automatic licensing, quotas, prohibitions and quantity-control measures |
| | | F | Price-control measures, including additional taxes and charges |
| | | G | Finance measures |
| | | H | Measures affecting competition |
| | | I | Trade-related investment measures |
| | | J | Distribution restrictions |
| | | K | Restrictions on post-sales services |
| | | L | Subsidies (excl. export subsidies) |
| | | M | Government procurement restrictions |
| | | N | Intellectual property |
| | | O | Rules of origin |
| **Export-related measures** | | P | Export-related measures |

Source: Based on UNCTAD (2013)

[2] UNCTAD, WTO, World Bank, UNIDO, FAO, ITC and OECD.

Data about NTMs is collected from national legislative documents, such as laws, decrees and directives. Once a relevant regulation is identified, each specific provision is classified into one of the 178 detailed NTM codes. For each measure, such as “Tolerance limits for residues and restricted use of substances”, it is necessary to identify the products that it refers to, such as pork or beef.

Of most interest in ASEAN are SPS measures that apply to agriculture. Some agricultural products have 10 or 20 technical measures applying to them. In addition to maximum residue limits, other restrictions include certain animal raising processes and an SPS certification procedure. In fact, there are 58 rows for each type of NTM. Given that these measures are in place to protect human, animal and plant health and safety, they cannot merely be eliminated. Therefore, it is necessary to come up with a measure of the extent to which they diverge or converge to some specific standard.

Even if regulations converge, the level itself may be somewhat arbitrary and debatable. The European Union has a common standard for residue limits of tetracycline (an antibiotic) in beef. This applies to intra-EU trade. However, it is twice as restrictive as the standard set by Codex Alimentarius, an international standard setting body for food items. Therefore, trade may be impacted if countries converge to an inappropriate standard. For example, Wilson, Otsuki and Majumdsar (2003) estimate that regulatory convergence towards the international standard set by Codex Alimentarius would increase international trade of beef by about US$ 3.2 billion.

Regulatory distance refers to the difference in measures for a particular regulation as applied to a particular product. If the maximum residue limits for tetracycline in beef are the same in two countries, this is not regarded as a barrier to trade. If they differ, then trade is impeded in one direction but not the other.

In the database, we have 5200 products and bilateral trade between ten ASEAN countries plus 36 trading partners. We classify each bilateral trade/product combination according to whether a specific NTM applies. Formally, the specific NTM type (*l*) applied by an importing country (*i)* to a specific product (*k*) coming from an exporting country (*j*) in a given year (*t*) is defined as a "dummy" variable:

$$n_{ijkt}^{l} = \begin{cases} 1, & \text{if country } i \text{ applies NTM type } l \text{ to product } k \text{ from origin } j \text{ in year } t \\ 0, & \text{if no such NTM is applied} \end{cases}$$

The regulatory distance (RD) between two countries *i* and *j* for the same NTM type, product and year is therefore:

$$RD_{ijkt}^{l} = \left| n_{ijkt}^{l} - n_{jikt}^{l} \right|, \text{for } i \neq j$$

If both countries apply the same measure, the regulatory distance is *0*; if they do not, the equation yields *1*. Regulatory distance between two countries can be aggregated across NTM measures and products, or indeed sectors, such as meat or dairy products.

With respect to technical (SPS and TBT) NTMs in agriculture, the basic picture is that the degree of regulation rises with the level of development. Thus, Cambodia or Lao PDR have low prevalence of NTMs, while Thailand, Indonesia, Malaysia have a greater number of measures. Countries such as

the United States, the European Union and Japan are more regulated. There is significant dispersion between the ASEAN economies. The four ASEAN countries that are net exporters of agricultural goods (Thailand, Indonesia, Malaysia and Vietnam) are found to converge towards the more highly regulated developed countries (the United States, European Union and Japan), but there are few signs of regulatory similarity between the four ASEAN member States.

In manufacturing, the ASEAN countries are quite similar, although once again not as regulated as United States, European Union and Japan. Countries with higher shares of intra-regional trade tended to have similar regulations, which may favour the development of regional value chains in manufacturing.

In bilateral trade, the general notion is that a more heavily regulated country, such as Thailand, should find it easier to export to a less regulated country, such as Cambodia, than the other way around. If Thailand has stricter MRLs in poultry production than Cambodia, the direction of trade is more likely to be one way. We can measure the degree of "regulatory overlap" by looking at the similarity of measures in bilateral trade.

## 3. Econometric estimates of regulatory divergence

NTMs applied by the importing country raise trade prices. Using a gravity model, we estimate the effects of the number of distinct types of NTMs on unit values. Control variables are included to capture overall price levels (*log* of exporters and importers per capita GDP) and transport costs (*log* of distance, landlocked state and common borders). Product-specific effects are absorbed through product-level fixed effects. The estimation is based on a worldwide cross-section of 46 recently collected countries, including ASEAN members, at a disaggregated product-level (HS 6-digits, more than 5,000 products).

The simple log-linear estimation equation reads as follows with sub-indices for product *k*, importer *I* and exporter *j* :

$$\ln(p_{ijk}) = \alpha + \beta_1 \text{ImpNTM}_{ijk} + \beta_2 \text{ExpNTM}_{ijk} + \beta_3 \text{sameNTM}_{ijk} + \beta_4 \text{QR}_{ijk} + \beta_5 \ln(\text{GDPpc}_i) + \beta_6 \ln(\text{GDPpc}_j) + \beta_7 \text{landlocked}_i + \beta_8 \text{landlocked}_j + \beta_9 \ln(\text{distance}_{ij}) + \beta_{10} \text{contig}_{ij} + FE_k + \varepsilon_{ijk}$$

The results for all sectors (1) and agriculture (2) and industry (3) separately produced the expected signs and magnitudes. NTMs tend to raise unit values whereas overlapping NTMs in both countries tend to reduce costs. Quantitative restrictions and income levels raise unit values. Distance and being landlocked raises costs whereas a common border reduces it, especially for agricultural products.

**Table 2: Regression results**

Dependent variable: log (c.i.f. trade unit value)

| | (1) | (2) | (3) |
|---|---|---|---|
| | all Sectors | *only Agriculture* | *only Industry* |
| Importer's *total number* of technical NTMs | 0.024*** | 0.012*** | 0.034*** |
| | (0.00) | (0.00) | (0.00) |
| Exporter's/domestic *total number* of technical NTMs | 0.021*** | 0.0093*** | 0.029*** |
| | (0.00) | (0.00) | (0.00) |
| Pairs of *overlapping* NTMs in exporter & importer | -0.023*** | -0.0086*** | -0.026*** |
| | (0.00) | (0.00) | (0.00) |
| Importer quantitative restrictions dummy | 0.032*** | 0.021 | 0.029*** |
| | (0.01) | (0.02) | (0.01) |
| log (Importer GDP per capita) | 0.20*** | 0.25*** | 0.19*** |
| | (0.00) | (0.01) | (0.00) |
| log (Exporter GDP per capita) | 0.21*** | 0.18*** | 0.21*** |
| | (0.00) | (0.01) | (0.00) |
| log (distance) | 0.19*** | 0.074*** | 0.20*** |
| | (0.00) | (0.00) | (0.01) |
| 1 for common border | -0.054*** | -0.22*** | -0.031*** |
| | (0.01) | (0.02) | (0.01) |
| 1 if importer is landlocked | 0.12*** | 0.19*** | 0.11*** |
| | (0.01) | (0.02) | (0.01) |
| 1 if exporter is landlocked | 0.20*** | 0.089** | 0.22*** |
| | (0.02) | (0.04) | (0.02) |
| Observations | 412,911 | 43,662 | 369,249 |
| Adjusted $R^2$ | 0.714 | 0.616 | 0.697 |

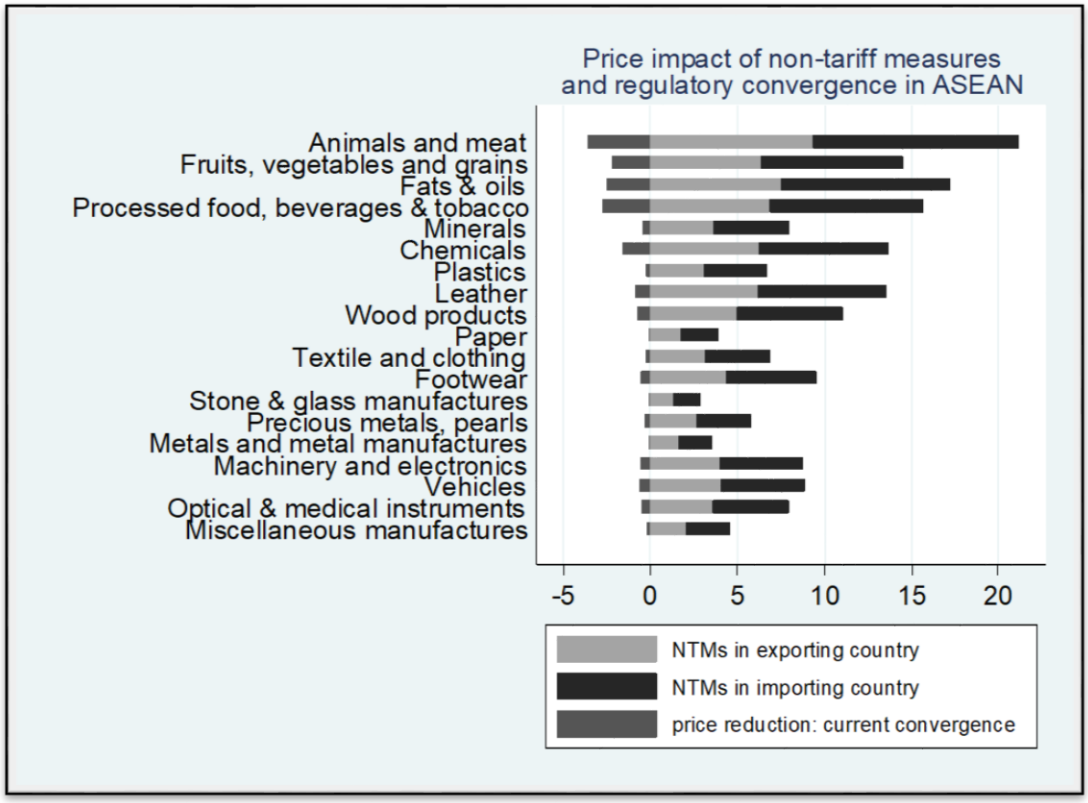
Clustered standard errors in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01.
Fixed effects regressions with product-specific (HS-6 digit) fixed effects.

The overlapping NTM result deserves further comment. Where the importer and exporter have the same NTM for a specific product, the effect is a reduction in costs. This applies even though the degree of restrictiveness, say MRL, may be different. The magnitude is -2.3 per cent, similar to the increase in cost (2.4 per cent) for the importer imposing the NTM. It seems that the 'net effect' of a foreign NTM is cancelled out if the exporter applies an overlapping NTM domestically. We also see this effect in both the agriculture and industry sub-samples.

## 4. Regulatory distance in ASEAN

To approximate the order of magnitude of the aggregate impact of technical NTMs and regulatory convergence in ASEAN, we simply multiply the marginal effects from table 3 for agriculture and manufacturing by the numbers of technical measures applied by the importer and exporter, and the overlapping measures. As expected, the largest impacts are in agricultural products, where NTMs increase import prices by 15-20 per cent. Where NTMs overlap, costs are reduced 3-4 per cent.

**Figure 1: Regional average price impact of NTMs and regulatory convergence**

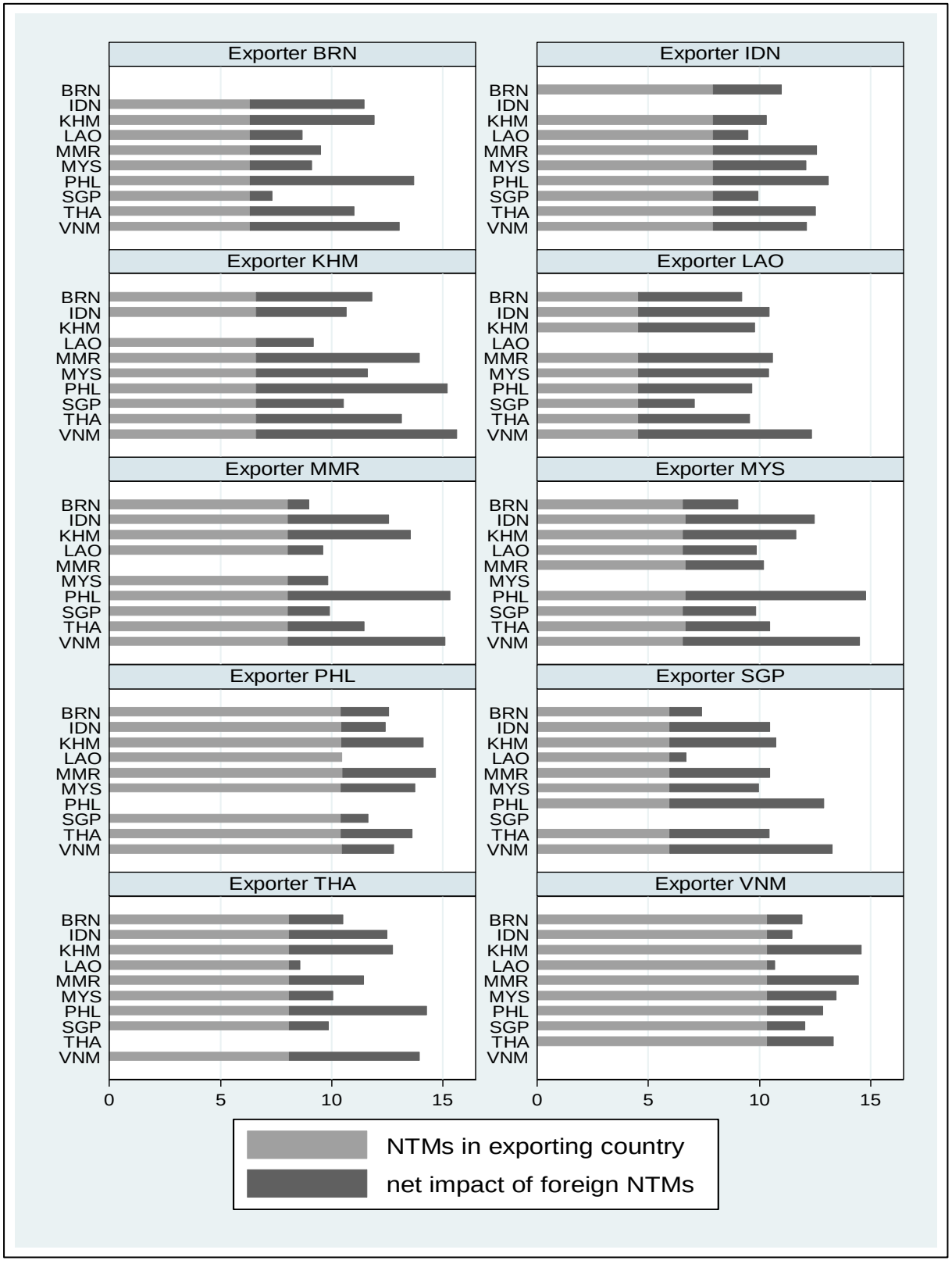



Not shown in figure 1 but apparent from the data is a low level of regulatory convergence in the ASEAN region. In general, there is scope to increase regional trade through the convergence of measures.

While figure 1 shows average impacts, bilateral impacts are obviously different, as shown in figure 2. For each exporter, the effect of domestic measures is the same for all destinations. For example, for Brunei in figure 2, domestic NTMs raise the average costs of exports to all ASEAN countries by around six per cent. In figure 2 we also show the bilateral 'net' effect for agriculture, which refers to the impact of foreign NTMs minus the price-reductions through regulatory overlap.[3] Importer NTMs raise costs a further six per cent on Brunei exports to Indonesia, but only another one or two per cent on exports to Singapore. Exporter NTMs are generally around 5-10 per cent, but are highest in the Philippines, Vietnam and Indonesia.

[3] Overlapping measures could be viewed primarily as domestic requirements that add costs of production before exporting. But when the producer starts exporting, the overlapping measures abroad only have a minimal impact. From this perspective, the real challenge for exporters lies principally with foreign non-overlapping measures.

**Figure 2: Average cost reductions in agriculture of technical measures through regulatory convergence**




Source: Authors' calculations.

For almost all countries, Lao PDR is an easy country to export to. It has few restrictions. By contrast, there are relatively large barriers in exporting to Indonesia, Philippines and Vietnam.

Regulatory overlap can make a difference. In exporting to Malaysia, it is easier for Thailand than Cambodia (KHM in figure 3). Cambodia has less domestic regulation but faces higher costs in the importing country. Lao PDR and Myanmar also tend to face higher import barriers than the wealthier ASEAN members.

## 5. Scenarios

To illustrate the potential trade gains from regulatory convergence, we simulate three scenarios, described in table 4.

**Table 4 Alternative scenarios**

| No | Label | Description |
|---|---|---|
| 1 | Intra-ASEAN | Elimination of non-technical barriers within ASEAN only. Regulatory convergence of technical (SPS and TBT) measures within ASEAN. |
| 2 | ASEAN Multilateral | As for 1 plus half convergence of technical NTMs on imports from all countries. |
| 3 | ASEAN Reciprocal | As for 2 with half convergence of technical NTMs on exports as well as imports. |

In each scenario, we eliminate all the non-technical barriers on trade within ASEAN. Elimination of non-technical barriers are modelled as a tariff equivalent. The estimated tariff equivalents are introduced into the initial database and removed in the simulation. This implies that the tariff revenue is collected by the Government, and removal of the NTB will lead to a fall in tariff revenue. The policy generates rents which are transferred when the measure is reduced, just as with the removal of a tariff. This is appropriate where the rents from the NTB are captured by the importing economy, such as a licensing arrangement.

In addition, for technical NTMs (mainly SPS and TBT), costs are reduced through regulatory reform. The reductions in costs vary by product and country but tend to be between 15-35 per cent. In the Intra-ASEAN scenario all this difference is eliminated. For the Multilateral and Reciprocal scenarios, the cost reductions are reduced by a half on the assumption harmonisation with non-ASEAN countries would be more difficult to bring about than intra-ASEAN negotiations.

Regulatory reform of technical NTMs is modelled as a productivity shock. This is applicable where there are no rents captured, such as many SPS, TBT and other regulatory measures which create efficiency losses. Andriamananjara et al. (2003) refer to this as institutional frictions or 'sand in the wheels'. Reform reduces the cost of trade between two countries. The welfare impacts tend to be greater under this approach, because rents are effectively shared between importer and exporter

rather than dissipated. With removal of a tariff equivalent, rents are merely transferred from Government to consumers.

These reforms can be implemented bilaterally or multilaterally depending on whether the barrier affects all countries or can be specified bilaterally. The thinking is that the SPS and TBT standards are likely to be multilateral, so that for example Vietnam would apply the same standards on aflatoxins in cashew nuts from Ghana as it would on nuts from Indonesia. However, this need not apply to the non-technical measures in table 1, such as discretionary licensing, where rents captured by the importer provide an incentive not to liberalise too widely.

In the first scenario, Intra-ASEAN, it is assumed the NTMs are harmonised bilaterally so only ASEAN member countries benefit. In fact, non-members, such as China, are made worse off because of competition effects. Just as non-members lose when tariffs are reduced within an FTA, so too with a bilateral convergence in NTMs.

The second scenario, ASEAN Multilateral, assumes a change in measures will encourage imports from all countries, not only a selected few. For example, raising MRLs on pork imports would affect imports from all sources, not just ASEAN. This applies only to technical (SPS and TBT) measures. Non-technical barriers are reduced bilaterally within ASEAN only, as in the first scenario.

The third scenario, ASEAN Reciprocal, assumes that exports are also enhanced when a country harmonises to a common regulation. This is because the importer can see that the exporter has raised domestic measures, and this will raise export measures even if there is no bilateral agreement. As in the previous two scenarios, non-technical barriers are reduced bilaterally within ASEAN.

For technical measures, convergence is modelled as a productivity shock. This is applicable where there are no rents captured, such as many SPS, TBT and other regulatory measures which create efficiency losses.

We make use of a general equilibrium model to capture the interactions in the whole economy by linking all the sectors through input-output tables and by linking all countries through trade flows. The general equilibrium model used here is GTAP[4], a well-documented, static, multiregional, multi-sector model that assumes perfect competition, constant returns to scale and imperfect substitution between foreign and domestic goods and between imports from different sources. The model is static, with no phasing in of reforms or underlying growth in the economy. By examining non-tariff changes at an industry level, it is possible to make a reasonable estimate as to their likely effects on the industry's prices and production, consumption and trade. The key step is to determine the size and nature of the shock, the *ad valorem* equivalent of the non-tariff barriers. The results show the impact of the policy change at a given point in time.

For this application, Version 10 (2014) of the GTAP database is aggregated to 50 regions (including ten ASEAN countries) and 43 sectors.

Looking at the ten ASEAN members, there are 90 possible bilateral trades for each of 42 sectors, a total of 3,780 possible shocks. For non-technical NTMs, many of the shocks are zero. There are 1,454

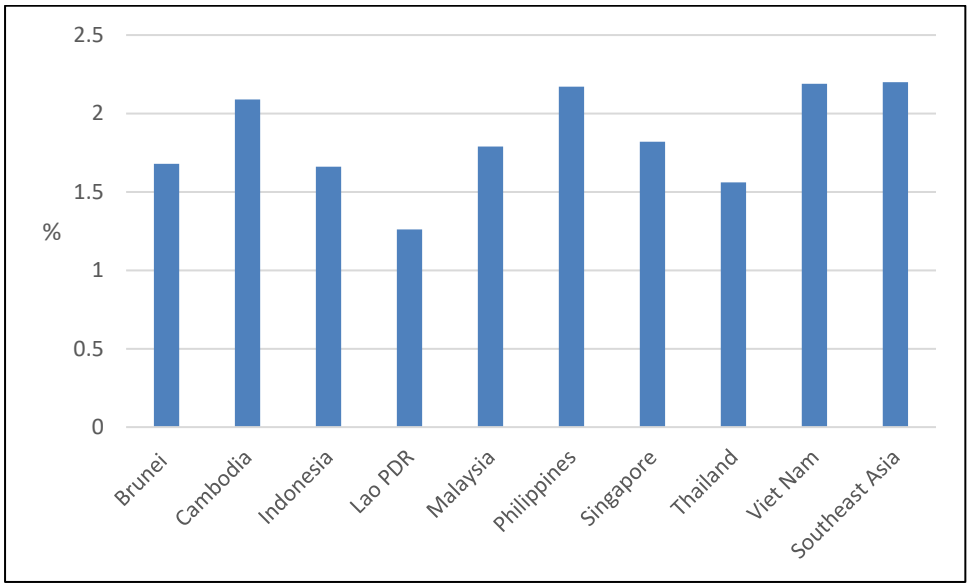
[4] For information on GTAP, see https://www.gtap.agecon.purdue.edu/.

non-zero shocks. The average of these is -1.35 per cent. The largest shock is only -2.94 per cent, which applies to coal and gas.

For technical NTMs, the scope for regulatory convergence is much greater. There are 3,128 non-zero shocks. The average of these is -1.86 per cent. The largest is -10.4 per cent, which applies to oil and gas traded between the Philippines and Myanmar.

The distribution of technical NTMs shocks by ASEAN member is shown in figure 3. One might expect the higher income countries to have greater impediments, but this doesn't show here. This is because the chart takes into account the degree of harmonisation. Poorer countries, such as Cambodia, have fewer SPS measures, but they are out of kilter with their trading partners.

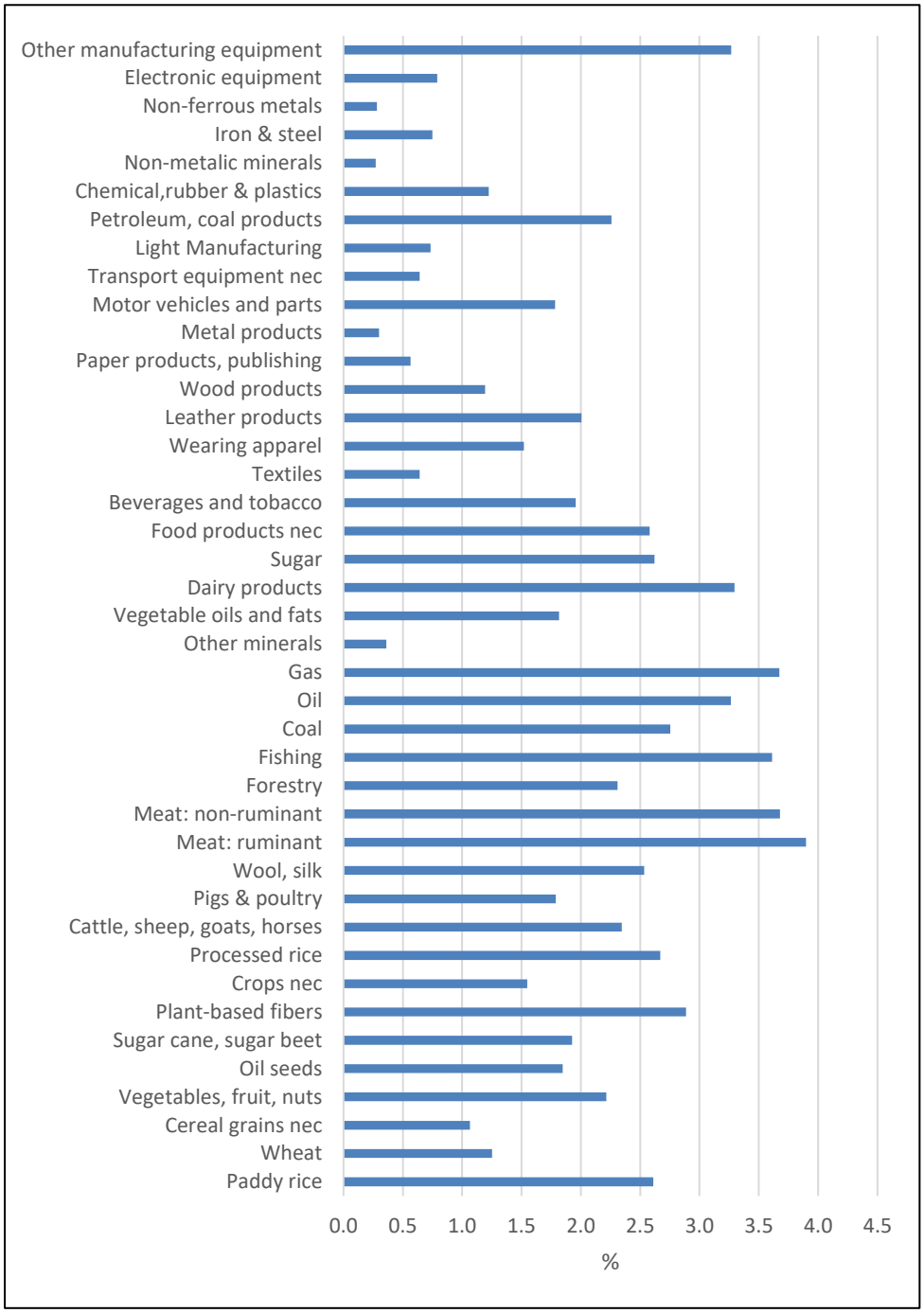
**Figure 3: Average cost reductions by country**




Source: Authors' estimates.

The distribution of technical NTMs shocks by the 42 GTAP sectors is shown in figure 4. The largest barriers with scope for harmonisation are meat, dairy, sugar, fishing and oil and gas. Countries that trade in these products are expected to reap the greatest gains from reform.

**Figure 4: Average cost reductions by sector in ASEAN**




Source: Authors' estimates.

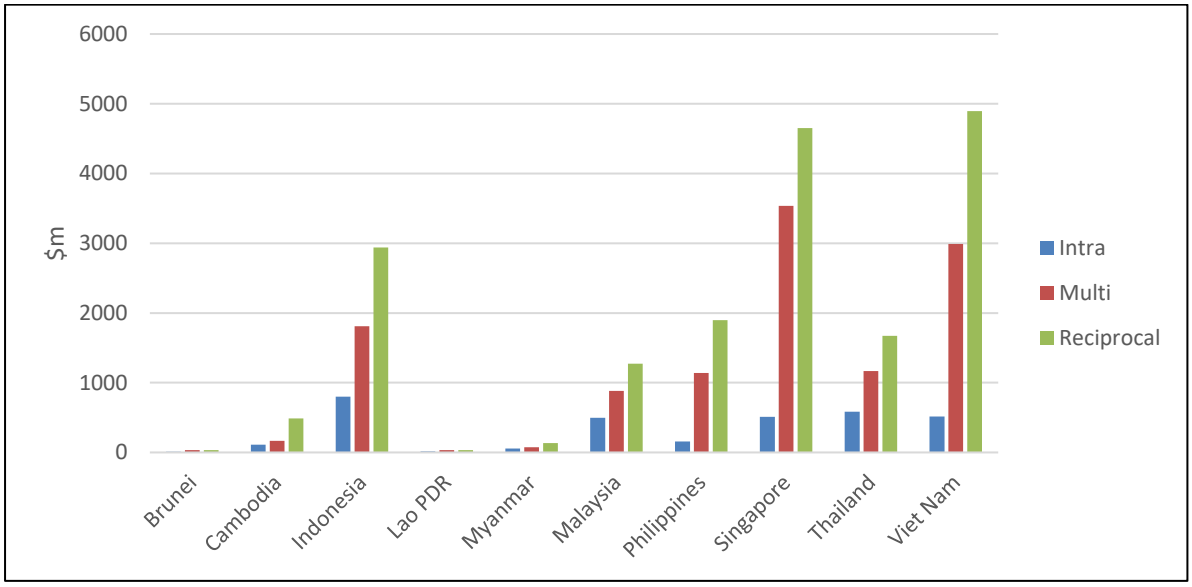
## 6. Results

The absolute welfare gains from regulatory convergence within ASEAN are shown in figures 5 for the three scenarios. The gains are roughly in proportion to international trade, with sizeable absolute gains to Indonesia, Malaysia, Thailand and Vietnam and few gains to Cambodia, Lao PDR and Myanmar. However, the magnitude of the gains varies greatly depending on whether the additional trade is confined to ASEAN only, opens the ASEAN market to all exporters, or allows ASEAN countries to increase exports to international markets outside the region.

For Scenario Intra-ASEAN, total gains for the region are US$3.2 billion. This exceeds global gains, $1.9 billion, which indicates that some countries outside of the ASEAN region lose. This includes regional neighbours China, Japan and Korea.

In ASEAN, two thirds of the welfare gains are attributable to productivity changes resulting from the SPS and TBT measures.[5] Other sources of gains are positive terms of trade effects and, to a minimal extent, allocative efficiency gains that derive from removing tariff equivalents. This implies that it is reforming the SPs and TBT measures that provides most of the gains in welfare.

**Figure 5: Change in welfare**




Source: GTAP simulations.

Opening ASEAN markets constrained by technical NTMs changes the magnitude and distribution of gains somewhat (Scenario Multi in figure 5). Regional (ASEAN) welfare gains rise to $11.8 billion, compared with $3.2 billion in the first scenario, but in this case the benefits accrue more to the Philippines, Vietnam and Singapore and less to Indonesia, Malaysia and Thailand. The first set of countries have a higher share of trade outside the region and so tend to benefit more when barriers are reduced to non-ASEAN exporters. In this scenario, non-ASEAN countries also tend to benefit more, so global gains, $9.8 billion, are more in line with ASEAN welfare gains. This is because non-ASEAN exporters can export more to ASEAN countries.

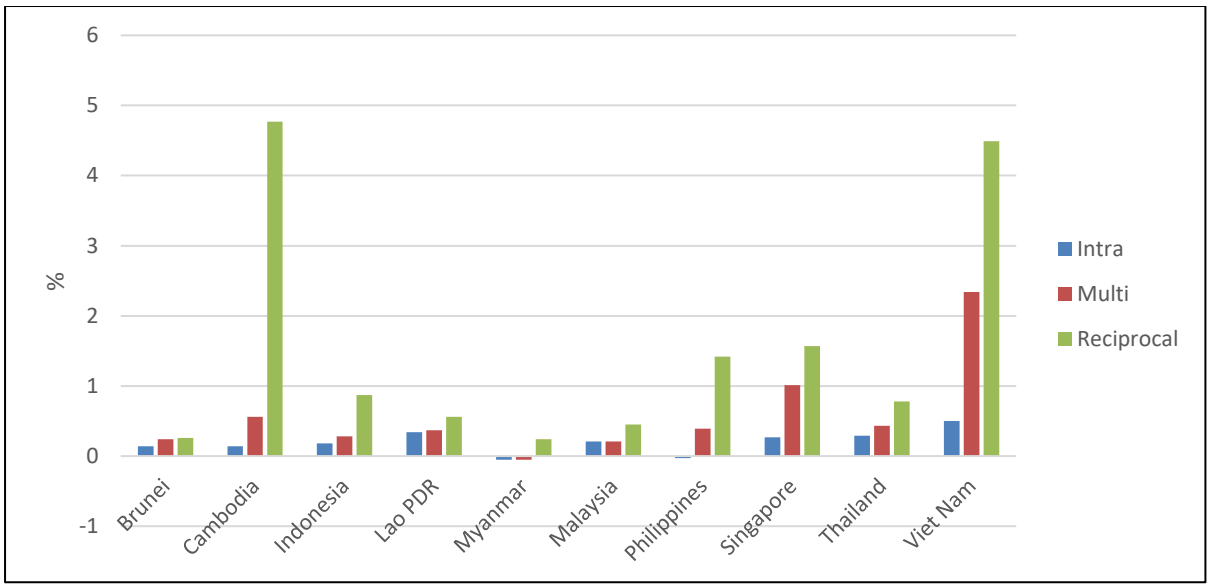
The third scenario allows ASEAN countries to export more to all regions (Scenario Reciprocal). ASEAN welfare gains are $18.0 billion, and global gains are $16.1 billion. This is a significant increase compared with the second scenario, but the distribution of gains between ASEAN countries is similar.

Whereas welfare gains show absolute amounts, the GDP estimates show the gains relative to the size of the economy (figure 6). Whereas most ASEAN countries gain half to one per cent of GDP in most of the scenarios, Cambodia and Vietnam benefit significantly from the Reciprocal scenario

[5] The productivity gains reflect the choice to shock “ams”, an import augmenting technical (productivity) change variable in GTAP.

which assumes access to international markets in addition to lowering the cost of imports as in the second scenario.

**Figure 6: Change in GDP**




Source: GTAP simulations.

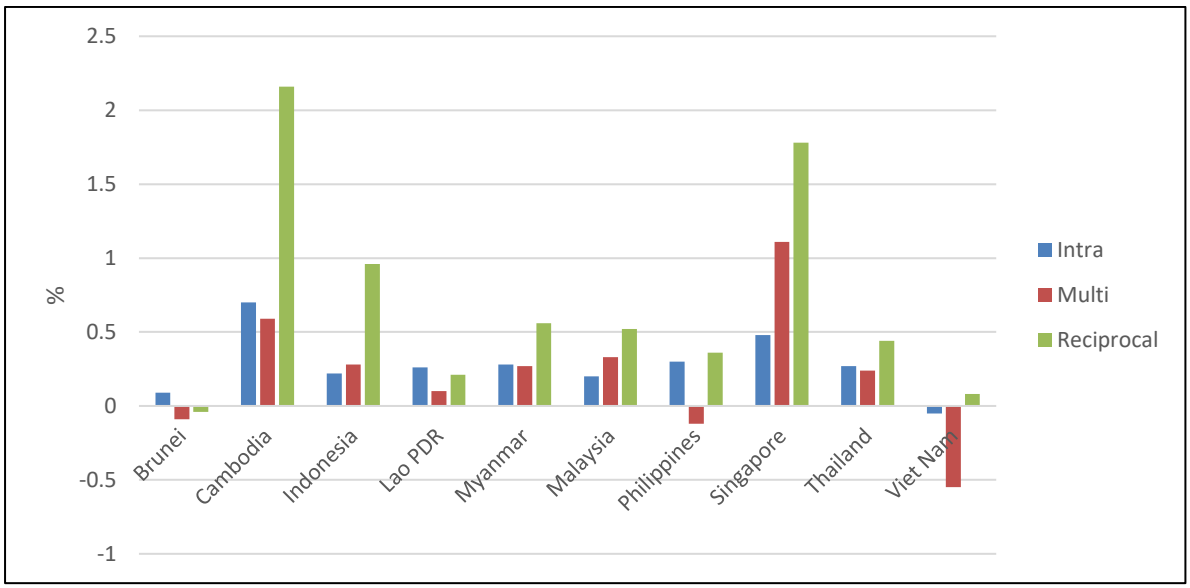
In Cambodia's case the gains come about through an increase in exports. This can be seen in figure 7. There is a two per cent increase in exports. This is attributed to an increase in exports of wearing apparel (clothes) and leather products (shoes), with a small contribution by motor vehicle parts and components and some manufacturing equipment. Cambodia's current exports are dominated by apparel going to the European Union and the United States.

For Vietnam there is a decline in exports in the second (Multilateral) scenario, due to a fall in exports of oil, processed food (shrimp and catfish), apparel and leather products to the United States. Exports increase within the region but not enough to counteract the losses. The trade balance is restored in the Reciprocal scenario due to an increase in clothing and leather goods exports to the United States, Japan and Korea.

Indonesia also experiences a boost in exports in Scenario 3 (Reciprocal). In this case the sectors to benefits are oil and gas, apparel, leather products and processed foods. The European Union and the United States are the major markets, although oil and gas are exported to Japan, Malaysia, Singapore and Korea.

Perhaps the major beneficiary in terms of exports from Reciprocal harmonisation is Singapore. It captures 70 per cent of the increase in exports. The major destinations are Indonesia, the United States, Japan, Korea and the Philippines. The major commodities are motor vehicles and petroleum and coal products. Singapore re-exports a lot of its imports, due to its location as a major port for Asia.

**Figure 7: Change in exports**

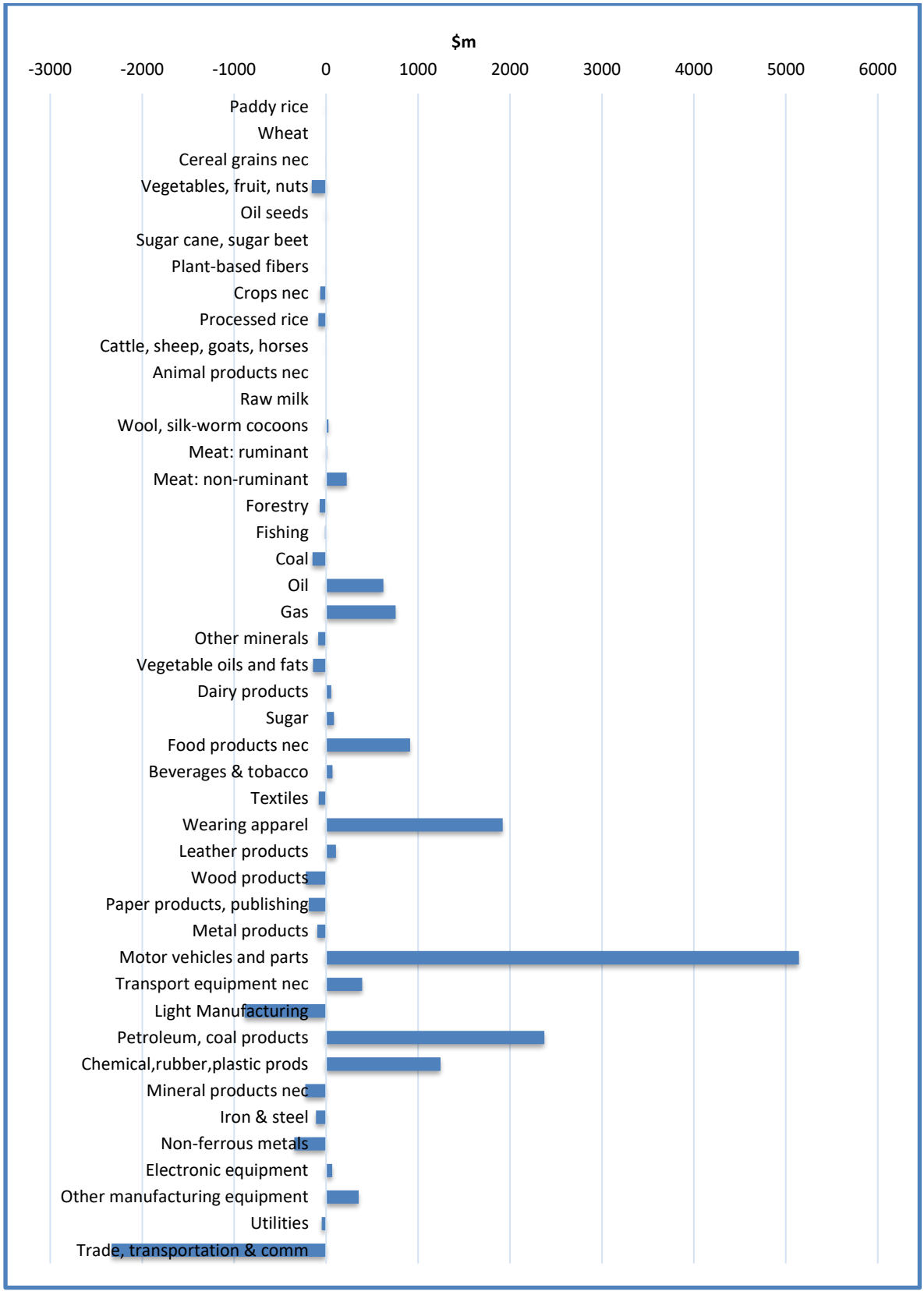



## Sectoral impacts

In percentage terms the most frequent distortions and scope for reform applies to agricultural products. This is because health and safety issues are seen as particularly important, so SPS provisions are common, with many measures applying to a single product. This can be seen in figure 3, shown earlier, with many of the longer bars clustered in the agricultural sector, particularly processed agricultural products.

In terms of impacts on exports in absolute terms, the industrial sector is more important. Figure 8 shows the change in ASEAN exports following the most reformist scenario, Reciprocal. (Estimates for all three scenarios are presented in Appendix table A1.) Motor vehicles, parts and components is the sector showing the largest growth in absolute terms, at $5,925 million in additional ASEAN exports per year. As noted above, most of these can be attributed to Singapore. Note that this estimate includes intra-ASEAN trade, for example from Singapore to Indonesia. The next most significant sectors are petroleum and coal products, wearing apparel and chemicals, rubber and plastics. There are small decreases in some exports, including light manufacturing, non-ferrous metals and transport and communication services. Given limited amounts of capital and labour, these reductions reflect a switch out of some industries to take advantage of export opportunities.

**Figure 8: Change in ASEAN exports by sector: Reciprocal scenario**



## 7. Implications and conclusions

What advice can we give to policy makers? We have shown that NTMs are pervasive and are also a significant impediment to international trade. SPS and TBT measures have significant price-raising effects that exceed those of traditional non-tariff barriers. Furthermore, many of these barriers are out of line with trading partners or international measures. Therefore, there is scope to enhance trade and welfare though the removal of some barriers and the harmonisation of others.

Of course, countries have a right, indeed an obligation, to protect their citizens from unsafe goods and materials, such as building cladding that catches fire, or pork that contains high levels of salmonella. A question arises as to what measures to use. Since ASEAN countries are generally well integrated into global value chains, using international measures is the first best option to achieve regulatory convergence towards a common benchmark. Regulatory convergence with particular countries, for example in mega regional agreements, could further reduce trade costs with these trading partners. We estimate that harmonising regulations, without reducing their number, could reduce the effects of NTMs by 15-25 per cent.

One of the limitations of estimating NTMs for a commodity is the lack of direction for policy makers. While it may be clear that the quantity of trade between two countries is low, or that prices differ greatly, it is not obvious which of many possible NTMs is binding. Hence, removal of one impediment may not improve trade at all. It is necessary to identify the binding constraint.

Details are particularly crucial with complex technical measures. For example, maximum residue limits may vary substantially between two countries. The proposed regulatory overlap only delivers an approximation with respect to the similarity of regulatory structures and mechanisms. With thousands of products and many countries to compare, a more detailed comparison is not feasible.

A limitation of the analysis is the extrapolation of the global gravity model estimates of the marginal effects from table 3 for agriculture and manufacturing to the ASEAN countries. However, it is not clear whether the true ASEAN estimates would be higher or lower.

It is also not clear whether NTMs affect bilateral imports, multilateral imports, or indeed multilateral exports. Results from the three scenarios show that these assumptions matter greatly. More detailed work is needed on a product by product basis. UNCTAD continues to undertake some of this work.

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# Appendix

**Table A1 Change in ASEAN exports following alternative scenarios**

| | Intra | Multilateral | Reciprocal |
|---|---|---|---|
| | $m | $m | $m |
| Paddy rice | 0 | 1 | 1 |
| Wheat | 0 | 0 | 0 |
| Cereal grains nec | 2 | -1 | -4 |
| Vegetables, fruit, nuts | -30 | -60 | -155 |
| Oil seeds | 7 | 7 | 6 |
| Sugar cane, sugar beet | 0 | 0 | 0 |
| Plant-based fibers | 0 | 2 | 2 |
| Crops nec | -5 | -61 | -64 |
| Processed rice | 57 | 3 | -83 |
| Cattle, sheep, goats, horses | 0 | 2 | 2 |
| Animal products nec | 0 | 6 | 0 |
| Raw milk | 0 | 0 | 0 |
| Wool, silk | 2 | 10 | 25 |
| Meat: ruminant | 8 | 8 | 10 |
| Meat: non-ruminant | -34 | -33 | 223 |
| Forestry | -25 | -29 | -68 |
| Fishing | -5 | -4 | -12 |
| Coal | -34 | -62 | -147 |
| Oil | 421 | 424 | 622 |
| Gas | -20 | 414 | 755 |
| Other minerals | -7 | -27 | -86 |
| Vegetable oils and fats | -18 | 16 | -141 |
| Dairy products | 30 | 46 | 56 |
| Sugar | 83 | 72 | 85 |
| Food products nec | 302 | 367 | 913 |
| Beverages & tobacco | 55 | 50 | 70 |
| Textiles | 24 | 8 | -80 |
| Wearing apparel | -361 | -410 | 1920 |
| Leather products | -45 | -110 | 108 |
| Wood products | -104 | -141 | -222 |
| Paper products, publishing | -56 | -69 | -189 |
| Metal products | -26 | -39 | -95 |
| Motor vehicles and parts | -291 | 3818 | 5142 |
| Transport equipment nec | -123 | 246 | 393 |
| Light Manufacturing | -188 | -469 | -887 |
| Petroleum, coal products | 1932 | 2061 | 2374 |
| Chemical, rubber, plastic prods | 2118 | 1014 | 1246 |
| Mineral products nec | -16 | -100 | -225 |
| Iron & steel | 16 | 8 | -109 |
| Non-ferrous metals | 9 | -84 | -345 |

| | | | |
|---|---|---|---|
| Electronic equipment | 1 | 203 | 67 |
| Other manufacturing equipment | 130 | 105 | 354 |
| Utilities | -1 | -10 | -47 |
| Trade, transportation & communications | -528 | -1040 | -2333 |
| Services | -737 | -1746 | -3152 |
| **Total** | **2541** | **4396** | **5925** |

Source: GTAP simulations. “nec” denotes “not elsewhere classified”.