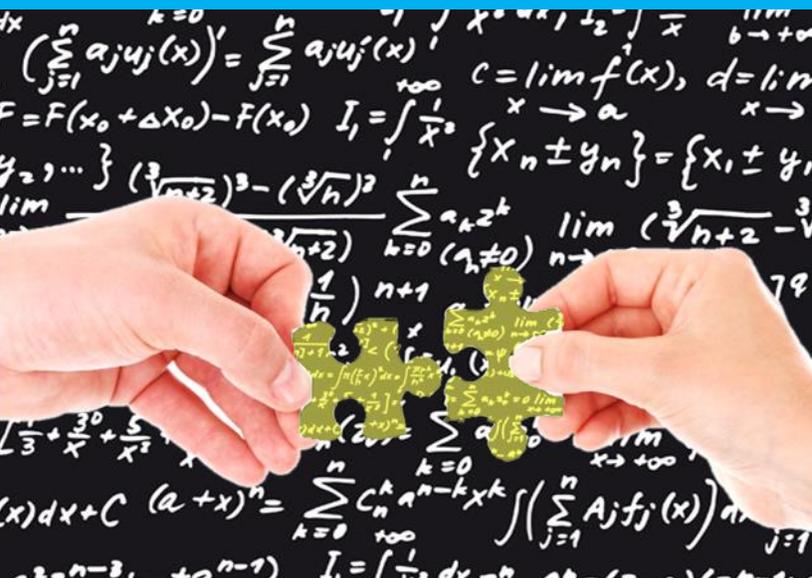




**Sustainable development
impact of trade and
investment liberalization in
Asia and the Pacific**



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ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE

Working Paper

NO. 173 | 2017

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ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE

WORKING PAPER

Sustainable development impact of trade and investment liberalization in Asia and the Pacific[†]

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[†] This is a background paper used as a basis for Chapter 6 of ESCAP (2017). *Asia-Pacific Trade and Investment Report 2017: Channelling Trade and Investment into Sustainable Development*. Available from <http://www.unescap.org/publications/APTIR2017>

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Authors are grateful to Zekarias Hussein (USEPA and Infinite Sum Modelling) and Zeynep Burcu Irfanogulu (Purdue University) for their technical inputs and assistance in some of the simulations done in this paper. The authors also express thanks to ARTNeT secretariat for assistance in disseminating this work.

Please cite this paper as: Narayanan B.G., Duval, Y., Kravchenko, A. and Wadhwa, D. (2017). " Sustainable development impact of trade and investment liberalization in Asia and the Pacific," ARTNeT Working Paper Series, No. 173, December 2017, Bangkok, ESCAP.

Available at: <http://artnet.unescap.org>

Abstract

Trade and investment can be effective means of implementation of the 2030 Sustainable Development Agenda. However, stand-alone trade and investment liberalization policies aimed at enhancing economic development may have negative side-effects on non-economic facets of sustainable development. As such, they are best to be accompanied by trade facilitation measures, as well as environmental, social and other complementary policies. In this paper, a computable general equilibrium (CGE) analysis is carried out using a modified Global Trade Analysis Project (GTAP) model and database to empirically evaluate the economic, social and environmental impacts of alternative policy changes in Asia and the Pacific. The CGE analysis confirms that trade and investment liberalization are essential drivers of economic development. The economic growth and trade benefits from trade facilitation generally dwarf those from tariff liberalization and, to a lesser extent, those achieved through investment liberalization. While results vary across subregions in the Asia-Pacific, both trade facilitation and investment liberalization also contribute positively to reducing inequality and undernourishment. However, the CGE analysis shows that liberalization policies increase CO₂ emissions at the regional level. Importantly, economic growth in Asia and the Pacific is enhanced when regional liberalization policies are complemented by domestic social policy and global implementation of the environmental commitments under the Paris Accord.

Key words: Trade, Trade Models, International Trade Agreements, Liberalization, Nontariff Barrier, Trade Policy, Economic Integration, Trade Simulation, Trade and Environment

JEL codes: F10, F12, F13, F15, F17, F18, Q56

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Abbreviations and acronyms

AAAA	Addis Ababa Action Agenda
ADB	Asian Development Bank
AfT	Aid-for-Trade
CGE	computable general equilibrium
DFQF	duty-free, quota-free
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
FDI	foreign direct investment
GDP	gross domestic product
GTAP	Global Trade Analysis Project
GVCs	global value chains
ICT	information and communications technology
LDC	least developed country
MDG	Millennium Development Goal
MTOE	million tonnes of oil equivalent
NTM	non-tariff measure
OECD	Organisation for Economic Co-operation and Development
RCEP	Regional Comprehensive Economic Partnership
RECI	Regional Economic Cooperation and Integration
SDG	Sustainable Development Goal
TFA	Trade Facilitation Agreement
TPP	Trans-Pacific Partnership
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

1. Introduction

Trade has been identified as one of the main tools to stimulate sustainable development globally. It contributes to higher levels of investment, technology upgradation and increases in productivity which expands production and enables economic growth. Trade liberalization has long been seen as critical to improving trade flows for developing economies to find their way out of poverty, expand employment opportunities and sustain livelihoods for all. However, there is an emerging vast literature which questions the benefits accrued from opening up trade, especially by small developing countries and least developed countries (LDCs). The use of trade as an enabler of sustainable development is only possible when it leaves no one behind, which requires appropriate global conditions. It is therefore important to fully understand how trade and trade liberalization interacts with the various goals encompassed in the Sustainable Development Goals (SDGs).

The 2030 Agenda for Sustainable Development consists of 17 goals and 169 targets to be achieved between 2016 and 2030. Their predecessors, the Millennium Development Goals (MDGs), were declared in the year 2000 with the aim of reducing global poverty and hunger, illiteracy, child and maternal mortality, gender inequality and other world development challenges by 2015. However, the MDGs did not indicate the means by which they should be achieved (Vandemoortele, 2012). In contrast, the SDGs specify the means of implementation¹ for achieving the Goals and aim to systematically address synergies and trade-offs between the economic, social and environmental dimensions of sustainable development (see table 1). Trade is widely regarded as one of the most

¹ Means for implementation' include the mobilization of financial resources, capacity-building and the transfer of environmentally sound technologies to developing countries.

significant non-financial means of implementation through which many of the specific goals and targets could be achieved (United Nations, 2015a).

Table 1. SDGS and their Dimensions

SDGs		No. of targets	Dimension
1	No poverty	5	Social
2	No Hunger, food security, sustainable agriculture	5	Social
3	Good health and well-being	9	Social
4	Quality education	7	Social
5	Gender equality	6	Social
6	Clean water and sanitation	6	Social/ Environmental
7	Affordable and clean energy	3	Environmental
8	Decent work and economic growth	10	Economic
9	Industry, innovation, infrastructure	5	Economic
10	Reduced inequalities	7	Social
11	Sustainable cities and communities	7	Social
12	Sustainable consumption and production	8	Environmental
13	Climate action	3	Social/ Environmental
14	Life below water	7	Environmental
15	Life on land	9	Environmental
16	Peace, justice and strong institutions	10	Social
17	Partnerships for the goals	19	Social

Source: Cutter, A. et al (2015)

Ahead of the SDGs, the trade-related elements had, to some extent, appeared in the Addis Ababa Action Agenda (AAAA) of the Third International Conference on Financing

for Development. The Agenda specifically highlights international trade as an engine for inclusive economic growth, poverty reduction, and the overall promotion of sustainable development (United Nations, 2015b). The mandate of the AAAA is to expeditiously implement the World Trade Organization's Doha Development Agenda negotiations, increase market-oriented trade finance, strengthen regional cooperation and provide duty-free, quota-free (DFQF) market access for the LDCs to foster growth in global trade and investment.

These trade-related elements of the AAAA were later integrated into the SDGs as targets and goal-specific means of implementation by putting significant emphasis on the role that trade can play in promoting sustainable development. Likewise, foreign direct investment (FDI) has been listed as the key source of financing for development in the context of the 2030 Agenda. Overall, 12 out of the 17 SDGs contain targets that are closely linked to trade while 35 out of 169 targets either explicitly mention trade and investment or are closely related to it (Jacob, 2016).

Asia-Pacific is home to more than 4 billion people accounting for nearly 55% of the world's population, having generated two-fifths of global GDP in 2015. However, there are still around 1.2 billion people in the region below the poverty line of \$3.10 (2011 PPP) a day. The region accounts for a significant share of global trade (32.2%) and also remains the largest recipient region of FDI. Thus, opening of further trade and investment is expected to play a critical role in achieving SDGs in the region (ADB, 2016).

In this context, this study empirically evaluates the economic, social and environmental impacts of alternative intraregional trade and investment liberalization strategies, and trade facilitation in Asia-Pacific. It further analyses the impact of complementary domestic policies, namely CO₂ emissions reduction commitments and income transfers policies.

As a background, the following two sections first provide an overview of the relevant literature and the methodology used, before a detailed analysis of results is presented.

2. Literature review

Over the past two decades, there has been a proliferation of bilateral and plurilateral trade agreements across the world. Together with the multilateral endeavours, this trend resulted in considerable growth in trade due to reductions of traditional market access barriers, such as tariffs. Furthermore, the changing nature of global trade has increasingly connected countries through global value chains (GVCs), where intermediate goods and services move from one country to another before becoming final goods. At present, around half of the world trade takes place through GVCs. As reported in OECD-WTO (2017), 48% of exports for developing economies, in value added terms, involve GVCs. However, in addition to lingering tariffs on certain products (most notably on agricultural products), there are also non-tariff measures (NTMs) which limit trade,² with disproportionate impact on developing economics that often have less capacity to deal with the regulatory burden. Such persistent barriers could impede benefits of trade for achieving SDGs.

A report by UNCTAD (2016) has focused on improved market access (both foreign market for a country's exports and domestic market access for imports) as an important determinant of the effectiveness of trade as a means of implementation for the achievement of the SDGs. It highlights the importance of improving physical market access to international markets by developing countries through reduction in trade costs. Low-income countries face on average proportionally higher trade costs than other

² Behind-the-border barriers in areas such as investment, competition, government procurement and intellectual property are also important, but not the focus of this study.

countries. Thus, expanding physical access to international markets at reasonable costs is essential for low-income countries to benefit from any reductions in trade barriers facing their exports and imports. Moreover, domestic trade costs incurred for getting to the border can be more trade restrictive than market access conditions at home and foreign markets. Reduction in transport costs is particularly important to low-income countries since prohibitively high transport costs faced by many low-income countries reduce their potential to trade more and forego income gains from the existing trade. The report concludes that in order to realize the potential of trade for inclusive growth and sustainable development, it is pertinent to balance the sustainability-enhancing effects with the trade-restricting effects of tariffs, which still remain a core challenge for trade policy for majority of the countries.

A study by Arvis et al. (2015) has shown that trade costs are substantially higher in poor countries than elsewhere. Hoekman (2016, 2017) has also highlighted the importance of measuring trade costs as part of a comprehensive approach to reviewing the trade elements of the sustainable development. He predicts that the global environment for trade and investment will be more challenging for low-income countries in the coming decade than it was in the 1990s and 2000s. He argues that a reduction in trade costs in both goods and services sectors should be the most important goal for developing countries. This will enable them to source inputs competitively, and provide households better access to products and services for improving their welfare, ranging from food security to health.

Moreover, OECD-WTO Aid for Trade (2015) report has stressed that lack of trade facilitation makes it difficult for many firms in developing countries to fully exploit market access opportunities. It highlighted that outdated or ill adapted infrastructure, cumbersome and time-consuming border procedures have been costing many firms in developing countries, particularly LDCs, out of international trade. Lack of trade facilitation

can undermine the potential gains from trade, especially in agricultural goods where perishability and trade restrictive measures push costs higher. Therefore, improvement in trade facilitation can play a significant role in increasing incomes, in particular for developing countries and LDCs. This may have positive impacts on export performance as well as on various social indicators (e.g. falls in poverty, rise in female employment).

Furthermore, OECD-WTO Aid for Trade (2017) report has emphasized on the importance of both physical and digital connectivity in creating trade opportunities for developing countries. While physical connectivity enables the movement of goods and services and provides access to local, regional and global markets, digital connectivity allows businesses to plug more directly into the global economy. One way forward in reducing trade costs is Aid-for-Trade (AfT), which includes technical assistance and capacity building. Aid-for-Trade initiative was launched in 2006 and more than USD 300 billion has been disbursed for financing aid-for-trade programs. More than three-quarters of total AfT has financed projects in four sectors that are closely related to cutting trade costs: transport and storage (29%), energy generation and supply (22%), agriculture (18%) and banking and financial services (11%). AfT has had some successes, primarily in addressing supply side and institutional constraints, such as infrastructure (e.g. roads and ports). This initiative contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and SDG 8 (Decent Work and Economic Growth) in particular (Da Silva, 2017).

Trade facilitation is a major determinant of how developing country firms connect to GVCs and are able to draw benefits by their participation. The ESCAP-World Bank Trade Cost Database estimates that for Asia-Pacific countries only 0-10% of trade costs are tariffs, while 10-30% correspond to natural trade costs (i.e. geographical and cultural factors). The remaining 60-90% relates to non-tariff policy measures such as direct behind and at-the border trade costs, indirect costs of trade procedures, maritime connectivity and

services, the business (regulatory) environment, currency fluctuations, the availability/use of ICT services and other non-tariff barriers – a large part of these relate to trade facilitation (Duval, 2015).

Razzaque et al. (2016) have highlighted that implementing national, regional and multilateral trade facilitation initiatives, such as the World Trade Organization's Trade Facilitation Agreement (WTO TFA), will contribute to enhanced trade flows by reducing costs. The WTO TFA, in particular, represents an opportunity to streamline border procedures and reduce trade costs and requires further sustained financial and technical support, mainly for LDCs and landlocked countries. Implementation of the WTO TFA has the potential to increase global merchandise exports by up to US\$1 trillion per annum, which can help bolster the role of trade as an effective means of achieving SDGs the (WTO, 2015).

Currently, the global economy is witnessing several uncertainties such as Brexit and a rise in protectionist rhetoric, which could further impact already subdued global trade and growth, and undermine the achievement of the SDGs. According to Evenett and Fritz (2015), LDCs have incurred a loss of US \$264 billion of exports as a result of protectionist measures since the global crisis of 2008. Thus, a well-designed trade policy will have a critical role to play towards attaining sustainable development objectives. Trade policy areas that stand out in this regard include lowering tariffs, providing accessible and the affordability digital and physical connectivity, improving trade facilitation, enhancing aid for trade and pursuit of trade facilitation agreement, among others (Tipping, 2014).

Policymakers across countries can use trade policy as an instrument for achieving sustainable development by ensuring that the gains from trade are distributed widely across the economy. This can be done by ensuring that the interaction between different policy measures aiming at sustainable development in different fields (i.e. social,

environmental or economic) create synergies for each other. The following sections outlines the methodology used in evaluating such synergies.

3. Methodology and scenario descriptions

This study uses a global CGE model based on the Global Trade Analysis Project-Power (GTAP-POWER) model and data base (Peters, 2016), which has comprehensive details at a sector level as well as at a country level for Asia-Pacific. It employs this extension of the standard GTAP model (Hertel, 1997), because it captures rich details of different types of energy, including various forms of renewable energy as well as fossil fuels and the CO₂ emissions associated with them.

This model is complemented further through the addition of equations based on models developed for other studies. Narayanan and Balie (2017) develop an econometric framework to assess the impact of food production and supply on undernourishment, which is then integrated within the GTAP model. Ciuriak et al (2016) develop a recursive dynamic model based on Monash framework on investment dynamics and investment identified by sector and countries of origin and destination. Results from this model are used to introduce dynamic effects in the comparative static framework, so that the whole analysis is conducted in a dynamic setting. Further, this study also looks at inequality as an outcome of our model simulations, by looking at the divergence between the real wages of skilled and unskilled labour, to proxy intra-country inequality.

The reference year for the GTAP database is 2011, however, the 2015 macro-level data is used to adjust this dataset using the GTAP Adjust tool (Horridge, 2008). Unemployment is assumed in labour market using a unit-elastic labour supply, which is a reasonable middle path between horizontal and vertical labour supply curves, and is also supported

reasonably well by econometric literature on labour supply elasticities. These are further unique features of our modelling framework, draw from the state-of-the-art recent literature on emissions, food security and inequality, which are all important concepts in the SDGs.

All simulated policy changes are implemented incrementally throughout the period considered, 2015 - 2030. The economic impacts of the policy changes are captured through changes in gross domestic product (GDP) and trade levels; the social impact through changes in levels of inequality and undernourishment; and the environmental impact through changes in CO₂ emissions. Whilst these aspects do not necessarily cover all dimensions of the links between trade policy and sustainability or SDGs, this study delves on them illustratively to obtain a tentative picture of these links with a view to understand the trade-offs involved as well as synergies that may exist.

This study considers tariff liberalization, investment liberalization, trade facilitation and integrated liberalization as potential trade policy-based facilitators of the SDGs. In addition, complementary social and environmental policies, namely the Paris Accord and income transfers are also examined to offset potential negative side-effects resulting from trade policy implementation. The following section outlines the scenarios in detail.

Scenario 1 – Enhanced tariff liberalization in Asia-Pacific (“Tariff liberalization”).

In this scenario, tariffs are gradually eliminated between members of the Regional Comprehensive Economic Partnership (RCEP) and Trans-Pacific Partnership (TPP) (minus the United States). In addition, other economies within Asia-Pacific introduce a 50% tariff reduction. This is in line with the current proliferation of bilateral, plurilateral and regional trade agreements, as well as the Regional Economic Cooperation and Integration (RECI) initiative at ESCAP.

Scenario 2 – Investment liberalization in Asia-Pacific (“Investment liberalization”).

This scenario closely follows the approach outlined in scenario 1. Intraregional investment liberalization is simulated by gradually eliminating investment barriers between members of RCEP and TPP (minus the United States). In addition, other Asia-Pacific countries introduce a 50% investment barrier reduction.

Scenario 3 – Trade facilitation implementation in Asia-Pacific (“Trade facilitation”).

In this scenario, trade costs are reduced as a result of implementation of trade facilitation and paperless trade measures across the Asia and the Pacific. Gradually, all the economies in the region reach the trade facilitation level of China. Quantifying the impact of trade facilitation using an index is a complex undertaking, requiring in this case, a concordance between trade data and the trade facilitation implementation rates available from the ESCAP-led Global Survey on Trade Facilitation and Paperless Trade Implementation.³

Scenario 4 – Simultaneous implementation of tariff liberalization, investment liberalization and trade facilitation (“Integrated liberalization”).

This scenario combines all above mentioned policy changes to demonstrate the aggregate effect of tariff liberalization, investment liberalization and trade facilitation implementation. As will be discussed, combining liberalization policies amplifies the economic benefits offered by the individual scenarios. Moreover, some adverse effects created by one policy are negated by one of the others.

³ For more information about the survey, see: UN Global Survey on Trade Facilitation and Paperless Trade Implementation, available from <https://unnex.unescap.org/content/un-global-survey-trade-facilitation-and-paperless-trade-implementation-0>

Further, in order to explore how specific domestic policies can help channel trade and investment liberalization towards sustainable development, three additional policy scenarios and their economic, social, and environmental impact are analysed, as follows:

Scenario 5 – Implementation of Paris Accord ("Paris Accord").

The previous policy simulations (scenarios 1-4) do not include constraints on emissions, and as such, emissions rise in each. In this scenario, all signatories of the Paris Accord globally reduce CO₂ emissions in accordance with agreed levels in the Agreement.⁴

Scenario 6 – Income transfers from skilled to unskilled labour ("Income transfers").

This scenario addresses inequality through a 3% redistribution of income from skilled to unskilled labour, taking place in all Asia-Pacific economies. Specific policies to achieve this objective could include welfare payments to low-income households, government subsidies and progressive taxation.

Scenario 7 – Combined trade, environmental and social policies ("Combined scenario").

This scenario combines integrated liberalization (scenario 4) with the Paris Accord and welfare transfers. It shows the interlinkages between what are sometimes thought of as diametrically opposed policies and demonstrates that environmental and social goals can be achieved in parallel with trade-driven economic development.

Finally, while regional and global trade prospects have been improving and greater economic integration holds promise to substantially rise the standards of living, the risk

⁴ More information on the Paris Accord and nationally determined contributions (NDCs) is available from http://unfccc.int/paris_agreement/items/9485.php

of a renewed wave of trade protectionism remains. Accordingly, to contrast the potential benefits from greater economic integration against the case of extreme protectionism, this study also models the possibility of a global trade war, where the trade protectionist measures initiated by one or a few countries ultimately lead to other countries retaliating. Specifically, the scenario simulates the effects of all countries raising import tariffs to their bound levels globally between 2015 and 2030 ("*Tariff hike*" scenario).

4. Results

4.1. Tariff liberalization, investment liberalization and trade facilitation scenarios

Figure 1 presents the effects of the policy scenarios for different subregions in Asia and the Pacific.⁵ The percentage changes shown are average annual changes between the period 2015-2030. Although they may look relatively small, they accumulate to significant changes over the time period examined.

In scenario 1, tariff liberalization results are comparably modest, as many of the economies in the region already have low tariff rates. Consequently, the impact of tariff liberalization on GDP is relatively small, ranging from 0.01% and 0.03% across subregions. In absolute terms, however, the effect on regional GDP is an annual increase of \$6.5 billion.

The impacts of tariff liberalization are more pronounced in trade. Exports increase on average 0.22% annually every year until 2030, while imports increase by 0.15%. In absolute terms, this is an annual increase of \$17.8 billion and \$10.7 billion for exports and

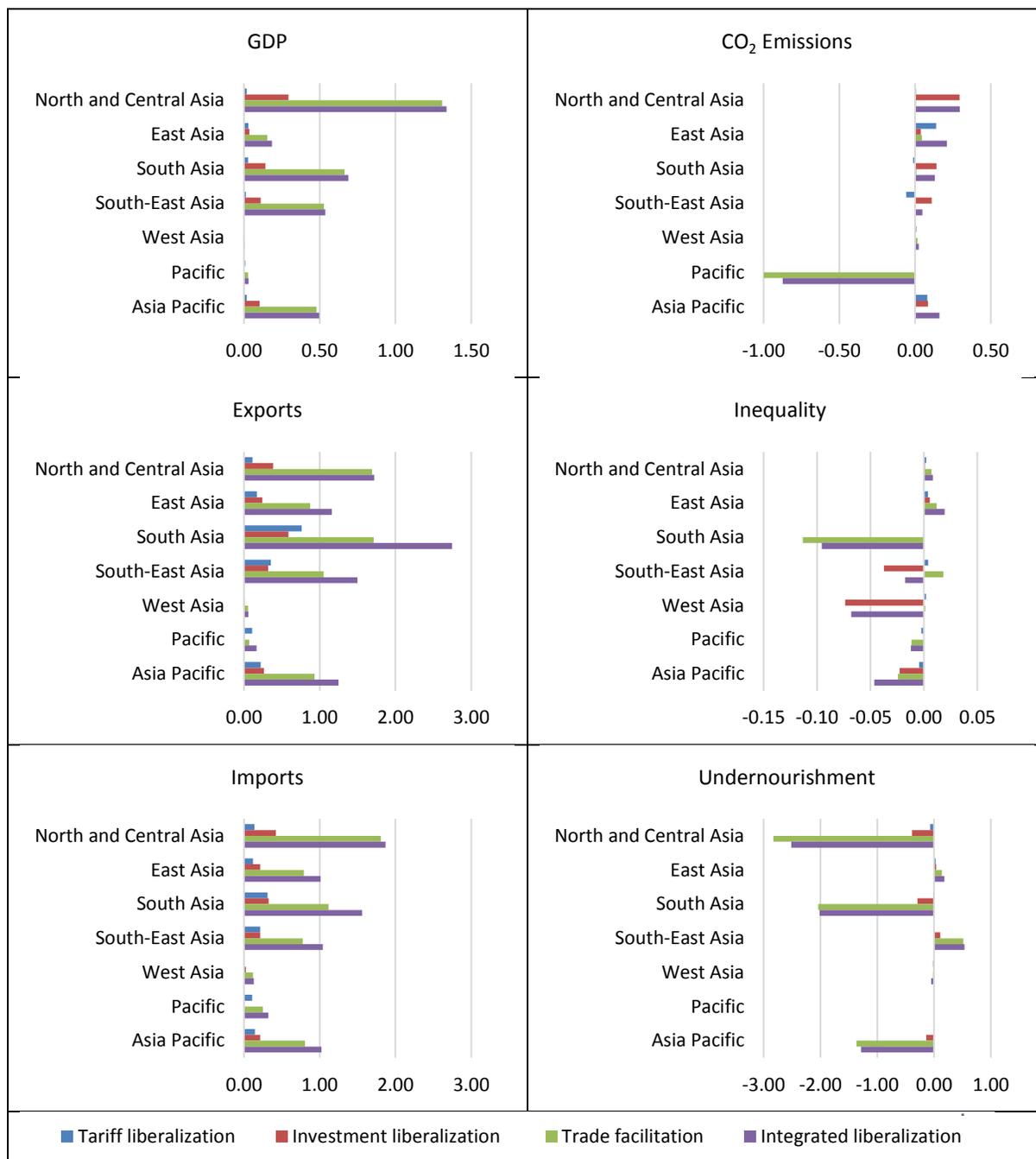
⁵ For definitions of subregions see Appendix A1 Regional definitions. Percentage changes are expressed as those above the baseline – see Appendix A2.

imports, respectively. The almost 70% larger increase in export compared to import demonstrates the significance of the interlinkages between the economies through regional and global value chains. Decreasing import tariffs, while increasing imports, also enables countries to reduce input costs, improve variety and quality of intermediate goods, become more competitive and increase exports even more.

Tariff liberalization's effect on the environment regionally is almost negligible. CO₂ emissions remain relatively neutral, increasing overall by less than 0.1% annually. However, driven by the redistribution of production, subregions exhibit some variations. In particular, emissions in East Asia increase 0.14% on average annually, or 12.9 million tonnes of oil equivalent (MTOE) per year.

Turning to the social impact, the effects of intra-regional tariff cuts on inequality within the region and subregions are not significant. This can be largely attributed to the tariff cuts taking place across-the-board (i.e., in all sectors and countries). Such cuts are likely to offset increased inequality in sectors displaced by trade with gains from export-oriented sectors of the economies. The impact on undernourishment is also insignificant in the region and subregions. While increased interregional trade may negatively affect some producers, the negative effects are offset by decreased prices, resulting in a net neutral effect in the region and the subregions.

Figure 1. Results of tariff liberalization, investment liberalization and trade facilitation scenarios



Source: Authors' calculations

The cumulative result of tariff liberalization is an increase in regional GDP of 0.3% and trade of 2.9% by 2030. This is consistent with the findings from Gilbert (2013), who found that a free trade agreement encompassing all members of ESCAP, which involved cutting all intraregional tariffs to zero, resulted in GDP increases ranging from 0.3% to 0.78%. However, tariff liberalization is only a small part of TPP, which also includes significant trade facilitation, investment liberalization as well as services liberalization commitments.

In scenario 2, the economic impact of regional investment liberalization is significantly higher than that of tariff liberalization. This is consistent with the fact that, unlike for tariffs, FDI restrictiveness remains high in many countries of the region. Economic gains from investment liberalization largely follow the pattern of tariff liberalization outcomes at the regional and subregional level. GDP increases by 0.1%, or \$19.5 billion annually, with North and Central Asia attracting much needed investment and experiencing the highest relative growth at 0.29%. Similarly, South Asia and South-East Asia experience significant annual GDP boosts of 0.14% and 0.11%, respectively.

However, the growth mechanism of investment liberalization differs from the one for tariff liberalization. In the case of tariff liberalization, all changes in economic performance are trade driven. In contrast, improved economic performance from investment liberalization is driven by increase in capital stock, which may or may not increase trade. As a result, the impact of investment liberalization on trade varies across subregions. For example, exports in South Asia and South-East Asia are below those gained through tariff liberalization. North and Central Asia imports, on the other hand, significantly increase, growing at 0.38% per year. On average, however, regional exports and imports grow at 0.26% and 0.21% annually – only slightly higher than was achieved through tariff liberalization.

Unlike tariff liberalization, investment liberalization decreases inequality in the region by 0.02% per year. Among all the subregions, inequality in South-East Asia and West Asia declines most significantly. Similarly, undernourishment, declines significantly across the region (falling 0.14% annually), and particularly in North and Central Asia and South Asia. In these subregions, undernourishment declines 0.39% and 0.29%, respectively. Therefore, investment liberalization reduces inequality and undernourishment more than tariff liberalization. The increases in capital stock allow more utilization of unskilled labour, and the combination of lower production costs and increased incomes makes food more affordable.

In terms of environmental impact, investment liberalization increases CO₂ emissions in the region by 0.1% or 13 MTOE annually, similar to the results for tariff liberalization. At the subregional level, North and Central Asia gains the most economically, but also has the highest CO₂ emission, an increase of 0.29% annually. The subregions' CO₂ emission increase stems from increased infrastructure investment. In South Asia and South-East Asia, emissions also increase significantly (0.14% and 0.11%, respectively).

Turning to scenario 3, trade facilitation has large and generally positive impacts across the region. Asia and the Pacific experiences an annual increase in GDP of 0.32%, which is equivalent to nearly \$87 billion per year – 14 times more than under enhanced tariff liberalization, and four times more than under investment liberalization. The GDP growth is driven by trade, with Asia-Pacific exports and imports annually increasing by 0.93% and 0.81%, respectively. These results are consistent with the empirical literature, which generally finds the impact of trade facilitation to be much larger than trade liberalization (ADB and ESCAP, 2013; Gilbert, 2013).

While trade increases are much larger than under the tariff liberalization scenario, both policy changes show regional exports expanding more than imports, resulting in an in-

crease in net exports of \$16 billion per year (exports increase by \$75 billion and imports by \$59 billion). These results suggest that trade facilitation and paperless trade implementation and, more generally, enhancing regional connectivity to reduce trade costs, should be a top priority among policymakers.

Although trade facilitation results in large regional trade gains, CO₂ emissions increase only marginally – and in any case less than with investment liberalization. The modest increase compared to tariff liberalization is the result of increased economic activity in North and Central Asia, South Asia and South-East Asia. On the other hand, in this scenario, emissions in the Pacific decline 1% annually, helping to offset increases in other subregions.

Trade facilitation decreases inequality within the region overall. While the decrease is generally small, it is larger than those gained through tariff or investment liberalization. This result is mainly due to changes in South Asia, and, to a lesser extent, the Pacific. South Asia has some of the most inefficient trade procedures in the region. Only those of the Small Island Developing States in the Pacific are worse. The results for the Pacific region as a whole are heavily moderated by Australia and New Zealand, who in contrast to other countries in the subregion have some of the highest trade facilitation implementation rates in Asia and the Pacific. Significant improvements in trade facilitation in low-income economies of South Asia and the Pacific could reduce inequality by increasing their export of traditionally labour-intensive goods (e.g., textiles) and boosting both the employment and wages of unskilled labour. However, the rise in inequality in other sub-regions highlights the necessity of complementary policies.

Trade facilitation also leads to significant reduction in undernourishment in Asia and the Pacific. In this scenario, undernourishment decreases by an average of 1.4% annually. By 2030, this is a reduction of over 20% overall in the region. The results, however, are

not uniform. Malnourishment increases slightly in South-East Asia (0.52% annually) due to the displacement of the agricultural sector by other higher value-added sectors. Nevertheless, trade facilitation appears to be a promising strategy for reducing undernourishment in the region and contributing to SDG 2 to achieve zero hunger.

In scenario 4, the policy change investigated combines tariff liberalization, investment liberalization and trade facilitation. This “integrated liberalization” approach provides the highest overall economic benefit and increases GDP for the region by 0.34% annually, or \$94 billion. The increase is largely driven by gains from trade facilitation, which by itself accounts for 0.32% increase in annual GDP.

In addition, integrated liberalization increases trade significantly more than any of the other stand-alone policy changes. Exports and imports are projected to increase by 1.25 % and 1.03%, respectively (\$101 billion and \$75 billion in absolute terms, per year), and the region’s increased annual net exports could reach more than \$25 billion. This is about \$10 billion more than with trade facilitation alone. This integrated approach facilitates the participation of countries in GVCs and significantly increases the competitiveness of regional exports. This integrated liberalization scenario provides strong evidence of the important synergies that can be achieved by liberalizing and facilitating trade and investment.

In terms of CO₂ emissions, the negative effects of the investment liberalization and tariff liberalization scenarios accumulate, resulting in an increase of 0.16% in emissions for the region, or approximately 24 MTOE per year. The North and Central Asia, East Asia, and South-East Asia regions are largely responsible for the regional increase. In the Pacific, on the other hand, there is a large relative decrease, but this does not affect the regional results significantly, given the relatively low contribution of that subregion to total regional emissions.

The integrated liberalization approach magnifies the small reductions in inequality observed under the trade facilitation and investment liberalization scenarios. Despite inequality increasing modestly in East Asia, and to a lesser extent North and Central Asia, inequality falls by an average of 0.05% per year at the regional level. However, the extent and the drivers of these reductions vary across subregions. For instance, South Asia and West Asia both experience particularly significant inequality reductions. In South Asia, investment liberalization reduces inequality whereas trade facilitation leads to the reductions in West Asia.

Interestingly, the integrated liberalization approach does not show synergies between the liberalization and facilitation scenarios in terms of food security. Rather, undernourishment worsens marginally compared to the stand-alone trade facilitation scenario. Similar to the trade facilitation scenario, undernourishment still decreases significantly in most subregions, but it increases slightly in South-East Asia. This is the result of complex interactions between trade and investment liberalization in the agriculture and food sector.

Overall, trade facilitation – which may be best understood in the context of this analysis in its broadest sense, i.e., as a reduction in trade costs - promises the most economic gains compared to either tariff liberalization or investment liberalization. However, in the trade facilitation scenario, there are also substantial variations among countries and between subregions in terms of the environmental and social impacts. As demonstrated in the following subsection, the greatest economic, complementary social and environmental policies can negate some of the negative outcomes.

4.2. Paris Accord, income transfer, integrated liberalization and combined scenarios

The results of the simulations for Paris Accord, income transfer, and integrated liberalization and combined scenarios are presented in figure 2. As a reference, the “integrated liberalization” strategy (scenario 4) is presented in all graphs.

In scenario 5 (Paris Accord scenario), the effect on GDP across the Asia-Pacific region is, contrary to expectations, mildly positive, a modest growth of 0.1% per annum.⁶ The economies of South Asia and South-East Asia grow by 0.38% and 0.34% respectively, driven largely by the growth in the renewable sector of these economies. However, due to the oil-centered economy of the Islamic Republic of Iran, West Asia GDP declines by 0.5% per annum.

The Paris Accord implementation includes cutting emission commitments by countries outside the region, which also affect economic growth outcomes in Asia and the Pacific. For example, relative to the status-quo without emission constraints, GDP in the United States and the European Union annually contract by 0.18% and 0.62%, respectively. The biggest reductions in output growth globally are in the petrochemical industries, with an annual reduction of 2.2% of output, while the renewables sector sees a 2.4% annual output growth.⁷

Exports in Asia and the Pacific remain unchanged under the Paris Accord scenario. The subregional breakdown shows that exports in South Asia rise significantly by 0.5% per year and 0.1% in West Asia, whereas they decrease by 0.1% in the Pacific and South-East Asia. At the same time, imports decline by 0.14% in the region, falling by 0.6% in South Asia and 0.4% in South-East Asia. The declines in these two subregions are

⁶ This approximately equals the effects of the investment liberalization scenario.

⁷ Sectoral composition is discussed more in subsection 4.4 below

partially the result of their reliance on fossil fuel imports by both subregions, which have been reduced to meet the Paris Accord obligations.

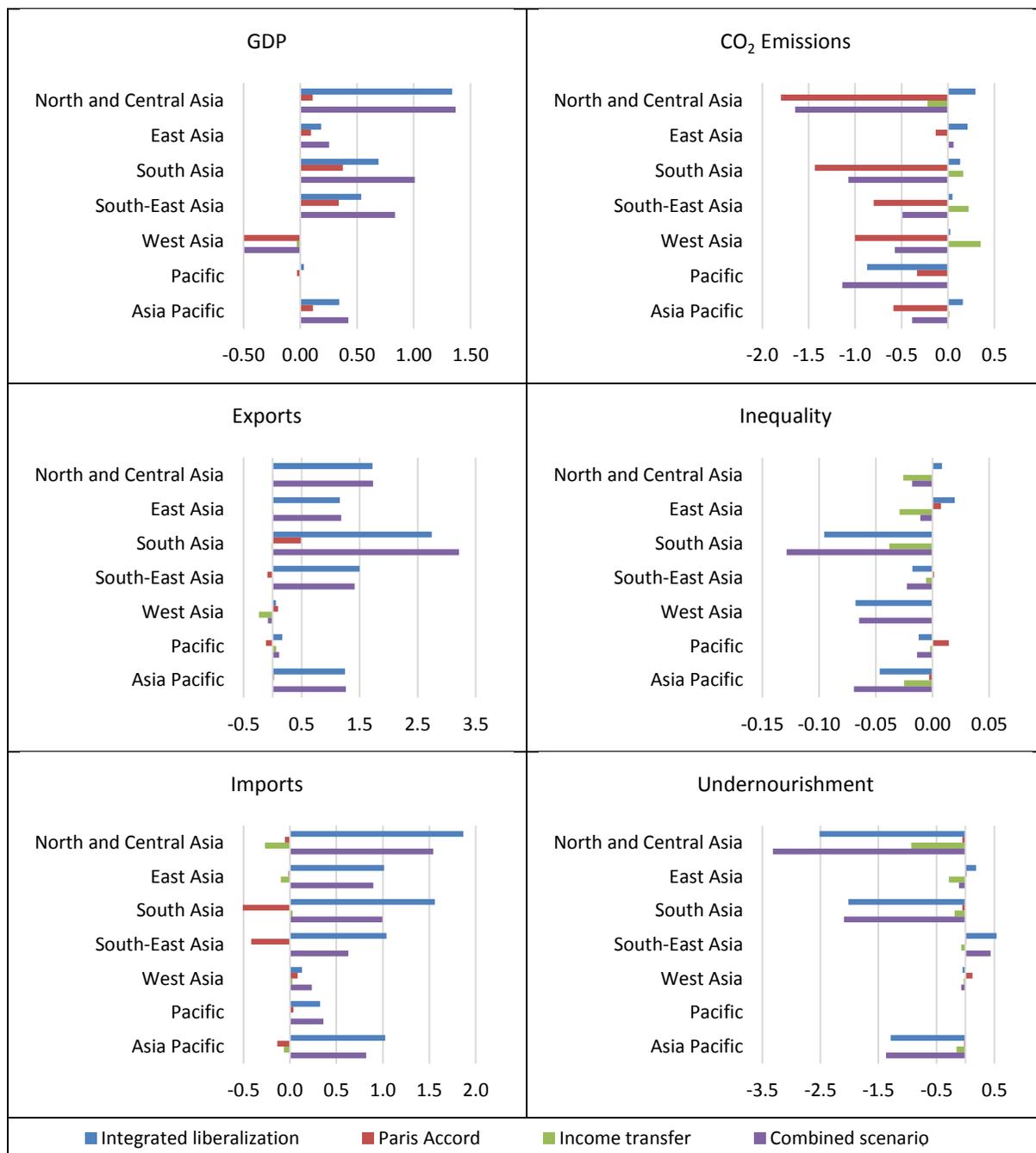
Following implementation of the Paris Accord, CO₂ emissions, as expected, fall across the region by 0.6% annually. Subregionally, North and Central Asia is projected to have the largest decline (1.8% per year). In contrast, the largest overall emitter, East Asia, which contributes nearly two-thirds of the region's emissions, has the lowest relative decline of 0.13%.⁸

The Paris Accord does not have any significant effect on inequality in the region. Undernourishment also does not change significantly for the region as whole, but effects differ across subregions. While falling somewhat in North and Central Asia and South Asia, it rises slightly in West Asia due to the dependence on oil and the subsequent loss of economic activity. Added to the decrease in GDP in the subregion, this highlights that CO₂ emissions reduction commitments and the move to renewable energies are likely to negatively impact oil producing countries.

In scenario 6 (the welfare transfer scenario), since income is redistributed from high skilled workers to low skilled workers with-in each economy, no impact on GDP at regional and subregional levels are registered. This result is in line with economic findings that show the economic effects of tax increases on high income earners are net neutral. Similarly, welfare transfers do not affect exports and imports at the aggregate level. However, small movements are apparent at the subregional level, with West Asia exports contracting by 0.2%, and North and Central Asia imports shrinking by 0.3%.

⁸ At the global level, CO₂ emissions annually decline by 1.3% in emissions, or 19.5% between 2015 and 2030. These results are in line with Campagnolo and Davide (2017), who similarly model a 19% decline in emissions from the status quo.

Figure 2. Results for Paris Accord, income transfer, integrated liberalization and combined scenarios



Source: Authors' calculations

Emissions do not increase in the region, but there is noticeable variation among subregions. While CO₂ emissions decrease in North and Central Asia by 0.2%, the emissions in South Asia, South-East Asia and West Asia increase by 0.2%, 0.2% and 0.4%, respectively. While not evident in the GDP effect, these increases are most likely due to the rising income of lower skilled workers and their subsequent consumption of more energy intensive products. The results illustrate that even income redistribution policies have the potential to impact emissions.

As expected, the income transfer policy reduces within-country inequality in all subregions as well as in the region as a whole. Inequality decreases by 0.03% per annum in Asia-Pacific, with the largest decreases in South Asia, which has one of the highest rates of inequality in the region (ESCAP, 2015). Similarly, undernourishment falls across the region by 0.15%, with the strongest effects in North and Central Asia, East Asia and South Asia, the three regions with the highest levels of undernourishment in the region.

Scenario 7 estimates the impact of integrated liberalization in Asia and the Pacific (scenario 4) when countries implement the Paris Accord commitments and income transfer policies. The combined effect is a net positive result regionally on the economic, social and environmental variables under consideration. Moreover, this combined scenario offsets most of the negative impacts seen in stand-alone policies. However, the results also show that some subregions still experience adverse effects. This underscores the need for the policy mix to take into account subregional and country level differences, particularly in light of different policy priorities.

The overall impact on GDP is an increase in annual growth of 0.4%, or \$116 billion. This is larger than the effect from integrated liberalization alone, meaning that there is a high level of complementarity among the policies. Over the 15-year period considered, the

policy mix results in an increase in regional GDP of \$1.7 trillion, or over 6% of the regional GDP.

Under the combination scenario, the subregions benefitting the most economically are North and Central Asia (annual growth of 1.4%), South Asia (1.0%) and South-East Asia (0.8%). However, GDP in oil-dependent West Asia shrinks as a result of the implementation of the Paris Accord. Moreover, none of the modelled trade policy changes (scenarios 1-4) lead to significant GDP gains for this subregion either. As such, this highlights the difficulty oil-exporting countries may face operating in a more sustainable global economy.

The effect on exports and imports in the final scenario is largely additive. Exports increase regionally by 1.3%, and imports increase by 0.8%, resulting in net annual export increases of over \$60 billion. Total trade, however, is slightly lower when liberalization and complementary policies are combined, than when integrated liberalization alone is implemented (scenario 4).

Carbon emissions are driven down by the Paris Accord implementation. They fall across the region and also negate some of the negative increases due to trade integration policies. Overall, there is a 0.4% reduction in the region, with only East Asia not showing significant reduction in CO₂ emissions – explained by the region's highest growth in exports in absolute terms. Campagnolo and Davide (2017) also find that emissions under the Paris Agreement simulations may increase in some countries because of weak mitigation targets in the national determined contributions.

Both inequality and undernourishment fall under the combined economic, social and environmental policy scenario. Inequality falls all subregions as a result primarily of trade facilitation and income transfer effects. In West Asia, trade facilitation decreases inequality, whereas in the Pacific and East Asia, income transfers offset the increased

inequality due to trade facilitation. Undernourishment also falls within in most subregions, decreasing by 1.4% annually, or a 20% reduction by 2030 from 2015 levels. The fall in undernourishment is essentially driven by trade facilitation, which facilitate the movement of agricultural and food products at lower costs.

This scenario's superior economic, social and environmental outcomes highlight the fact that social, environmental and trade and investment policies can be synergistic. They can promote better development outcomes than can be achieved with stand-alone policies. However, this requires multilateral cooperation (as in the case of the Paris Accord) and deeper regional integration. Indeed, the results strongly support cooperative and coordinated implementation of environmental and social policies in regional trade and investment integration efforts, including to ensure that these policies do not create unnecessary or unintended barriers to trade. Encouragingly, new generation regional trade agreements already do this to a large extent (e.g., RCEP and TPP in this region), encompassing an ever-wider range of economic, social and environmental issues during negotiations.

4.3. Tariff war scenario

To highlight the dangers of protectionist policies, this subsection briefly discusses the results of a simulated tariff war. Table 2 presents the overall impact of the scenario. All regions experience a reduction in GDP, varying between 0.2% annually in Latin America to 0.9% per year in Europe. This leads to an overall global reduction in GDP of \$380 billion a year. The significant reduction is driven by trade, as expected, with exports and imports both plummeting globally. CO₂ emissions, on the other hand, are reduced due to overall lower economic activity. Tariff hikes do not affect inequality because the reduction in wages for skilled and unskilled labour are equally affected by the global tariff hikes, but undernourishment increases significantly across all regions that had non-zero undernourishment levels in the baseline data.

Table 2. Results of a hike in tariffs globally (% deviations from the baseline)

	GDP	Exports	Imports	CO ₂ Emissions	Under-nourishment
Asia Pacific	-0.4	-19	-17	-0.4	1.5
<i>East Asia</i>	-0.3	-13	-7	-1.3	1.5
<i>South-East Asia</i>	-0.3	-25	-14	0.1	0.9
<i>South Asia</i>	-0.3	-38	-8	-0.1	0
<i>West Asia</i>	-0.3	-5	-38	0	3.4
<i>North and Central Asia</i>	-0.7	-15	-31	-0.1	1.8
<i>The Pacific</i>	-0.4	-5	-5	-0.4	N/A
Latin America	-0.2	-13	-22	-1.8	N/A
Sub Saharan Africa	-0.7	-3	-27	-1.1	2.4
Other Africa	-0.5	-6	-10	-2.6	1.6
Europe	-0.9	-37	-16	-0.2	N/A
North America	-0.3	-15	-26	-1.9	N/A

Source: Authors' calculations

Among Asia-Pacific subregions, North and Central Asia sees the most significant reduction in GDP of 0.7%, or \$16 billion annually. In absolute terms, East Asia's GDP decreases the most by over \$51 billion. Overall, Asia-Pacific's GDP decreases more than \$110 billion per year between 2015 and 2030. The declines in GDP are directly caused by significant reduction in trade, which vary significantly across subregions. South Asia experiences a dramatic export decline of 38% annually. On the other hand, West Asia and the Pacific see their exports export decline by only 5% a year, on average. The difference in the effect is largely due to the export product mix, i.e., subregions that are most affected have exports that are more susceptible to being blocked by increases in applied rates. In terms of imports, since countries in West Asia and North and Central Asia have the most policy space (i.e., their applied tariff levels are much lower than their bound tariff rates), they reduce imports by more than 30%. CO₂ emissions actually increase in South-East Asia due to an increase in local production of previously imported

products. Other countries experience declines in emissions as economies are in depressions. In terms of undernourishment, the most notable subregional result is in West Asia, which sees an increase of 3.4% a year, underlying the danger the tariff war poses for the poor.

The results of this scenario highlight a very clear danger of an escalating isolationism, which contrasts vividly against the opportunities offered by trade and investment liberalisation and trade facilitation. It should act as a reminder that beggar thy neighbour policies that can lead to retaliatory trade policy actions may substantially reduce global trade, hurting the poorest countries in the processes.

4.4. Sectorial decomposition

This subsection briefly outlines Asia-Pacific sectoral results of scenarios 1-7 and the tariff hike scenario. All sectors' output increases in the scenarios of trade liberalization, investment liberalization, and trade facilitation (see table 3). Note that following the pattern observed in GDP changes, trade facilitation offers the greatest increases across sectors, particularly in processed foods, petrol and services sectors. These effects across the three trade scenarios are amplified in the integrated liberalization scenario with the highest increases in sectors. The increases, however, are largely driven by the trade facilitation scenario, hence the sectors with most output changes are also processed foods, petrol and services. Notably, no sectors decrease production under integrated liberalization in aggregate in the region. Paris Accord implementation may have a negative effect on all sectors except renewables, fishing, forestry, non-food/textile manufacturing and services. Income transfers has a positive effect on all sectors, while the combined effect of all scenarios is positive for all sectors except petroleum products. Notably, under the combined scenario, many sectors actually increase output at a greater rate than under the integrated liberalization approach alone. Finally, as expected, tariff hike hurts all sectors, with highest losses seen in petrol, textile & apparel and oil sectors.

Table 3. Percentage changes of Asia Pacific output in specific broad sectors

	Tariff liberalization	Investment liberalization	Trade facilitation	Integrated liberalization	Paris Accord	Income transfer	Combined scenario	Tariff hike
Crops	-0.03	0.02	0.26	0.23	-0.06	0.21	0.38	-0.18
Processed Food	0.06	0.17	1.50	1.65	-0.38	0.20	1.47	-0.36
Textiles & Apparel	0.24	0.16	0.39	0.76	-0.39	0.32	0.68	-0.64
Livestock	0.01	0.17	0.49	0.64	-0.16	0.39	0.87	-0.32
Fish	0.15	0.04	0.93	1.06	1.02	0.17	2.26	-0.24
Forest	0.00	0.01	0.14	0.15	0.25	0.11	0.51	-0.28
Coal	0.15	0.02	0.56	0.69	-0.20	0.44	0.93	-0.46
Oil	0.12	0.03	0.38	0.50	-0.26	0.30	0.55	-0.69
Gas	0.00	0.10	0.45	0.52	-0.21	0.36	0.66	-0.07
Petrol	0.15	0.03	1.22	1.33	-2.23	0.20	-0.69	-0.87
Renewables	0.06	0.09	0.12	0.25	2.44	0.10	2.79	-0.18
Light Manufacturing	0.07	0.01	0.17	0.24	0.06	0.14	0.44	-0.46
Heavy Manufacturing	0.10	0.03	0.43	0.53	0.28	0.34	1.14	-0.42
Services	0.12	0.00	1.70	1.73	1.95	0.36	4.05	-0.36

Source: Authors' calculations

5. Conclusions

This study analysed the potential effects of regional tariff liberalization, investment liberalization, and trade facilitation on economic growth, trade, CO₂ emissions, inequality and undernourishment, both individually and when implemented in an integrated policy package using a global CGE framework based on GTAP. The effects of emission reduction commitments under the Paris Agreement, as well as of domestic income transfers in Asia-Pacific countries were also analysed, as examples of complementary policies needed to channel trade and investment into sustainable development. The framework used combines the latest developments in the literature that are most relevant for trade and SDGs.

The analysis highlighted the importance of trade and investment liberalization and facilitation as a key driver of economic growth. An integrated approach to trade and

investment liberalization and facilitation is preferred, boosting trade by over \$175 billion annually and partly reducing negative social and environmental impacts associated with individual liberalization policies. The results suggest that lowering trade and investment barriers regionally in an integrated manner increases the competitiveness of regional firms in the global market by enabling them to effectively participate in global value chains.

Gains from liberalization are mainly driven by trade facilitation, whose economic impact significantly outweighs that of tariff and investment liberalization. In the context of the model, trade facilitation may be interpreted broadly as reduction in trade costs, including but not limited to the implementation of trade facilitation and paperless trade measures included in the WTO Trade Facilitation Agreement and the new Framework Agreement on Facilitation of Cross-Border Paperless Trade in Asia and the Pacific.⁹

Finally, the analysis confirms the need for complementary social and environmental policies to better channel trade and investment into sustainable development. Indeed, while the social and environmental impacts from liberalization are typically not large at the regional level, they vary substantially across subregions in both significance and direction. Importantly, the combined effect of integrated liberalization, domestic welfare transfers and global Paris Accord implementation is a higher level of economic growth in Asia and the Pacific than what is achieved through integrated liberalization alone, while inequality and CO₂ emissions are also mitigated. Increasing multilateral and regional cooperation on trade and investment as well as social and environmental issues is key to achieving positive outcomes across all three pillars of sustainable development.

⁹ ESCAP (2016). *Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific*. Available from <http://www.unescap.org/resources/framework-agreement-facilitation-cross-border-paperless-trade-asia-and-pacific>

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Appendix

A1. Regional definitions

The model was run in a very granular disaggregation, comprising all major GTAP countries in the Asia Pacific and a few outside, i.e., 75 countries and regions in total. For the purposes of exposition in the paper, the results are summarized in a few aggregate regions and subregions.

Table A1: Description of regions in this document

Asia-Pacific	
<i>East Asia</i>	China; Hong Kong, China; Japan; Republic of Korea; Mongolia; Taiwan, Province of China; Rest of East Asia;
<i>South-East Asia</i>	Cambodia; Indonesia; the Lao People's Democratic Republic; Malaysia; Philippines; Singapore; Thailand; Viet Nam; Rest of Southeast Asia.
<i>South Asia</i>	Bangladesh; India; Nepal; Pakistan; Sri Lanka; Rest of South Asia.
<i>West Asia</i>	Islamic Republic of Iran; Turkey
<i>North and Central Asia</i>	Armenia; Azerbaijan; Georgia; Kazakhstan; Kyrgyz Republic; the Russia Federation.
<i>The Pacific</i>	Australia; New Zealand; Rest of Oceania.
Latin America	Argentina; Bolivia; Brazil; Chile; Colombia; Ecuador; Paraguay; Peru; Uruguay; Venezuela; Rest of South America; Costa Rica; Guatemala; Honduras; Nicaragua; Panama; El Salvador; Rest of Central America; Dominican Republic; Jamaica; Puerto Rico; Trinidad and Tobago; Caribbean.
Sub Saharan Africa	Benin; Burkina Faso; Cameroon; Cote d'Ivoire; Ghana; Guinea; Nigeria; Senegal; Togo; Rest of Western Africa; Central Africa; South Central Africa; Ethiopia; Kenya; Madagascar; Malawi; Mauritius; Mozambique; Rwanda; Tanzania; Uganda; Zambia; Zimbabwe; Rest of Eastern Africa; Botswana; Namibia; South Africa; Rest of South African Customs Union.
Other Africa	Egypt; Morocco; Tunisia; Rest of North Africa.
Europe	Austria; Belgium; Cyprus; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Latvia; Lithuania; Luxembourg; Malta; Netherlands; Poland; Portugal; Slovakia; Slovenia; Spain; Sweden; United Kingdom; Switzerland; Norway; Rest of EFTA; Albania; Bulgaria; Belarus; Croatia; Romania; Ukraine; Rest of Eastern Europe; Rest of Europe.
North America	Canada; United States; Mexico; Rest of North America.

A2. Absolute initial values and the 2030 baseline scenario

Table A2. Absolute initial (2015) values

	GDP	Exports	Imports	CO₂	Inequality	Under-
	(2015 US dollars, billions)			Emissions		nourishment
Asia Pacific	27,520	8,070	7,347	15,006	0.23	10.28
<i>East Asia</i>	17,248	4,561	3,953	9,190	0.26	12.40
<i>South-East Asia</i>	2,524	1,383	1,346	1,149	0.40	10.75
<i>South Asia</i>	2,584	536	697	1,990	0.43	20.70
<i>West Asia</i>	1,223	605	588	502	0.34	2.12
<i>North and Central Asia</i>	2,287	661	458	1,764	0.32	3.70
<i>The Pacific</i>	1,655	323	305	412	0.62	-
Latin America	5,099	910	871	1,148	0.02	-
Sub Saharan Africa	4,144	978	844	571	0.27	32.40
Other Africa	3,473	925	772	523	0.42	1.50
Europe	17,502	7,130	7,379	2,145	0.46	-
Northern America	18,905	2,330	3,178	5,611	0.31	-
Global	76,641	20,342	20,391	25,004	-	-

Table A3. Baseline scenario - annualized percentage changes by 2030

	GDP	Exports	Imports	CO₂ Emissions	Inequality	Under-nourishment
Asia Pacific	3.67	1.98	2.33	0.76	-0.04	-0.19
<i>East Asia</i>	4.26	6.63	6.46	4.26	-0.03	4.26
<i>South-East Asia</i>	7.38	0.58	1.84	0.04	-0.02	7.38
<i>South Asia</i>	2.32	0.18	2.12	0.07	-	-0.43
<i>West Asia</i>	1.70	1.41	0.29	0.15	-	-0.26
<i>North and Central Asia</i>	3.30	2.05	1.77	0.13	-0.03	-0.48
<i>The Pacific</i>	3.70	1.87	2.04	0.64	0.00	-
Latin America	2.25	1.15	1.26	0.11	-0.03	-
Sub Saharan Africa	4.44	3.58	1.42	0.07	-	-0.70
Other Africa	1.62	1.00	0.95	0.09	-0.20	-0.27
Europe	2.91	1.23	1.74	0.07	-	-
Northern America	2.49	1.40	1.34	0.11	-0.04	-



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