

Profiling of Conformity Assessment Procedures (TBT Measures)
Special Reference to Sectoral Domination Across Country Grouping

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The negotiations on the Technical Barriers to Trade (also known as Standards Code) began in Tokyo Round (1973-1979) under the GATT, however, with the establishment of the World Trade Organization (WTO) it came into existence as a legally binding Agreement. The paper discovers a new role of the CAPs as it was found that CAPs were being used for protecting the third world countries markets and preserving the same for domestic producers by way of increased exports to these protected markets of only those countries with similar regulatory and standards requirements. This would certainly widen the wedge between the developed and low-income countries and between the leading firms in a sector and larger small and medium enterprises (SMEs). The paper utilised all the TBT notifications notified to WTO (1995 to 2021) based on the CWS Online TBT database with Trade links (HSN codes).

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Abstract

The negotiations on the Technical Barriers to Trade (also known as Standards Code) began in Tokyo Round (1973-1979) under the GATT, however, with the establishment of the World Trade Organization (WTO) it came into existence as a legally binding Agreement. In succinct terms, the TBT agreement assumes a pivotal role in maintaining equilibrium between the promotion of legitimate societal objectives and disciplining measures of members notified to WTO with the intent to erect impediments. Among the trio of measures encompassed by the TBT agreement, Conformity Assessment Procedures (CAPs) serve as how it is established whether the prerequisites, as outlined by Technical Regulations (TRs) or Standards, have been dutifully met or flouted.

The Conformity Assessment Procedures (CAPs) have become a significant tool used skilfully by wealthy and advanced countries. CAPs are used to restrict foreign products' entry into their territory. Despite the widespread and fervent deployment of CAPs, the academic discourse concerning these measures remains sparse. This study endeavours to bridge this intellectual gap by analysing the TBT notifications at the 4-digit level of the Harmonised System (HS) using the online databases of the Centre for WTO Studies on the TBT and Sanitary and Phytosanitary (SPS) measures.

The empirical findings unveil a trend, revealing that from 1996 to 2021, the primary proponents of CAPs and TRs were predominantly the high-income and middle-income nations. Intriguingly, a discernible shift occurred post-2001 and 2008, with developing and least developed countries increasingly engaging in the usage of CAP measures. The paper will endeavour to unravel the underlying rationale behind this noteworthy transition. It is argued that some of these measures are being applied to protect (ring-fencing) the growing markets across the developing and least developed countries. Leading to a situation wherein, markets across the developing and least-developed countries would be isolated and would continue to remain under the control of the developed and technologically leading countries. Contrary to the popular perception that the CAPs are used to serve legitimate concerns such as consumer welfare, the paper finds that CAPs are being used to prevent imports and thus shelter domestic companies from competition. The paper suggests a new role for the CAPs as it was found that CAPs were being used for protecting the third-countries markets and preserving the same for the domestic producers by way of increased exports to these protected markets of only those developed economies with similar regulatory and standards requirements. This would certainly widen the wedge between the developed and low-income countries and between leading firms in a sector and larger small and medium enterprises (SMEs).

Keywords: WTO Membership, Developmental Classification, Technical Barriers to Trade, Conformity Assessment Procedures, WTO, Technical Regulations, Standards, Private Standards

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Introduction

The establishment of the World Trade Organization (WTO) on 1 January 1995, the WTO multilateral agreement on Technical Barriers to Trade (TBT) entered into force. Briefly, it aims to ensure that product requirements on safety, quality etc., as well as procedures for assessing product compliance with such requirements (testing, inspection, accreditation, etc.), are not unjustifiably discriminatory and do not create unnecessary obstacles to trade (WTO 2021).

The three types of measures covered by the TBT Agreement include technical regulations (TRs), standards, and conformity assessment procedures (CAPs). The three measures are amongst the most important measures used around the world, hence, carefully analysing them is important. Secondly, non-tariff measures (NTMs) are often technically complex, less transparent, and more difficult to quantify than tariffs, and can therefore have a significant impact on market access, making this study necessary.

In simplified words, for a measure to constitute a technical regulation it must lay down product characteristics or rules pertaining to their related processes and production methods and make compliance mandatory. Technical regulations may also deal with terminology, symbols, packaging, marking and labelling requirements. It is normally seen that this instrument is adopted by central government bodies (CGBs) however they are also occasionally adopted by local government bodies (LGBs). In this case of TBT measures with TRs, an applying member shall accord treatment no less favourable than that accorded to like products of national origin and to like products originating in any other country.

Standards on the other hand are not mandatory, therefore compliance is voluntary and is developed by a recognised body (governmental or non-governmental) that is responsible for establishing rules and guidelines for products or related processes and production methods (WTO 2021).

Over the years, private standards have also come to the forefront of the multilateral trading system. Food safety is normally developed by private entities such as multinational companies, non-governmental organisations (NGOs), individuals etc. Most of them have highly restrictive membership provisions and are often closed. These private standards are primarily being introduced to manage supply chains and respond to consumer concerns pertaining to environmental, social, or food safety specifications. Despite being non-mandatory in nature, private standards are increasingly affecting market access since they lay down a higher level of stringent requirements (socio-economic and technical), are obscure and have rapidly proliferated over the years. The trade-restrictive effects of

private standards as some of these are not based on science and therefore need more attention than what has been presently given in the WTO negotiations.

Lastly, conformity assessment procedures (CAPs) are used to determine whether the relevant requirements set out by technical regulations or standards are fulfilled or not. They typically include procedures for sampling, inspection, evaluation, verification, and assurance of conformity etc. CAPs are vital since on one hand, they give confidence and trust to the consumers in the safety of products, whereas on the other hand, CAPs add value to manufacturers' marketing claims, and to the products themselves – providing them with much-needed market access.

TBT Agreement deals especially with conformity assessment procedures at the international, regional, national, local, and non-governmental levels. The provisions on conformity assessment draw on the text of the plurilateral Tokyo Round Standards Code and strengthen earlier provisions (Appleton 2013). Although as mentioned above the TBT Agreement covers various types of provisions, these measures can address a wide variety of policy objectives, inter alia the protection of human, animal, plant life or health and the environment (post-Paris COP in 2015) as well as many other objectives such as consumer information, quality, animal welfare, etc.

Beyond the general definition of conformity assessment contained in the TBT Agreement, in practice, the International Organisation for Standardisation (ISO) breaks conformity assessment activities into three groups. The First Party is a supplier's declaration of conformity (SDoC). Second-party conformity assessment is a customer's assessment of conformity. Third-Party conformity assessment is an assessment of conformity by an independent third party or body. This useful classification of conformity assessment activities is standard in the conformity assessment industry (Appleton 2013).

TBT Agreement and the CAP

Under the transparency-related notification commitments, the WTO members notify their TBT measures and these can be differentiated into technical regulations, standards, and conformity assessment procedures as per the article mentioned in the TBT measure. Such differentiations can be identified and the three categories are clearly and distinctly highlighted in the notification template. An analysis of the TBT Article clearly and distinctly provides the break-up of these three major measures used by the members. TBT Articles 2 to 4 of the agreement in terms of structure which fall under a section of the TBT Agreement entitled 'Conformity with Technical Regulations and Standards'. Further, these can be bifurcated into three types, Article 2 refers to the technical regulation by Central Government Bodies (CGBs); Article 3 refers to the technical regulation by Local Government Bodies (LGBs) and Non-Government Bodies (NGBs); and Article 4 referring to the standards by the NGOs. Article 5 deals with the Procedures for Conformity Assessment carried out by Central Government Bodies, Article 6 addresses the Recognition of Conformity Assessment conducted by Central Government Bodies, Article 7 focuses on the Procedures for Conformity Assessment by Local Government Bodies, Article 8 pertains to the Procedures for Conformity Assessment by Non-

Government Bodies and Article 9 centres around the conformity with International and Regional Systems.

Article 5 is the heart of the TBT Agreement's provisions on conformity assessment and this working paper provides a detailed analysis of the same. It contains many important sub-paragraphs that set forth many of the same disciplines found throughout the TBT Agreement, specifically: Non-discrimination; the prohibition of unnecessary restrictions to international trade; Harmonisation; and Transparency.

Article 5.6 to 5.9 sets forth transparency obligations similar to the transparency obligations applicable when a member promulgates technical regulations and standards. Four important obligations are present in Article 5.6. They apply when two conditions are met (i) an international standardising body has not issued a relevant guide or recommendation or the technical content of a 'proposed' CAP is not following relevant guides or recommendations of an international standardising body, provided that (ii) the CAP 'may have a significant effect on trade of other Members.' In all such cases, Members have the obligation to:

- 1) Publish a notice before the measure enters into effect that they propose a CAP
- 2) Notify other WTO Members through the WTO Secretariat of the products to be covered by the proposed CAP with a brief description of the CAP's objective and rationale before the measure enters into effect so that comments from other members can be considered and amendments can be made accordingly, if any.
- 3) Upon request from another Member, provide copies of the proposed procedure.
- 4) Without discrimination provide a reasonable time for other members to offer their comments.

To provide a detailed analysis, the working paper uses two types of country classifications the first being the WTO classification which is a self-declaration provided by the WTO member and the second is the UNIDO classification based on the countries' innovation capacities. The International Organisation for Standardisation (ISO), the national governments (Central and Federal Levels) and the United Nations Industrial Development Organisation (UNIDO) are three of the main three agents that play an important role in conformity assessment-related activities. Against this backdrop, this study aims to provide a unique insight into the domain of CAPs by profiling and analysing the TBT notifications notified to the WTO from 1995 to 2021 by its members. The CAP provides temporary mandatory status to those NGBs and other private standards when these are referred to in the Notification by a member of the WTO.

Data Sources and Methodology

The working paper is structured as follows. Post undertaking an extensive literature review of CAPs, the study will provide an economic analysis of CAPs by accentuating the trends in the CAPs at the global scale. Finally, we would recommend how government bodies can reduce CAPs as trade barriers and conclude our analysis.

The Centre for WTO Studies (CWS) has conceptualised two web-based searchable online databases on non-tariff measures (NTMs) like the Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT) measures notified since 1995 to the WTO. The web online portals have been hosted since 2009 have been in existence and are updated regularly. The data source for the working paper is solely the CWS online databases:

SPS Online Database – January 1995 to December 2021. < <http://cc.iift.ac.in/DB/sps/index.asp>>

TBT Online Database – January 1995 to December 2021. < <http://cc.iift.ac.in/DB/tbt/index.asp>>

The databases provide a detailed account of trade linkages in HS 4-digit terms for all SPS and TBT notifications made under the WTO by all the Members. It should be noted that most of these notifications, up to 80 per cent in terms of number, do not provide the trade link. The CWS databases provide information on the trade link up to 100 per cent of the SPS and TBT measures notified to the WTO by the members. The objective of this online database web portal is to help small exporters better assess their market potential in the global scenario. Also, increasingly non-tariff measures (NTMs) like SPS and TBT have been replacing the role of tariffs in trade policy. The comprehensive databases cover all the WTO members from January 1995 to December 2021.¹

To establish the linkage of TBT measures and international trade the paper uses the mapping of harmonised system codes (at HS 4 digits level) to Multilateral Trade Negotiations product groups (WTO, 2023). Further, all the TBT notifications are mapped with MTN product groups to understand and analyse the implications concerning technical regulations, standards, and conformity assessment. The working paper uses very simple statistical techniques to understand the trade impact of the TBT measures notified to the WTO.

Literature Review

International trade theories have often used the classical interpretations of various macroeconomic concepts that have been discussed concerning the general principles of macroeconomic equilibrium economic performance, and economic development. The evolution of international trade theories, since mercantilism trade theory, has been long and complex and largely based on the original understanding and framework of the classical and neo-classical approaches. The classical trade theory and neo-classical trade theory are called traditional trade theories. The theory of Mercantilism, the theory of Absolute Advantage and the theory of Comparative Advantage come under classical theories. The first international trade theory originated from the mercantilist period. During the period from the sixteenth to the middle eighteenth century Britain, Spain, France, and the Netherlands were the most developed countries in the world economy. The governments of these nations had a powerful

¹ SPS Online Database – January 1995 to December 2021. < <http://cc.iift.ac.in/DB/sps/index.asp>> TBT Online Database – January 1995 to December 2021. < <http://cc.iift.ac.in/DB/tbt/index.asp>>

intervention in their economic policy which can also be observed in terms of its influence on international trade theories.

The state-centric approach to international trade is based on the idea that the state is the primary actor in international trade. This approach is rooted in the belief that the state has a responsibility to protect its citizens and promote their economic interests. The state-centric approach emphasises the role of the state in regulating trade, protecting domestic industries, and negotiating trade agreements with other states. The various articles based on this approach and during the period, examined international trade within the classical school to understand the essence of trade and its benefits and losses for individual countries. These country-based theories focus on studying imports and exports of standardised and undifferentiated goods and services for a country or a group of countries.

In this context, the success of many of the developed-to-developed countries' agreements can be credited to having better linkages between the stakeholders that were established among the negotiating partners (Moerland, 2017). Most of these countries had vibrant and established foundations for data gathering between sectors (agriculture, manufacturing, and services) controlled privately and the governments acting as facilitators (Tekula and Andersen 2019). One other related aspect is the level of regulatory/institutional depth required for the modern trade agreements which was directly linked to the scale of formal economy content with the partner or sector. Thus, there was an increased focus on production and processes in newer trade agreements. The firm-centric approach to international trade emphasises the role of firms in global value chains (GVCs) or regional value chains (RVCs). This approach is based on the idea that firms are the primary actors in international trade and that they should be free to pursue their interests without interference from the state. The firm-centric approach emphasises the importance of competition, innovation, and entrepreneurship in driving economic growth and development (Lake 2007). Both approaches have their strengths and weaknesses, and there is ongoing debate about which approach is best suited for promoting economic growth and development. Some argue that a hybrid approach that combines elements of both approaches may be most effective.

It can be observed that while the State negotiates a trade deal most often it is the firms or industrial sectors which help in achieving what was the negotiated outcome. The foundational concept was the achieving a state of '*Nash equilibrium*'². In the context a firm is a micro-cosmic agent and understanding each of these individual units is an important part of the whole exercise, aggregation of these micro units should ideally be a trade agreement - between the two equals with near-complete symmetry in terms of data and information and therefore we can expect *Nash equilibrium*. Most of these international trade theories were based on ad-valorem tariffs and there was an absence of the

² A trade agreement between the parties resulting in a net total welfare suggesting a stable state of a system involving the interaction of different participants, in which no participant can gain by a unilateral change of strategy if the strategies of the others remain unchanged.

treatment of non-ad-valorem tariffs (specific duties application) and another important market access barrier called the Nontariff measure/barrier like the TBT and SPS regulations/standards.

The literature suggests that technical regulations, price control measures and certain other measures are very often subject to concerns about access to developed-country markets³. The widening wedge between developed and developing is a result of the direct application of the suggested remedies based on trade theories – which were primarily based on data and information from the developed and industrial countries. These were being applied at the global level expecting similar results. However, a universal treatment would require an assessment of the barriers to market access at the global level. This paper would attempt to provide the same through an empirical assessment of the presence of CAPs at the global level.

CAP Centric Literature

Any procedure used, directly or indirectly, to determine that relevant requirements in technical regulations or standards are fulfilled is the definition of “conformity assessment procedures⁴” (CAP) under the TBT Agreement. Outside the TBT Agreement, the CAP may also encompass a broader set of procedures, for example, good manufacturing practices that are not related to product characteristics which are also called private standards⁵. The rise of Conformity Assessment Procedures (CAPs) can be associated with the firm-based approach. The role of the State here is to scrutinise and enforce compliance with the set norms/standards for all products traded in the national territory. From the literature survey, the firm-centred models predict that trade internally divides industries and the survey results found that larger firms often were the strongest advocates for globalisation. The new preference map alters extant predictions about the dynamics of interest group contestation over trade and suggests revised accounts for how political organisations and institutions contribute to an open international trading order (Kim and Osgood 2019). The development of trade theories has seen a major shift from the view of restricting free trade as stated in the theory of mercantilism to the various modern theories providing a better understanding to facilitate smooth international trade with increasing benefits. Looking for increasing benefits have led to an increase in the CAPs – as these lead to increased and harmonious production process centred around the global leader (most often the Original Equipment Manufacturer -OEM) in a Sector.

³ Staiger, Robert W., Wisconsin Stanford, and NBER, 2012, Non-tariff Measures and the WTO, World Trade Organization Economic Research and Statistics Division, Staff Working Paper ERSD-2012-01, https://www.wto.org/english/res_e/reser_e/ersd201201_e.pdf.

⁴ Conformity assessment procedures take a variety of forms, including, for example, testing, certification, registration, inspection, accreditation, and verification. The entities that conduct these procedures are referred to as conformity assessment bodies and include such bodies as testing laboratories, certification bodies, and accreditation bodies. Testing laboratories, for example, test products to evaluate their performance or product characteristics while certification bodies certify that products conform to specific standards or requirements. Accreditation bodies, for example, evaluate the competency of testing and certification bodies and verify that they comply with specific standards or requirements.

⁵ Unlike the standards developed by the ISO and other intergovernmental bodies the Private Standards are most often referred to as Voluntary Sustainable Standards (VSS) or Private Sustainable Standards (PSS) and these are controlled under the closed membership and private entities.

It is widely agreed in the limited literature available that CAPs are used to prevent imports and shelter domestic companies from competition rather than serving legitimate concerns such as consumer welfare. Sherry 1997 stated that conformity assessment is much more prone to bureaucratic discretion and industry influence. Additionally, CAPs as a non-tariff barrier can easily arise through various mechanisms such as increased product costs created by redundant repetition of testing and certification procedures for different markets; or increased transportation costs if the product is deemed not to comply with the importer's regulatory requirements; or time and administrative delays caused by costly and time-consuming inspection visits by the importing country's authorities.

Breitenberg 1987 found that in the United States, an extensive and increasingly complex conformity assessment system has developed due to the changing needs of industry, government, and society. This is supplemented by the statistics from (a National Research Council 1995) study which pointed to an annual expansion of 13.5 per cent of the activities of testing laboratories in the United States which carried out conformity assessment evaluation from 1985 to 1992. Adding the revenue from all firms involved in testing activities the study shows that this industry is estimated to involve around \$10.5 billion annually. Hence, the statistics show that conformity assessment has become a growing industry (business model), particularly in developed countries and the present size of this activity gives some indication of what type of obstacle it may pose in international trade. Whereas in developing countries the level of sophistication and awareness with respect to CAPs and standards development, is very low and it may take several years and considerable investment to improve this situation (Sherry 1997). This paper also finds and points towards a worrisome trend, wherein activities pertaining to CAPs have grown more rapidly in developed economies.

Moreover, the issue of standards and conformity assessment and the impact that their adoption and use may have on economic development and trade flows has not been a major concern of policymakers in developing countries until recently. Sherry 1997 explains that this may be due to the fact that more traditional forms of market imperfections and trade barriers have played a predominant role in these economies. Additionally, industrial policy has been concentrated on the provision of differential taxes and subsidies to chosen sectors of industry rather than focusing on the impact of harmonising or making compatible differing product standards

A report of the Board on Science, Technology, and Economic Policy of the National Research Council, 1995 finds that although the severity of these obstacles posed by CAPs varies by industry and sector, however, it is important to achieve a rapid, negotiated removal of barriers in nations such as EU as it will serve to expand trade opportunities for rest of the countries. Some other studies in the literature also point out the abuse of CAP provisions by developed economies. (McDaniels and Karttunen 2016) found that the EU and US appear to be most actively concerned about CAPs, while China is most frequently challenged.

Based on the review of scant literature it will not be wrong to say that redundant and costly CAP requirements may partially negate and reduce the benefits from international trade. (OECD 1996) the

study found that differing standards and technical regulations in various national markets, combined with the costs of testing and certifying compliance with those requirements, can constitute between 2 and 10 per cent of the firm's overall production costs. Another important finding of the study cites conformity assessment and certification requirements at the top of their list as an impediment to trade whose growing complexity threatens to undermine future trade expansion due to the duplicative and often discriminatory requirements for product testing, certification, and quality system registration.

One of the few studies which conducted an empirical analysis of the trade issues that Members encounter with CAPs is by (McDaniels and Karttunen 2016). This study aimed to shed light on CAPs and how they work in practice and explore the types of trade barriers they may create. They employ the specific trade concerns (STCs) raised in the TBT Committee during 2010-2014 for their analysis. The first key finding is that CAPs are perceived as more burdensome trade barriers than technical regulations since CAPs raise proportionally more concern among WTO Members than technical regulations. Secondly, although only a fraction of notified measures is CAPs, however, they raise significant concern in Committee discussions, indicating that the TBT Committee serves as an essential forum both to raise awareness and exchange views on CAPs. Thirdly, it was found that testing and certification cause by far the most trade concern, featuring in 85% of CAP-related STCs. Additionally, the issues most often highlighted by Members are the lack of transparency related to CAPs and the potential unnecessary barriers to trade resulting from CAPs.

The survey-based analysis of the Private Standards submitted to the Department of Commerce on the cost implications of private standards based on 300 samples and six sectors like food processing, leather and leather products, wood products, marine products, chemicals, and textiles suggested a general increase in the unit prices of products. The maximum increase recorded was 15 per cent in the chemical sector owing to the adoption of private standards. Further, an empirical investigation was carried out in section one of the report which suggested that third-party certification procedures suggested under the CAP can have indirect implications of litigation-associated denial for future certification of the sector or products. The case was captured well in the EU legal penalties and the possible impact on the third-party certification authorities. (Kallummal and Gurung 2016).

Few of the studies also point out that the potential for CAPs to unnecessarily increase trade costs will be more magnified by the recent growing phenomena of global value chains, and the associated increasing dispersion and fractionalisation of production. (Baldwin 2011) accentuates that CAPs may need to be performed on each component sourced along the value chain to ensure interoperability or safety and the impact of duplication or discrimination in CAPs will grow the more production is unbundled.

The remaining few studies that exist have surveyed exporter and conformity assessment body perceptions of CAPs as trade barriers. (Källgren et al 2003), consider the present status of the role of measurement uncertainty in conformity testing in EU's MetroTrade project whose objective is to remove impediments to international trade coming from a non-acceptance of the technical competence

of existing laboratories, and promote mutual acceptance of national measurement standards and calibration certificates issued by national metrology institutes. One conclusion of the study is that, while much has been achieved, a lack of clarity in procedures for setting and specifying tolerances and associated uncertainties can lead to difficulties in achieving acceptance of conformity from both customer and supplier. Cases such as these have been identified in the ongoing EU project MetroTrade and have even resulted in perceived barriers to trade and serious international trade disputes. Hence, there still exists some work to be done in order to facilitate acceptance of conformity from both customer and supplier and avoid perceived barriers to trade and serious international trade disputes.

Conformity assessment procedures of a mandatory nature are contained in technical legislation which in most cases either describes the applicable conformity assessment procedures directly or defines the choice of possible conformity assessment procedures. Community technical harmonization directives based on the principle of the New Approach from 1990 onwards indicate which specific procedures are applicable out of the different modules laid down in the Module Decision (80/683/EEC of 13/12/902, repealed and replaced by 93/465/EEC of 22/7/933). According to the type of risk, a variety of modules have been established ranging from internal production control (simple manufacturer's declaration) over type examination to qualify assurance techniques. Compliance with all obligations applicable to a specific product grants the right to affix the CE marking to this product. As regards testing and certification in the voluntary field, the Commission and the European standards organizations have set up the European Organization for Testing and Certification (EOTC). This is an umbrella organization under which interested parties can conclude mutual recognition agreements. Participation in these voluntary agreements is open also to companies in third countries (WTO, 1996)⁶ The 1995 report by the National Research Council, realising the impediments caused by CAPs recommends agreements between governments to recognise national conformity assessment mechanisms to facilitate trade. For example, a network of mutual recognition agreements (MRAs) would enable manufacturers to test products once and obtain certification and acceptance in all national markets. However, all these would be based on the EU directives and hence would be more stringent than the harmonised international standards.

Another analytical report of OECD presents findings from a survey conducted in 2005-2006 of 428 conformity assessment bodies (CABs) and 110 exporting companies from the OECD region. The survey was conceived to gather primary data from key players in the field on perceptions of conformity assessment (CA) barriers. Exporting companies participating in the survey, raise a number of concerns, for example, the complexity and delay in obtaining information on CA requirements in the destination market or inefficiencies caused by non-acceptance of home-country test reports, repetition of identical tests for different markets, or other requirements. CABs report and confirm the usefulness of mutual recognition agreements.

⁶ WTO, 1996, Implementation and Administration of the Agreement on Technical Barriers to Trade, Committee on Technical Barriers to Trade, European Union, G/TBT/2/Add.12, 27 June, <https://docs.wto.org/>.

Despite, conformity assessment procedures being a very important component of the regulations and standards ecosystem, and amidst growing awareness of the potential deterrence to trade posed by CAPs as the more traditional trade barriers have been brought down, academic research on CAPs remains limited. Relatively little is known about the trend, extent, and nature of these barriers and even less about their quantitative impact, particularly in the least developing and developing countries. Against this background, the paper aims to fill one of the gaps in the academic literature by providing a trend analysis (profiling) in terms of the groups of countries applying the CAP at the global level. Additionally, the paper would also provide some insights into the income-based classification of notifications of such measures and an understanding of the sectors - wherein such notifications are dominant and how governments can prevent CAPs from not becoming a trade barrier. As was found in the pandemic and climate change mitigation efforts at the global level by way of harmonisation efforts and cooperation between trading partners. The latter needs a considerably detailed analysis, but as a first step, the paper would undertake a simple profiling of the CAP across the WTO membership and sectors.

Global Contours of Conformity Assessment Procedures (CAP)

In this sub-section, a profiling of TBT measures across different types of classifications to rightly capture the geo-economic and strategic dynamics at the global level is carried-out. The first classification used is the WTO's self-declaration (WTO)⁷ and the second classification used is the World Bank's income-based classifications. The analysis of the two provide a glaring correction on the perspectives of the notification patterns. There has been a change in the country grouping in terms of the largest notifier.

Higher numbers of TBT notifications reflects a dominance of private sector⁸ and the industrial prowess an analysis of the Competitive Industrial Performance Index (CIP) was also carried out. It would better capture the industrial innovation at the global level (Bao and Larry, 2012).⁹

The TBT agreement plays an important role in disciplining measures of members which are largely domestic standards applied on imported products - notified as measures however these can also create barriers. Figure 1, suggests the usage of such non-tariff measures (NTMs) in the form of TBTs notified to the WTO from 1995 to 2021 has been increasing with a secular trend.

It is very clear from Figure 1, that in 1995 overall number of notifications notified was 365, in 2009 it went up to 1,486 and then it spiked up to 2,508 in 2021. In the initial years, developed members were the major notifiers, but after 2002 developing members took over and they started using more of these

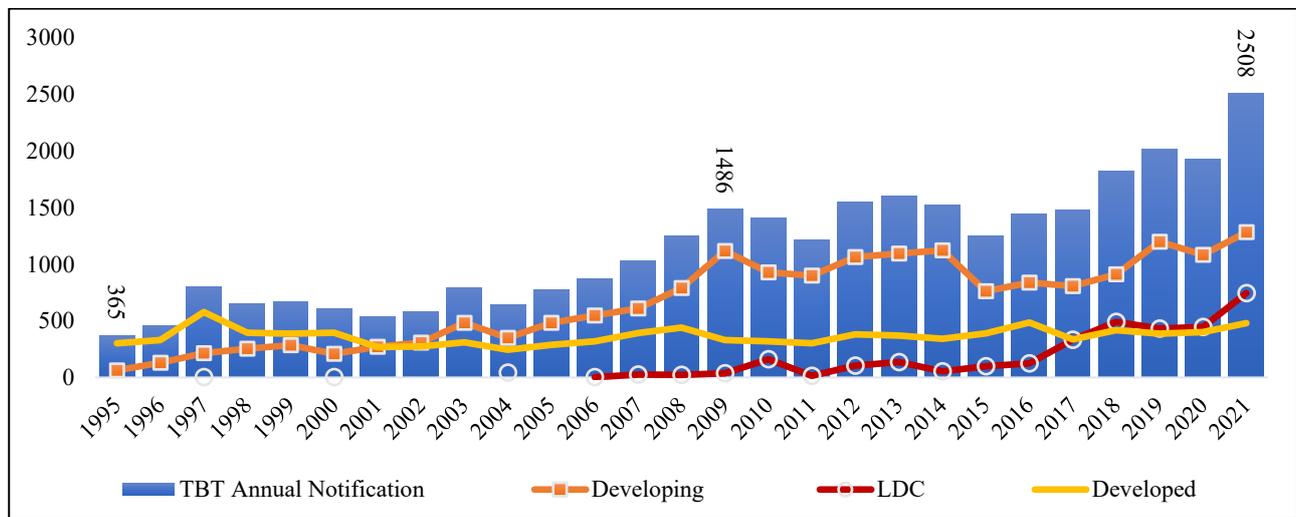
⁷ WTO, "Who are the developing Countries in the WTO?", Development: Definition, https://www.wto.org/english/tratop_e/devel_e/d1who_e.htm.

⁸ USTR, 2014 Report on Technical Barriers to Trade, United States Trade Representatives, <https://ustr.gov/sites/default/files/2014%20TBT%20Report.pdf>.

⁹ Bao, Xiaohua and Larry D. Qiu, 2012, *How Do Technical Barriers to Trade Influence Trade?* Review of International Economics, 20(4), 691-706, <https://doi.org/10.1111/j.1467-9396.2012.01047.x>.

notifications. Which can be associated primarily with the membership of China and used the path of non-tariff measures as a trade policy tool.

Figure 1: TBT Notifications: WTO’s Self-Declaration (No. of Notifications)



Source: Authors’ calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

While notifications of developed members have almost remained constant over the years, least-developed countries (LDC) started notifying TBT notifications in 2006 with a very small number but later after 2016, the same intensified the TBT notifications for the LDCs. The trends seen in the case of LDCs indicate that, all this time, this group has been non-participant and thus provided market access to the developed and developing members. The reason why the notifications by developing countries have seen such a steep rise is primarily because a lot of the high-income countries such as Brazil, China, Hong Kong China, South Korea¹⁰ and Singapore, self-declare themselves as developing countries at the WTO. Hence, due to the presence of some of these high-income countries, the trend in notification by developing countries has been increasing.

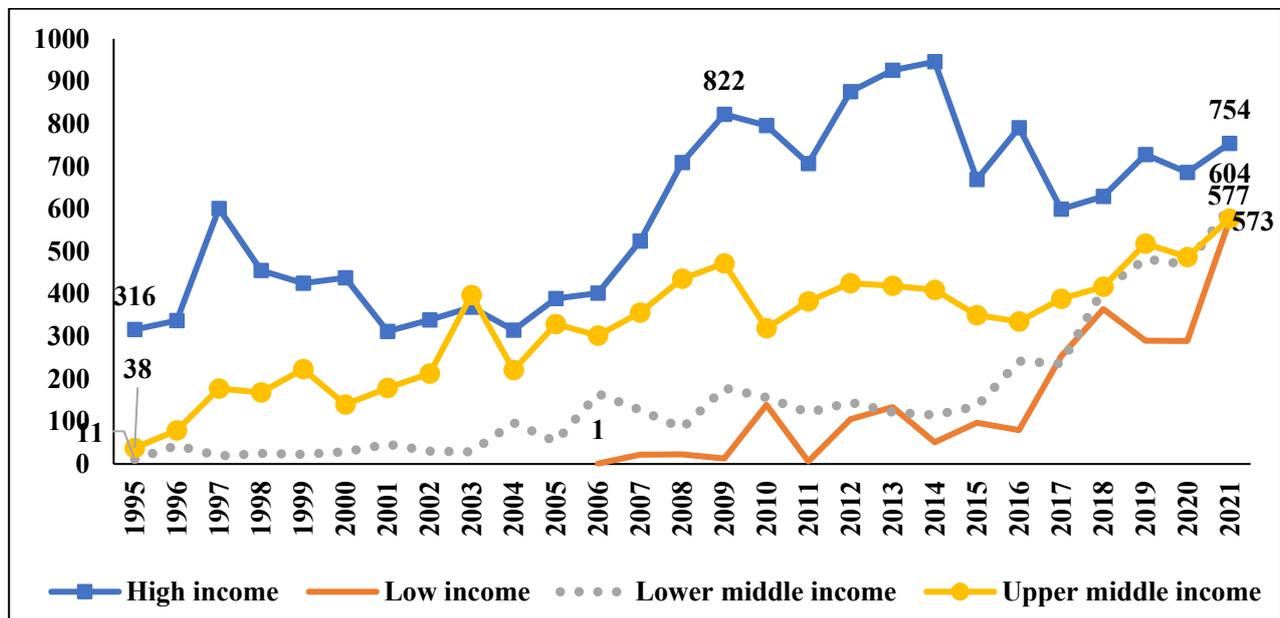
Figure 2 provides an analysis of the TBT notifications on the basis of World Bank income classification, the majority of notifications covering 51 per cent are notified by high-income countries. The trends suggest an increase from 1995 of 316 TBT measures notified to the WTO to 822 notifications in 2009. After which it fluctuated up to 2017 and thereafter increased to register a total of 754 TBT notifications in 2021.

Upper middle income is the second major notifier of TBT notifications covering 28 percent of it, which started with 38 notifications and went up to 577 notifications in 2021. Hence, in principle, it won’t be wrong to say that governments of rich nations are choosing to very frequently intervene in the production process, and consumption and trade flow via various regulations, standards and control

¹⁰ Korea JoonAng Daily, 2021, Korea Promoted to Developed Nation by UNCTAD, Published: 04 Jul, <https://koreajoongangdaily.joins.com/2021/07/04/business/economy/Unctad-developed-country-developing-country/20210704185600398.html>.

mechanisms. Whether these are to protect legitimate societal objectives or with the intent to create unnecessary barriers is one that requires greater attention from scholars.

Figure 2: TBT Notification-Income Category Wise



Source: Authors' calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

The lower-middle-income group countries received 11 notifications in 1995 and 604 notifications in 2021. Low-income countries started notifying TBT measures in 2006 and the use of this measure kept on rising to touch a high of 573 TBT notifications.

This suggests the technological leaders were ring-circling the developing country markets with their own (high-income) national standards and regulations. Although it is premature to conclude before an analysis of the CAP but there is a clear trend from the TBT measures notifications. It can be concluded that high-income countries are a major user of non-tariff measures such as TBT and upper middle income is following the same path as high-income countries which are creating barriers to trade for exporters. The trends suggest a catching-up seen across all the income-based categories to the levels seen across the high-income countries. With the resurgence of the industrial and manufacturing policies across many of the developed world, it is necessary to have an evaluation of the TBT measures at the global level. The next sub-section will attempt to provide empirical evidence on the issue of ring-fencing aspect by providing a bifurcated analysis of the time period 1995 to 2021.

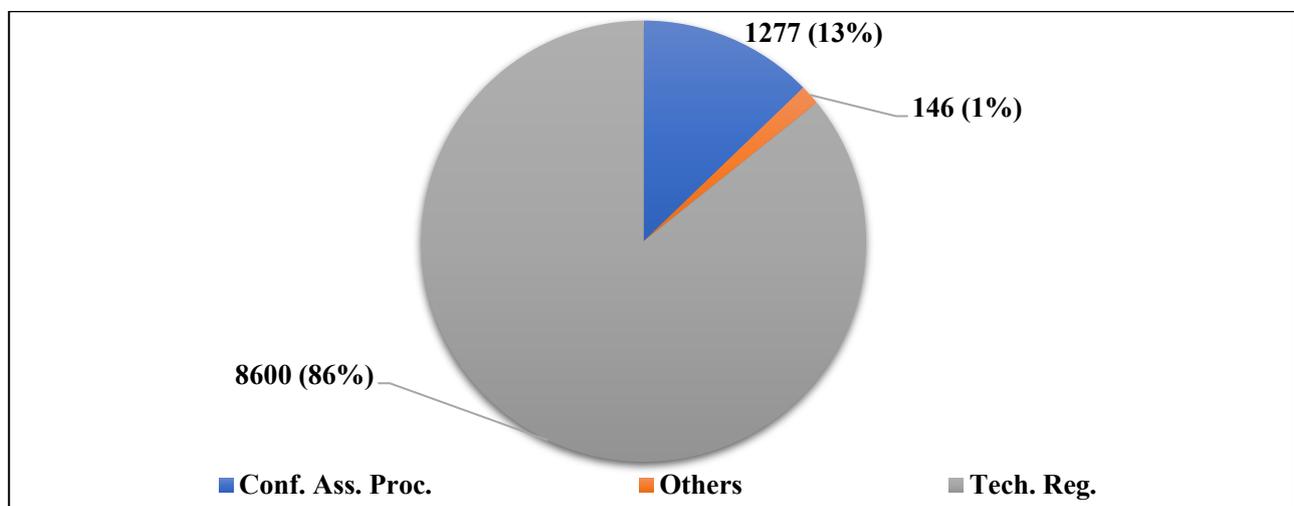
Bifurcated Distribution of TR, Standards and CAP

This sub-section provides a detailed analysis of the distributional pattern of TR, standards, and CAPs in two parts. The first part is to understand the difference in the pattern (compositional) across the pre- and post-2008 periods in TR, standards, and CAPs. The second set of analyses captures the similar compositional trend across the four income-based classifications of the notifying WTO members.

The two phases have been identified based on the two distinct trends seen in the notification patterns of the WTO membership. The stalling of the Doha Round (2008 Draft rev3 texts) has been used for the distinction between the periods. The distinction further has been made after observing the total notifications to the WTO by various groups both WTO's self-declared and income-based classifications. WTO's fourth ministerial conference the Doha Development round in 2001, started with the objective to achieve major reform of the international trading system through the introduction of lower trade barriers and harmonising non-tariff measures. However, the round ended in a stalemate with no decisive conclusion – officially the round was extended up to 2004, but the negotiations were on up to 2008. Hence, the years post the Doha round are crucial to understand how members started to use trade policy tools.

The TBT notifications by members are notified to the WTO can be categorised under three different classifications for the analysis. The first category is those notifications listed under Articles 2 & 3: **Technical Regulations** (CGBs, LGBs & NGOs). Those listed under Article 4: are **Standards**, see Figure 3. and these have been shown in figures hereafter under the technical regulation (Tech. Reg.). The third category the TBT notification list under the Article 5 which pertains to **Conformity Assessment Procedures** (CAP). And, the last category is all the other notifications are called as '**Others category**'. We have analysed the notifications under these three categories for the pre-2008 and post-2008 periods for the reasons mentioned above.

Figure 3: Pre-2008 Composition of TBT Notifications:1995 to 2008



Source: Authors' calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

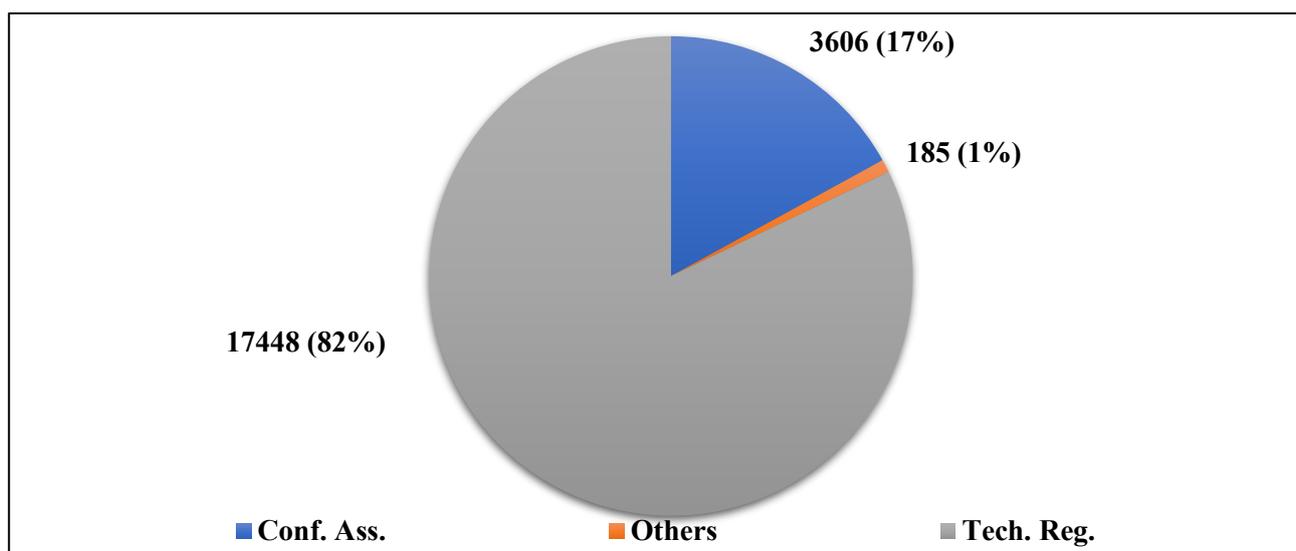
It can be observed from Figure 3 that during the pre-2008 period, a majority of the notifications belonged to Technical Regulations (TR) having a compositional coverage of 86 per cent share with a total number of 8,600 TBT notifications. Followed by Conformity Assessment Procedure (CAP) with

1,277 TBT notifications with a compositional share of 13 per cent. Only 1 percent of notifications were under ‘Others’ category¹¹ with 146 TBT notifications.

However, in the Post-2008 period there is a slight change in TBT notifications covered under three different categories. Notifications under TR decreased by 4 percentage points with a share of 82 per cent. On the other hand, the notifications under CAP increased by 4 percentage points with a total number of 3,606 TBT notifications. Notifications under the Others category remain the same. Indicating that in recent years, there has been a higher emphasis on conforming with technical regulations and standards and most of this as shown above is being led and driven by a few high-income members of WTO. Additionally, both pre- and post-2008 analysis suggests that the usage of TR and CAP by the developed member countries are major obstacles for the exporters of the non-developed (low-middle and low-income) countries to get market access.

Further, we have analysed these TBT notifications on the basis of income classification of countries for the periods: pre- and post-2008 to understand what is the pattern of these three types of notifications across the different income groups.

Figure 4: Post-2008 Composition of TBT Notifications:2009 to 2021



Source: Authors’ calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

The Special and Differential Treatment (S&DT) principle the TBT Agreement provides for less stringent norms for LDCs. Considering the limitations of the group and acknowledging the technical assistance requirement owing to limited participation in international standardizing bodies, or the scanty presence of regulatory bodies for conformity assistance in their territories are few of the many challenges faced by them and these continues to plague them even today.

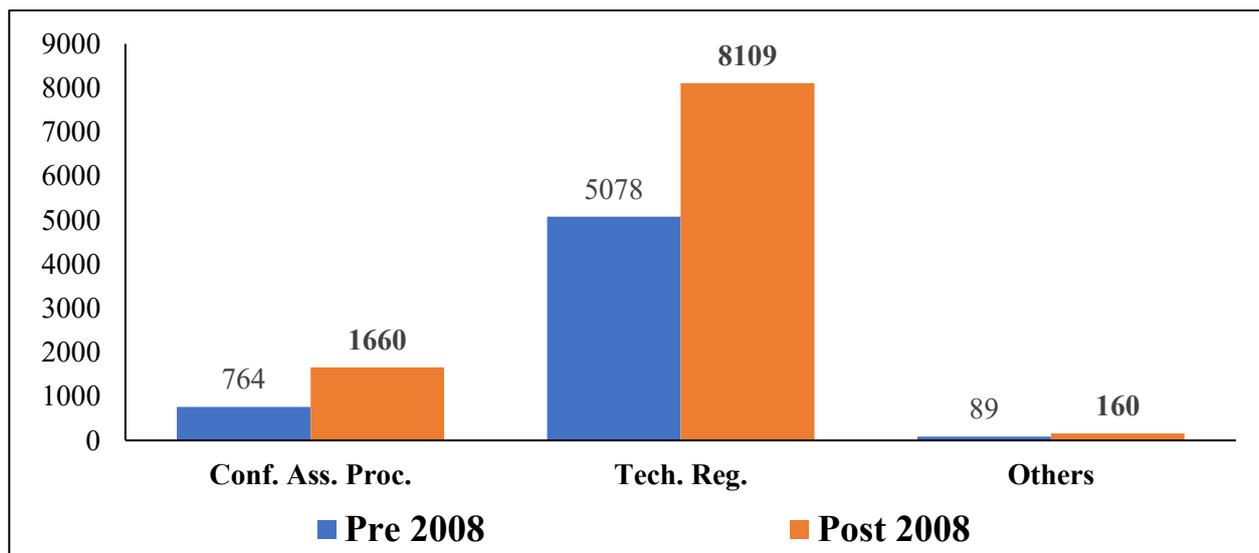
Analysis of TR, Standards and CAP across Country Groupings

¹¹ The notifications that fell under the ‘Others’ category pertained to largely issues of transparency, mutual recognition agreements etc

The evidence of relevance from the previous section provides a clear picture that only two categorisations need to be considered in this sub-section to carry out a detailed empirical analysis of the difference in pattern of pre- and post-2008 TBT notifications across the three categories for two out of three country classifications used in the paper - as the WTO's self-declaration does not reflect a correct picture of developmental differences it has not been considered. The compositional usage pattern of the three TBT measures across the world bank income-based classification is empirically established in the subsequent part.

Figure 5 provides a compositional usage pattern of TBT measures by high income countries. It is observed that there is a clear domination of the usage of TR during both periods with pre-2008 accounting for 5,078 TBT notifications and the post 2008 the same increased to 8,109 TBT notifications. With 1,660 notifications under the TBT measures under the CAP in post-2008 in comparison to the pre-2008 of a moderate number of 764 – the trend suggested seven times increase. In the case of notifications under Others also increased post-2008 recording two times rise from 89 to 160 TBT measures notified.

Figure 5: TBT Notifications by High-Income Countries

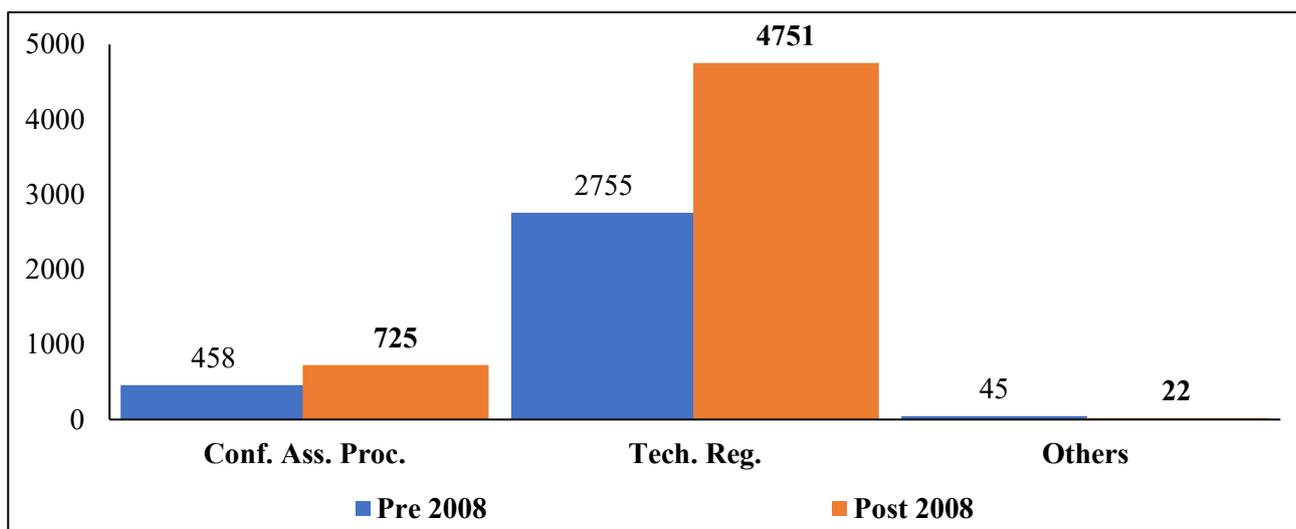


Source: Authors' calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

In Figure 6, the same analysis is repeated for the Upper middle-income country group, where the notifications under TR are highest in both periods pre- and post-2008. Notifications under CAP increased post-2008 with an increase of 725 notifications.

The compositional shares of TR and CAP suggest an increase of two percentage points in the case of TR and a decrease of one percentage point in the case of CAP respectively. While notifications under Others declined to only 22 post-2008 from 45 TBT notifications. Higher reporting of notifications under CAP over the years shows that it is emerging as a popular tool as a trade policy instrument used by the members.

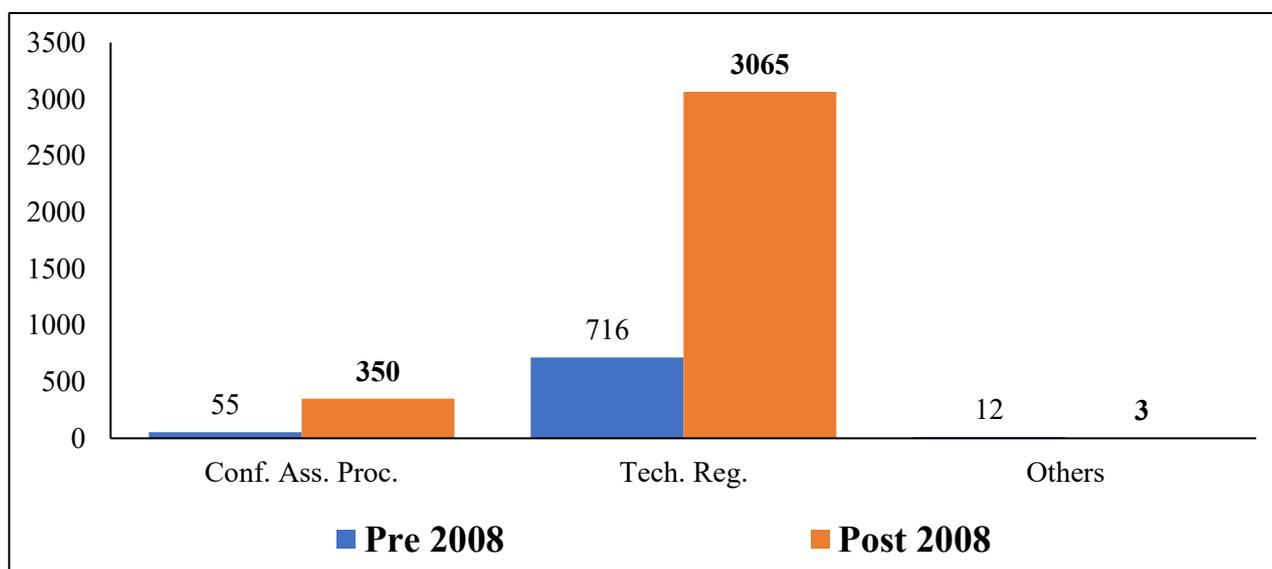
Figure 6: TBT Notifications by Upper Middle-Income Countries



Source: Authors' calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

It is no doubt that CAPs can improve production efficiency and facilitate trade, however, none of the studies thus far has provided this dimension. In terms of times of increase the TR saw seven times increase and was higher than the CAPs which saw an increase of 6 times between the two periods, see Figure 6.

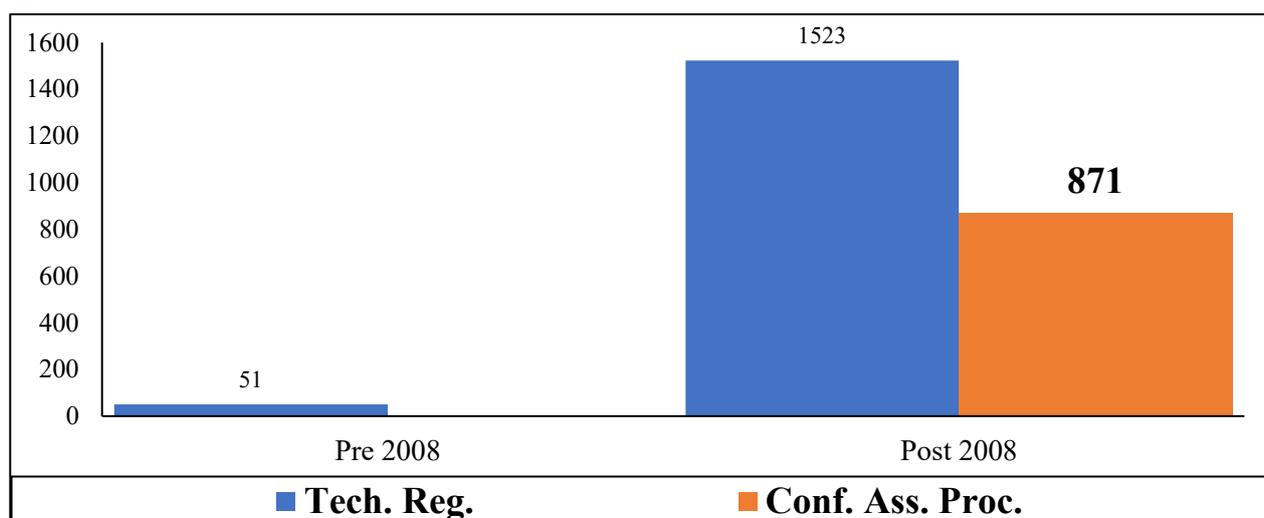
Figure 7: TBT Notifications by Lower Middle-Income Countries



Source: Authors' calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

Figure 7, accentuates the types of notifications reported by the lower middle-income country group, where the notifications under TR are highest in both periods pre and post-2008. Post-2008 the TR notifications stood at a cumulative of 3,065, a jump of over 400 per cent from notifications reported in the pre-2008 period of 716 TBT measures. Notifications under CAP also increased post-2008 with an increase of 350 notifications from a moderate number of 55 TBT measures. While notifications under Others declined from 12 to 3 in the post-2008 period.

Figure 8: TBT Notifications by Low-Income Countries



Source: Authors' calculation based on the TBT database of Centre for WTO Studies <http://cc.iift.ac.in/tbt/index.asp>

Lastly, if we look at the low-income group, the TBT category of Other was not seen in the TBT notified to the WTO. The trend in TRs and CAPs follows the other country groupings. In the pre-2008 period, there were no CAPs that were notified however, post-2008 period 871 CAPs were notified. Similarly, post-2008, TRs stood at 1523 compared to only 51 in pre-2008 period.

This increase in CAPs alone without adequate technical regulations or standards at the central or federal levels for the low-income countries suggested the adoption of the high- and middle-income countries – also alluded to in an earlier section as ring-fencing. The technological leaders or the OEMs are ring-fencing the low-income markets and shielding this market by extending higher than the domestic technological capacities with technical regulation and standards at the levels prevailing in high-income economies. Permanently shielding these markets access for products/sectors across some of the developing and lower middle countries with an additional requirement of meeting a higher standard.

The next section will attempt to identify and profile some of the dominant sectors across the income categories and to do it the primary focus would be to assess the perceptibly the most stringent TBT barrier like the Conformity Assessment Procedure (CAP).

CAP and its Usages Across the MTN Product Groups

This sub-section provides a two-way analysis to address the linkage of CAP notifications and Sectors. The first set of CAP analyses across the income-based categories can be profiled across the 21 Multilateral Trade Negotiations (MTN) product groups. The second set is an illustration of the dominant five MTN product groups across the four income-based classifications. As the TBT Measures apply to largely manufactured products a deeper analysis must be undertaken on the Sectors (MTN product groups) that are being affected by CAPs.

From 1995 to 2021 a total of 4,602 CAP notifications¹² were notified by the WTO members. The top five MTN product groups accounted for nearly 67 per cent of the total CAP notifications, suggesting a very high concentration. **Chemicals** with 748 CAP Measures followed by **Electrical machinery** with 725 CAP measures, **non-electrical machinery** with 661 measures, fourth place is taken by **Minerals & metals** with 544 CAP measures and **Transport Equipment** accounted for 385 notifications by the WTO membership belonging across all four income classifications.

Table 1: CAP and the MTN Product Groups (Numbers) – 1995 to 2021

| MTN Product Groups (no. of notification) | High income | Upper middle income | Lower middle income | Low income | Total TBT Notifications - CAPs |
|--|-------------|---------------------|---------------------|------------|--------------------------------|
| Chemicals | 313 | 139 | 63 | 233 | 748 |
| Electrical machinery | 497 | 165 | 52 | 11 | 725 |
| Non-electrical machinery | 414 | 185 | 43 | 19 | 661 |
| Minerals & metals | 207 | 157 | 56 | 124 | 544 |
| Transport Equipment | 277 | 84 | 16 | 8 | 385 |
| Wood, Paper, etc | 95 | 33 | 13 | 57 | 198 |
| Fruit, vegetables, plants | 85 | 27 | 11 | 25 | 148 |
| Petroleum | 46 | 21 | 8 | 59 | 134 |
| Manufactures, n.e.s. | 73 | 26 | 12 | 23 | 134 |
| Other agricultural products | 55 | 34 | 8 | 30 | 127 |
| Leather, footwear, etc. | 52 | 34 | 8 | 33 | 127 |
| Animal products | 48 | 51 | 12 | 13 | 124 |
| Textiles | 42 | 15 | 14 | 47 | 118 |
| Beverages & tobacco | 38 | 34 | 10 | 25 | 107 |
| Cereals & preparations | 13 | 24 | 7 | 31 | 75 |
| Dairy products | 17 | 33 | 8 | 14 | 72 |
| Oilseeds, fats & oils | 9 | 7 | 6 | 27 | 49 |
| Fish & fish products | 7 | 8 | 6 | 24 | 45 |
| Clothing | 10 | 4 | 2 | 20 | 36 |
| Sugars & confectionery | | 3 | 4 | 19 | 26 |
| Coffee, tea | 4 | 3 | 2 | 10 | 19 |
| Total TBT Notifications - CAPs | 2302 | 1087 | 361 | 852 | 4602 |

Source: Authors' calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

At the global level, the most regulated sectors are these five sectors, with each of the 3,063 CAP notifications requiring **first-party** (self-certification) **second-party** (consumers risk-based surveillance) or **third-party** certification (accreditors labs or agencies).

The other MTN product groups like **Wood, Paper, etc** with a 4.3 % share of the total CAP notifications followed by **Fruit, vegetables, plants** (3.2%), **Petroleum** (2.9%), **Manufacturing, n.e.s** (2.9%), **Other agricultural products** (2.8%), **Leather, footwear, etc.** (2.8%), **Animal products** (2.7%), **Textiles** (2.6%), **Beverages & Tobacco** (2.3%), **Cereals & preparations** (1.6%), **Dairy products**, (1.6%), **Oilseeds, fats & oils** (1.1%), **Fish & fish products** (1.0%), **Clothing** (0.8%), **Sugars & confectionery** (0.6%) and **Coffee, tea** with (0.4 %) are other product categories which have seen CAPs. It is ironic that in most of these sectors (MTN product Group) where there is a low usage of CAP, the developing and LDCs as a group are seeking market access. This brings us to the question of how the developed countries address the concern of providing market access by shifting between the two non-tariff measures - the SPS and TBT measures. There is a need to further analyse the CAPs under the

¹² The listing does not account for those notification of CAP under the “broad category” listing.

SPS-based barriers (notified to the WTO) by the high and upper-middle-income countries before concluding the question of market access.

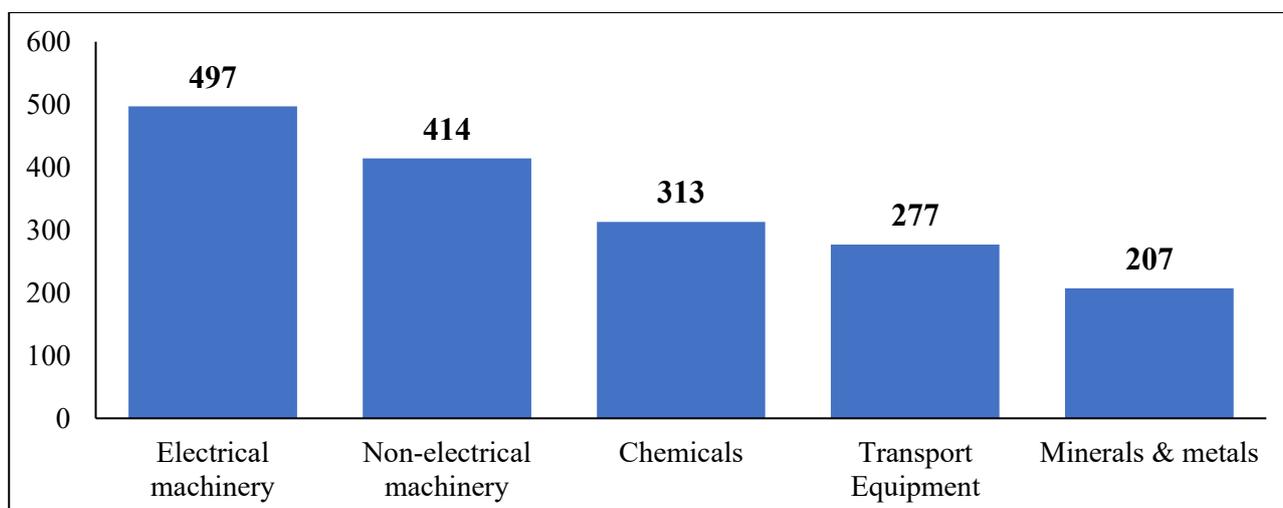
Table 2: Income-Wise Concentration Across Each MTN Group (% shares) – 1995 to 2021

| MTN Product Groups (% of each MTN) | High income | Upper middle income | Lower middle income | Low income | Total TBT Notifications - CAPs |
|---------------------------------------|-------------|---------------------|---------------------|------------|--------------------------------|
| Chemicals | 42 | 19 | 8 | 31 | 748 |
| Electrical machinery | 69 | 23 | 7 | 2 | 725 |
| Non-electrical machinery | 63 | 28 | 7 | 3 | 661 |
| Minerals & metals | 38 | 29 | 10 | 23 | 544 |
| Transport Equipment | 72 | 22 | 4 | 2 | 385 |
| Wood, Paper, etc | 48 | 17 | 7 | 29 | 198 |
| Fruit, vegetables, plants | 57 | 18 | 7 | 17 | 148 |
| Petroleum | 34 | 16 | 6 | 44 | 134 |
| Manufactures, n.e.s. | 54 | 19 | 9 | 17 | 134 |
| Other agricultural products | 43 | 27 | 6 | 24 | 127 |
| Leather, footwear, etc. | 41 | 27 | 6 | 26 | 127 |
| Animal products | 39 | 41 | 10 | 10 | 124 |
| Textiles | 36 | 13 | 12 | 40 | 118 |
| Beverages & Tobacco | 36 | 32 | 9 | 23 | 107 |
| Cereals & preparations | 17 | 32 | 9 | 41 | 75 |
| Dairy products | 24 | 46 | 11 | 19 | 72 |
| Oilseeds, fats & oils | 18 | 14 | 12 | 55 | 49 |
| Fish & fish products | 16 | 18 | 13 | 53 | 45 |
| Clothing | 28 | 11 | 6 | 56 | 36 |
| Sugars & confectionery | 0 | 12 | 15 | 73 | 26 |
| Coffee, tea | 21 | 16 | 11 | 53 | 19 |
| Total TBT Notifications - CAPs | 50 | 24 | 8 | 19 | 4602 |

Source: Authors' calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

Given the significance of these five sectors, most of these may be required to carry out third-party certification. However, the possibility of a combination of 'self-declaration' aided by strong risk-based market surveillance cannot be ruled out. Both these possibilities need a deeper analysis of each of the CAP TBT measures, which can only be possible after this exercise of profiling. Each of the notifications by an individual member would need to be studied deeper to understand the actual requirement.

Figure 9: MTN Category-wise CAP Measures by High-Income Countries (1995-2021)



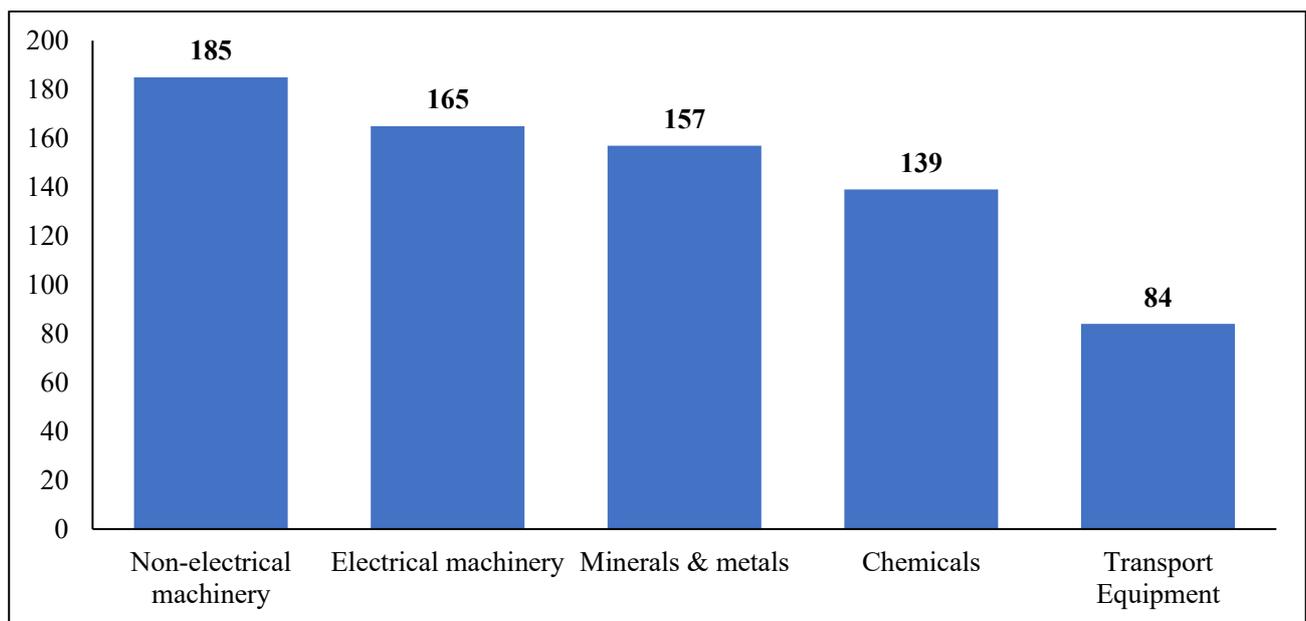
Source: Authors' calculation based on the TBT database of Centre for WTO Studies <http://cc.iift.ac.in/tbt/index.asp>

The top five sectors of the high-income countries notified 1,708 CAP measures accounting for nearly 75 per cent of the total measures notified by all four income-based classifications. Figure 9 highlights that across high-income countries, Electrical Machinery along with non-electrical machinery witnessed a significant amount of restriction in terms of CAPs. From 1995 to 2021, there were 497 notifications and 414 notifications respectively on the products. Chemicals and Transport equipment were other popular products witnessing 313 and 277 CAP measures respectively. The minerals and metals sector accounted for 207 CAPs.

In terms of the high share of individual MTN Product groups, the high-income countries accounted for 72 per cent of the total CAP notifications in the Transport sector, see Table 2. A similar analysis is also carried out for the Electrical machinery with 69 per cent of the sectoral total of CAP notifications notified by high-income countries. For the high-income countries, the other three sectors with high CAP shares were non-electrical machinery (63%), followed by Fruit, vegetables, and plants with 57 per cent and manufactures n.e.s with 54 per cent share.

The top five sectors of the upper-middle income countries notified 730 CAP Measures accounting for nearly 67 per cent of the total CAP measures notified across all of the four income-based categories. Figure 10 highlights, that in the trends seen for the last 26 years, the upper middle-income countries are similar to High-income countries. Upper middle-income countries impose most CAPs on Non-electrical machinery (185 notifications) and Electrical Machinery (165 notifications). Upon deeper reflection, figures 9 and 10 reveal that high-income and upper-middle-income countries are trading majorly between themselves hence although the ranking of MTN categories changes the categories remain primarily the same.

Figure 10: MTN Category-wise CAP Measures by Upper Middle-Income Countries (1995-2021)

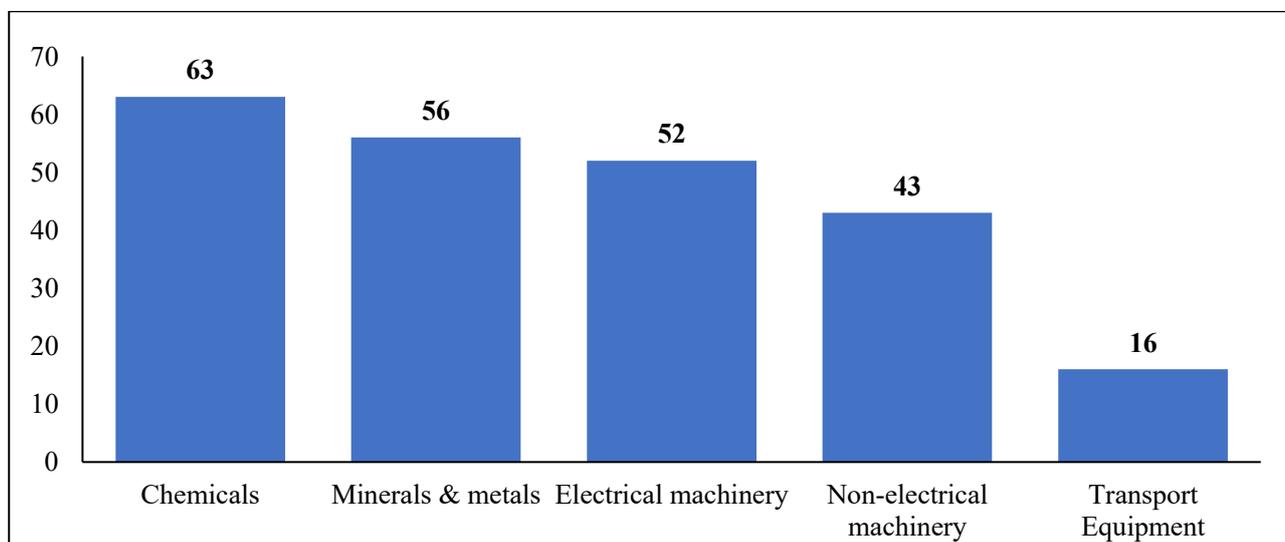


Source: Authors' calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

The similarity is also mirrored in terms of real trade as the interests almost remain similar in terms of sectors. In 2021, China’s trade with the European Union (EU) amounted to \$828.1 billion, up 27.5% year on year. China remained the EU’s largest trading partner, while the EU was China’s second-largest trading partner (China.org 2022). In 2022, China was the third-largest partner for EU exports of goods (9.0%) and the largest partner for EU imports of goods (20.8%), (Eurostat, ND). In 2021, the United States exported \$151B to China. The main products exported from the United States to China were Soybeans (\$14.3B), Integrated Circuits (\$12.5B), and Cars (\$6.89B). The bilateral trade between China, the EU and the US has remained high suggesting similarities in the interest.

In terms of the high share of individual MTN Product groups, the upper-middle-income countries accounted for 46 per cent of the total CAP notifications in the Dairy product sector, (see Table 2). Similarity can be observed for Animal products with 41 per cent of the sectoral total of CAP notifications in animal products across the four income classifications. The other three sectors with high CAP shares were Cereals and preparations (with 32 % shares), followed by Beverages and tobacco with 32 per cent and Minerals and metals with 29 per cent share for the upper middle-income countries. One observation from this analysis is that the market access provided for agricultural products was adequately certified by way of CAPs across the upper-middle-income countries. The quantum of CAP notification and implementation are two different aspects of trade policy strategy and some countries resort to ‘tit-for-tat’ and other delay tactics in clearing imported consignments.

Figure 11: MTN Category-wise CAP Measures by Lower Middle-Income Countries (1995-2021)



Source: Authors’ calculation based on the TBT database of Centre for WTO Studies <<http://cc.iift.ac.in/tbt/index.asp>>

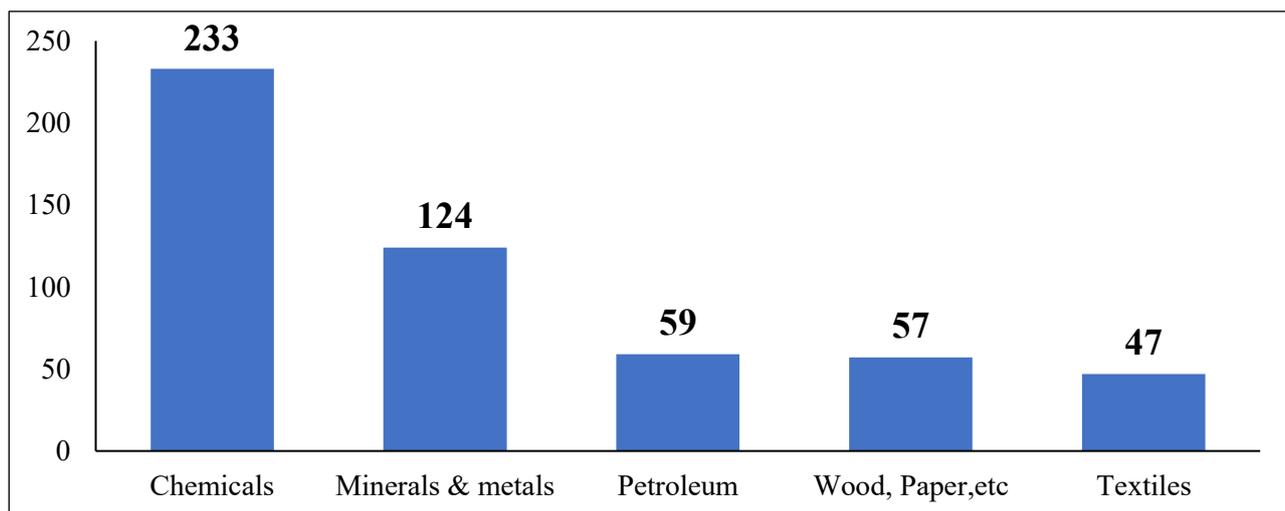
In the Lower-middle income countries, the top five sectors accounted for 230 CAP Measures with a share of nearly 63 per cent of the total CAP measures notified. Figure 11, the MTN categories remained largely similar but the order of ranking varied from the past high- and middle-income countries. The top five MTN product groups in the lower middle were Chemicals (63 notifications) and Minerals & Metals (56 notifications). It won’t be wrong to say that due to several initiatives taken by multilateral

organisations such as WTO, ISO, and UNIDO to name a few, to increase the participation of lower middle-income countries - the situation is improving however much more effort is needed.

In terms of the high share of individual MTN Product groups, the lower-middle-income countries accounted for 15 per cent of the total CAP notifications in the Sugar and confectionery sector, see Table 2. A similar analysis is also carried out for Fish and Fish Products with 13 per cent of the sectoral total of CAP notifications in animal products across the four income classifications. The other three sectors with high CAP shares were Oilseeds, fats and oils (with 12 % shares), followed by Textiles with 12 per cent and Dairy products with 11 per cent share for the lower-middle-income countries.

The top five sectors of the low-income countries notified 520 CAP Measures accounting for nearly 61 per cent of the total CAP measures notifications. Figure 12, CAP measures used by low-income groups on various MTN categories are shown. We find that new MTN categories surfaced compared to the above three country groupings indicating that concerns of low-income countries are different from the other groups. The dominant Product groups are Chemicals (233 CAP measures) and Minerals and metals (124), categories like Textile (59), Wood, Paper, etc (57) and Petroleum (47) were the dominant sectors for this group. Trends in CAP can also throw light on the possibility of ring-fencing by the countries' OEM makers with the technical regulations and standards (largely controlled and regulated by the private sector) from high-income countries for the application of imports in the low-income country markets. The MTN Product group Chemicals and Minerals and Metals are the two categories wherein we could see such a possibility. In comparison to the lower-middle income economies, the top five sectors of low income had almost double the number of CAPs pre-and post-2008– suggesting the ring-fencing approach practised by the high-income country firms.

Figure 12: MTN Category-wise CAP Measures by Low-Income Countries (1995-2021)



Source: Authors' calculation based on the TBT database of Centre for WTO Studies <http://cc.iift.ac.in/tbt/index.asp>

In terms of the high share of individual MTN Product groups, the low-income countries accounted for 73 per cent of the total CAP notifications in the Sugar and confectionery sector, see Table 2. A similar analysis is also carried out for Clothing with 56 per cent of the sectoral total of CAP notifications in animal products across the four income classifications. The other three sectors with high CAP shares

were Oilseeds, fats and oils (with 55 % shares), followed by Fish and fish products with 53 per cent and Coffee, and tea products with 53 per cent share for the low-income countries.

Since, the analysis specifically finds that irrespective of whichever country income grouping, the usage of CAPs has increased, this trend is a warning of the upcoming challenges that exporters will face. For example, (Breitenberg 1987) found that in the United States, an extensive and increasingly complex conformity assessment system has developed due to the changing needs of industry, government, and society. This is supplemented by the statistics from (the National Research Council 1995) study which pointed to an annual expansion of 13.5 per cent of the activities of testing laboratories in the United States which carried out conformity assessment evaluation from 1985 to 1992. Hence, more academic focus on the implications of CAPs is needed of the hour.

Conclusion and Policy Recommendation

The WTO as an international trading system could play an important role in ensuring that technical regulations, standards, and conformity assessment procedures do not create unnecessary obstacles to international trade. The analysis finds that the early users of these technical measures were developed and high-income countries. In 1996 alone, notifications by high-income and upper-middle-income countries stood at 354 compared to only 11 notifications by lower-middle-income countries and 0 notifications by low-income countries. A primary reason behind the lack of participation by non-developed economies is the lack of adequate quality infrastructure in developing countries which constrains the ability of exporters to access foreign markets. This is because meeting requirements is often not enough; it may also be necessary to demonstrate compliance to build confidence in the quality and safety of exported products. Quality infrastructure, including accredited conformity assessment bodies, is essential to help domestic firms integrate into value chains. These facilities are usually missing in the developing markets. The literature does confirm that CAPs do increase costs as well as uncertainty like delays related to access to information about the specific requirements, which results in delays like product adaptation and delay in the entry of imports. These costs and uncertainties can limit market access and reduce international trade opportunities. For the sake of a mere trade agreement, governments never circumscribe their freedom (Hudec 1990)¹³.

The analysis further finds higher TBT Notifications during the post-2008 which can also be associated with the stalled Doha Round. The notifications saw approximately a 112% jump wherein the share of CAPs increased to 17% from 13% in the pre-2008 period. Indicating that due to extensive criticism of well-known measures such as TRs and standards, members started to shift to the less transparent measures such as CAPs which were equivalent in delaying market access. Composition and trends in usage patterns of CAP measures across country groupings can also throw light on the possibility of ring-fencing by the countries with OEM-makers having higher technical regulations and standards

¹³ As cited in Staiger Robert W., 2012, Non-tariff Measures and the WTO, Staff Working Paper ERSD-2012-01 , World Trade Organization Economic Research and Statistics Division. Hudec R.E., 1990, *The GATT Legal System and World Trade Diplomacy*. Second Edition, Salem: Butterworth Legal Publishers.

(largely controlled and regulated by the private sector). OEMs from high-income countries would convince the application of higher technical standards on imported products through the CAP measures in low-income markets - the paper finds evidence in two sectors the Chemicals and Minerals and Metals.

Policy Recommendation

Overcoming all these obstacles needs to be appropriately addressed and in this regard following policy recommendations are being suggested.

1. As a first step, encourage High and Upper middle-income members to provide technical cooperation/assistance in the areas of metrology, testing, certification, and accreditation to improve technical infrastructure. Undertaking such initiatives will help facilitate trade and help members strike the right balance between achieving legitimate societal objectives and imposing these measures – it will overcome the occurrences of non-tariff measures becoming non-tariff barriers.
2. To improve the efficiency of production and to facilitate the conduct of international trade, encouragement for the development of conformity assessment systems should be there. As mentioned above, the severity of these obstacles posed by CAPs varies by industry and sector. In the analysis, we find that the TBT notification of CAPs across the MTN categories can be differentiated in terms of income groupings. In the low-income groups, the relative presence of CAPs can be observed across primary goods such as Sugar and confectionery, Clothing, Oilseeds, fats and oils, Fish and fish products, Coffee, and tea products, Textile, and Wood, and Paper. On the other hand, the CAP concern of the other three income groups lay in more complex and higher value industrial products such as Chemicals and Electrical machinery and non-electrical machinery and Manufacturing n.e.s. However, it is important to achieve a rapid, negotiated removal of barriers in nations such as the EU and the US as it will serve to expand trade opportunities for other nations. So, it is very important to recognise the importance of standards and conformity assessment systems.
3. Preferential Trade Agreements (PTAs) are increasingly addressing the regulation of Non-Tariff Measures (NTMs) among member countries, with a particular focus on Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) measures. Some PTAs involve mutual recognition of each member's regulations, treating them as equivalent to their domestic ones, such as seen in the Peru-Chile PTA of 2009. In contrast, certain PTAs opt for a harmonisation process, aiming to align their domestic regulations with international or regional standards, as exemplified by the EU-Chile PTA of 2003. As a result, when negotiating or entering into trade agreements, WTO members should consider facilitating the harmonisation of technical measures through these agreements (Fernandes et al. 2021).
4. The relevance of TBT measures remains a major challenge in terms of market access for goods across many developed markets. Global efforts seen in trade during the pandemic are the best

example of global cooperation and harmonisation of TBT standards. The WTO membership would need to address the complex and emerging challenges such as climate change environmental protection, and sustainable development are proliferating very rapidly. The TBT Agreement is closely relevant to address some of these challenges. Detailed analysis is required to identify the market access potentials for India in both developed and bottom and low-income countries as across the latter we can observe a trend of ring-fencing of markets for developed countries by the application of CAPs.

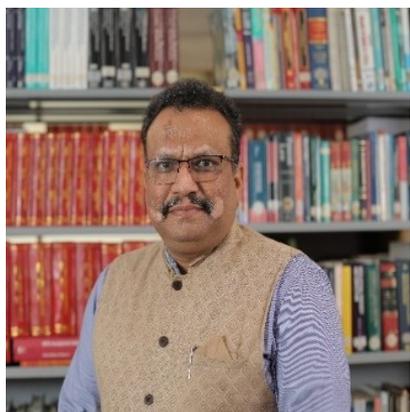
5. Lastly, the mutual recognition of regulations among member countries is anticipated to alleviate the burden of fixed costs for businesses, sparing them from the need to adhere to a multitude of distinct regulations (Baldwin, 2000). On the other hand, the harmonisation of regulations among member countries may, in the initial stages, raise the fixed costs for firms engaged in exports as they adapt to the newly established standards. Nevertheless, the adoption of a common standard, especially if it is an international one, has the potential to expand market opportunities, enabling firms to harness economies of scale. Therefore, it is advisable to promote mutual recognition agreements among member nations.

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