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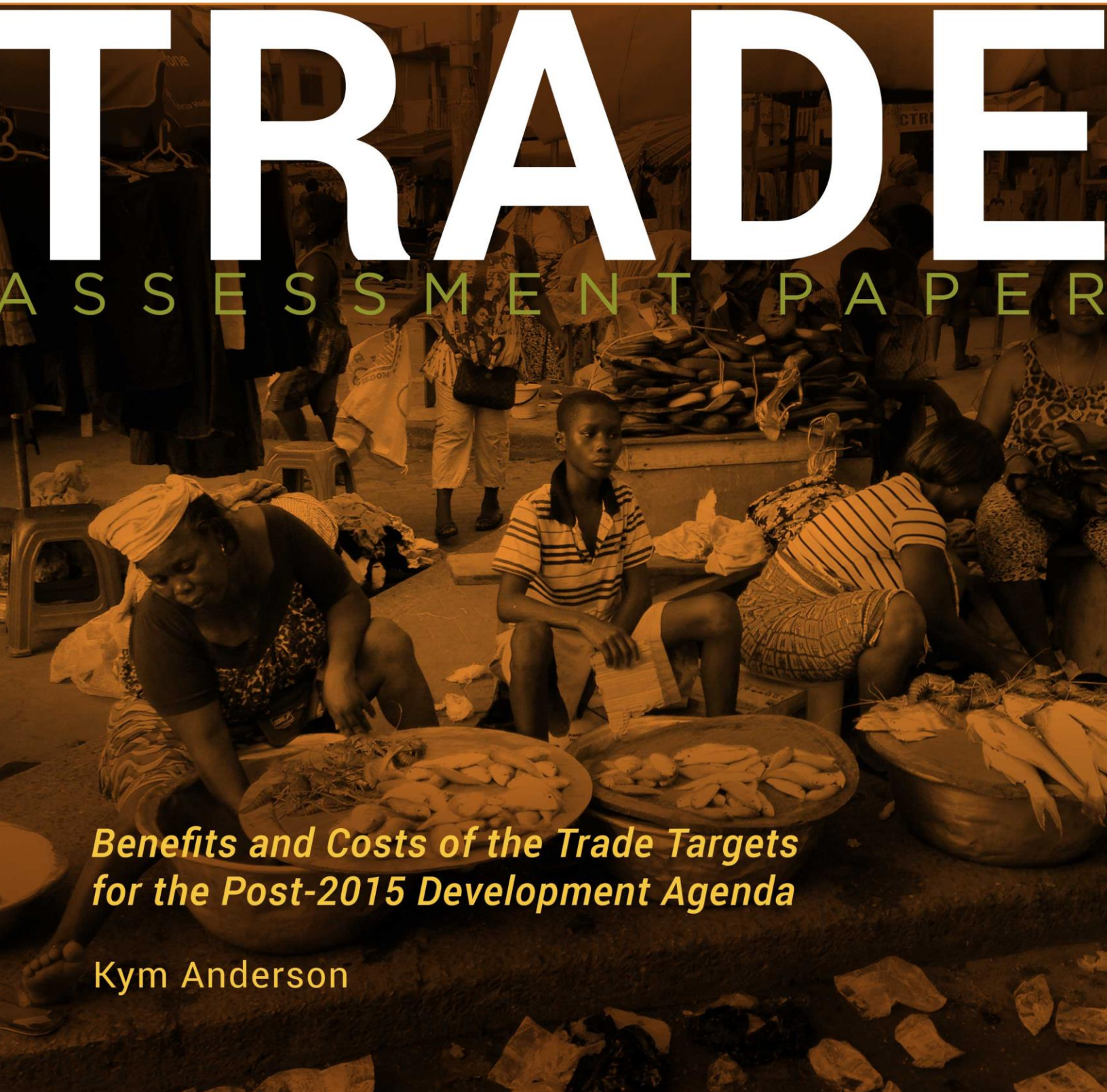

Benefits and Costs of the Trade Targets for the Post-2015 Development Agenda

Kym Anderson

POST-2015 CONSENSUS

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Kym Anderson
University of Adelaide
Australian National University

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Highlights

The goal with the highest benefit-cost ratio in the area of trade policy reform is:

"Complete the languishing Doha Development Agenda process at the World Trade Organization", which has a benefit cost ratio of ~1,300-2,800 for the world and ~2,100-4,700 for developing countries as a group.

Three other goals in this area which have valuable global benefit-cost ratios are:

"Implement a free trade agreement between member states of the free trade area of the Asia Pacific", which has a benefit cost ratio of ~1,100-2,400 for the world economy and ~1,600-3,500 for developing countries as a group;

"Implement a free trade agreement between selected APEC countries (known as the Trans-Pacific Partnership)", which has a benefit cost ratio of ~800-1,700 for the world economy and 1,800-3,300 for developing countries as a group;

"Implement a free trade agreement between ASEAN countries and China, Japan and South Korea (known as ASEAN+3)", which has a benefit cost ratio of ~1,200-2,600 for the world economy and ~2,200-4,700 for developing countries as a group.

Summary Table: Benefits and costs are net present values as of 2014 in real (2007) US$ T

Target	3% Discount			5% Discount		
	Benefit($T)	Cost($T)	B:C ratio	Benefit($T)	Cost($T)	B:C ratio
Target 1, to agree on the more-ambitious WTO's DDA proposal of 2008	$772	$0.28	2,769	$334	$0.27	1,252
Target 2, to form a Free Trade Area of the Asia-Pacific (FTAAP)	$518	$0.22	2,380	$224	$0.21	1,076
Target 3, to agree to a Trans-Pacific Partnership of 12 countries	$126	$0.07	1,693	$55	$0.07	765
Target 4, to form an ASEAN+3 trading group	$338	$0.13	2,631	$147	$0.12	1,196

Abstract

Several of the proposed targets for the UN's Post-2015 agenda focus on international trade policy measures. This paper reviews how costly and inequitable trade policies are, and examines possible goals the UN's Post-2015 agenda could target to reduce remaining distortions. The trade policy reform target that has the highest benefit-cost ratio, and highest aggregate net benefit, for both the world economy (B/C ratio of ~1,300-2,800) and for developing countries as a group (B/C ratio of ~2,100-4,700), is completing the languishing Doha Development Agenda (DDA) process at the World Trade Organization (WTO). Should that prove to be too politically difficult to achieve, there are three alternative ways of freeing up trade in the biggest part of the world economy not yet covered by a comprehensive regional integration agreement, namely the Asia-Pacific region. One is the Trans-Pacific Partnership (TPP), which would yield a B/C ratio of ~800-1,700 for the world economy and 1,800-3,300 for developing countries; but if that were to be expanded into a free trade area of the Asia-Pacific (FTAAP) those ratios would rise to ~1,100-2,400 for the world economy and ~1,600-3,500 for developing countries. While the latter ratios are only slightly below those for the WTO's DDA, the total net present value of benefits is higher with the DDA (up to $772 trillion in 2007 US dollars globally) than with a full FTAAP (up to $448 trillion globally). The FTAAP may be able to deliver a little more to the developing country group, but those benefits would be concentrated mostly in the relatively affluent developing countries of East Asia and may be – because of trade diversion – partly at the expense of poorer developing countries in South Asia and Sub-Saharan Africa. A third alternative is to form an ASEAN+3 trading group, the three additional countries being China, Japan and South Korea, which would yield a B/C ratio of ~1,200-2,600 for the world economy and ~2,200-4,700 for developing countries. An additional opportunity for the WTO is to bring disciplines to export restrictions to match those for import restrictions (for which a B/C ratio is not able to be estimated). Achieving these trade targets would also contribute to alleviating several of the other challenges identified by the UN's Post-2015 draft agenda, including alleviating poverty, promoting equality among nations, reducing malnutrition and hunger, and boosting employment and economic growth sustainably, particularly in rural areas.

Opportunities to Lower Trade Barriers

The primary goal of the United Nations' Post-2015 development agenda is almost certain to be poverty alleviation and possibly, as part of that, the elimination of extreme poverty globally. Three other key goals are likely to be to end hunger, to reduce income inequality within and between countries, and to strengthen global partnerships for sustainable development (United Nations 2014). Lowering trade barriers would contribute to all four of those goals. The purpose of this paper is to explain why that is so, to review estimates of the net benefits from possible initiatives in this area, and to estimate benefit/cost ratios from several currently available opportunities to contribute to the lowering of barriers to international trade.

More specifically, a strengthening global partnerships for sustainable development would result from promoting a more open, rules-based, non-discriminatory and equitable multilateral trading system by successfully completing the Doha Development Agenda (DDA) negotiations at the World Trade Organization (WTO) so as to improve market access for agricultural and industrial exports of developing countries, especially the least developed of them. While numerous barriers to international trade in goods, in some services, and in capital flows have been reduced considerably over the past three decades, many remain, as do many farm subsidies. Such policies harm most the economies imposing them, but the worst of the merchandise barriers (in agriculture and textiles) are particularly harmful to the world's poorest producers. Reforming those policies would thus alleviate poverty, reduce income inequality within and between nations, reduce malnutrition and hunger globally, and boost employment and economic growth sustainably, particularly in rural areas of developing countries where three-quarters of the world's poor reside (World Bank 2007).

This paper focuses first conceptually and then empirically on how costly are those anti-poor trade policies. It is within the power of national governments to lower their own barriers to trade unilaterally of course, but often that is difficult to achieve politically. Lowering them is politically easier when other countries do so at the same time, as with a multilateral or regional trade and integration agreement. For developing countries that is especially so if that agreement includes an aid-for-trade package.[1]

Among the possible strategies to reduce remaining price- and trade-distorting measures, five current opportunities stand out. The most beneficial involves multilaterally completing the stalled Doha Development Agenda (DDA) of the World Trade Organization (WTO). If that continues to prove to be too difficult politically to bring to a conclusion in the near

[1] A secondary goal that has been proposed for the Post-2015 agenda is to implement the principle of special and differential treatment for developing countries, and in particular least developed countries. This is commonly interpreted to mean developing countries need not commit in WTO agreements to as much policy reform as high-income countries. Yet developing and especially least developed countries would gain far more from their own policy reforms than from those of high-income countries, so allowing them to continue to deny themselves prospective gains from trade liberalization is not going to contribute to their economic growth.

future, three other opportunities considered here are prospective sub-global regional integration agreements. One involves the proposed Trans-Pacific Partnership (TPP) among a subset of member countries of the Asia Pacific Economic Cooperation (APEC) grouping; another involves extending the free-trade area among the 10-member Association of South East Asian Nations to include China, Japan and South Korea (ASEAN+3); and the third opportunity is to free up trade among all APEC countries (a free trade area of the Asia-Pacific, FTAAP).[2] One more potential opportunity not currently on the WTO's DDA, but worth adding, involves bringing disciplines to export restrictions to match those for import restrictions, especially for farm products.

True, these agreements do not directly involve the countries of South Asia or Sub-Saharan Africa where the majority of the world's poorest people reside. However, there are no current proposals to form major regional integration agreements in those two regions. Nonetheless, Africans and South Asians could benefit indirectly and substantially from new opportunities to trade with East Asia's booming economies that would result from greater integration of Asia-Pacific economies. Their indirect benefit would be greater, the more they unilaterally lower their own trade barriers. They could do so by liberalizing their border measures (import tariffs, export taxes, non-tariff barriers) but also by removing regulations or investing more in infrastructures that lower the costs of doing business across borders.

The paper begins by explaining why it continues to be a challenge for governments to reduce distortions to prices by reforming the world's trade policies. It then summarizes the arguments as to why removing them is a worthy goal for the post-2015 agenda. The various opportunities for reducing trade barriers and farm subsidies are then outlined, along with an explanation as to why the focus here is to be on the above-mentioned five. The core of the paper is in the next two sections, which review the estimated economic benefits and adjustment costs associated with taking up these opportunities. That provides the foundation to undertake the benefit/cost analysis so this set of opportunities can be ranked against other worthy goals in the post-2015 agenda. The paper concludes by suggesting that taking up these opportunities could generate social benefit/cost ratios that are additional to the direct economic ones quantified in this study.

Why Do Trade Barriers Persist?

Despite the net economic and social benefits of reducing most government subsidies[3] and barriers to international trade and investment, almost every national government intervenes in markets for goods, services, and capital in ways that distort international

[2] The twelve current countries in TPP negotiations are Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the United States and Vietnam. The 21 members of APEC include the TPP participants plus the other main ASEAN+3 economies plus Hong Kong, Papua New Guinea, Russia and Taiwan.

[3] Not all subsidies are welfare-reducing, and in some cases a subsidy-cum-tax will be the optimal government intervention to overcome a gap between private and social costs that cannot be bridged à la Coase (1960). Throughout this paper all references to 'cutting subsidies' refer to bringing them back to their optimal level (which will be zero in all but those relatively few exceptional cases).

commerce.[4] The policy instruments considered here will focus mainly on those trade-related ones over which a government's international trade negotiators have some influence both at home and abroad.[5] It should be kept in mind, though, that policies affecting the services sector can also add to the cost of doing business across borders (Francois and Hoekman 2010; Borchert, Gootiiz and Mattoo 2014).

This of course is not a new challenge. While the latter part of the nineteenth century saw a strong movement toward laissez faire in goods and financial capital and widespread international migration, that development was reversed following the First World War in ways that contributed to the Great Depression of the early 1930s and the conflict that followed (Kindleberger 1989). It was during World War II, in 1944, that a conference at Bretton Woods in New Hampshire proposed an International Trade Organization. An ITO charter was drawn up by 1947 along with a General Agreement on Tariffs and Trade (GATT), but the ITO idea died when the United States failed to progress it through Congress (Diebold 1952). Despite that, the GATT came into being from 1948. During its 47-year history (before it was absorbed into the WTO on 1 January 1995) it oversaw the gradual lowering of many tariffs on imports of most manufactured goods by governments of high-income countries. Manufacturing tariffs remained high in developing countries, however, and distortionary subsidies and trade policies affecting agricultural, textile, and services markets of both rich and poor countries, plus immigrations restrictions, continued to hamper efficient resource allocation, consumption choices, economic growth and poverty alleviation.

The GATT's Uruguay Round of multilateral trade negotiations led to agreements signed in 1994 that contributed to trade liberalization over the subsequent ten years. But even when those agreements were fully implemented by early 2005, and despite additional unilateral trade liberalizations since the 1980s by a number of countries (particularly developing and transition economies), many subsidies and trade restrictions remained. They include not just trade taxes-cum-subsidies but also contingent protection measures such as anti-dumping, regulatory standards that can be technical barriers to trade, and domestic producer subsidies (allegedly decoupled from production in the case of some farm support programs in high-income countries, but in fact only partially so). Furthermore, the on-going proliferation of preferential trading and bilateral or regional integration arrangements – for which there would be far less need in the absence of high barriers to trade – is adding complexity to international economic relations. In some cases those arrangements are leading to trade and investment diversion that, as shown below, may be welfare reducing for some excluded economies.

[4] Labor market interventions also are rife, including barriers to international migration. For estimates of the potential global economic benefits from reducing the latter, see Anderson and Winters (2009).

[5] That thereby excludes measures such as generic taxes on income, consumption and value added, government spending on mainstream public services, infrastructure and generic social safety nets in strong demand by the community, and subsidies (taxes) and related measures set optimally from the national viewpoint to overcome positive (negative) environmental or other externalities. Also excluded from consideration here are policies affecting markets for foreign exchange.

The reluctance to reduce trade distortions is almost never because such policy reform involves government treasury outlays. On the contrary, except in the case of a handful of low-income countries still heavily dependent on trade taxes for government revenue, such reform may well benefit the treasury (by raising income or consumption/value added tax revenues more than trade tax revenues fall). Rather, trade distortions (and barriers to immigration) remain largely because further liberalization would redistribute jobs, income and wealth in ways that those in government fear would reduce their chances of remaining in power (and, in countries where corruption is rife, possibly reduce their own wealth). The challenge involves finding politically attractive ways to phase out remaining distortions to world markets for goods and services.

Arguments for Lowering Trade Barriers

Even before examining the empirical estimates of the benefits and costs of grasping various trade-liberalizing opportunities, the case can be made that such reform in principle is beneficial economically.[6] We begin with the static economic gains from trade arguments and then consider additional dynamic gains.

Static Economic Gains from Own-Country Trade Reform

The standard comparative static analysis of national gains from international trade emphasizes the economic benefits from production specialization and exchange so as to exploit comparative advantage in situations where a nation's costs of production and/or preferences differ from those in the rest of the world. This is part of the more general theory of the welfare effects of distortions in a trading economy, as summarized by Bhagwati (1971) and Corden (1997). Domestic industries become more productive on average as those with a comparative advantage expand by drawing resources from those previously protected or subsidized industries that grow slower or contract following reform.

The gains from opening an economy are larger, the greater the variance of rates of protection among industries – especially within a sector, insofar as resources are more mobile within than between sectors (Lloyd 1974). Likewise, the more productive domestic firms within industries expand by drawing resources from less productive firms that contract or go out of business. Indeed theory and empirical studies suggest the shifting of resources within an industry may be more welfare-improving than shifts between industries.[7] Furthermore, if trade barriers are managed by inefficient institutions (such as distributors of import or export quota licences), gains from removal of such barriers will be larger than removal of standard trade taxes (Khandelwal, Schott and Wei 2013).

The static gains from trade tend to be greater as a share of national output the smaller the economy, particularly where economies of scale in production have not been fully exploited and where consumers (including firms importing intermediate inputs) value

[6] This survey does not pretend to provide a comprehensive coverage of the gains-from-trade theory. For more, readers are referred to the handbooks by Grossman and Rogoff (1995) and Harrigan and Choi (2003) and the textbook by Feenstra (2003).

[7] Melitz (2003) provides the theory behind this point, and many econometricians have since provided strong empirical support for that theory.

variety so that intra- as well as inter-industry trade can flourish. Less-than-full exploitation of scale economies is often the result of imperfect competition being allowed to prevail in the domestic marketplace, which again is more common in smaller and poorer economies where industries have commensurately smaller numbers of firms. This is especially the case in the service sector. One example is sub-sectors such as utilities, where governments have been inclined to sanction monopoly provision.[8] The gain comes from firms having to reduce their mark-ups in the face of greater competition.

Those gains from opening up will be even greater if accompanied by a freeing up of domestic markets and the market for currency exchange. The more stable is domestic macroeconomic policy, the more attractive will an economy be to capital inflows. And the more domestic microeconomic policies are friendly to markets and competition for goods, services and productive factors, the greater the likelihood that adjustments by firms and consumers to trade liberalization will lead to a more-efficient utilization of national resources, lower consumer prices (in most cases) and greater economic welfare (Corden 1997). If domestic policy reforms included improving the government's capacity to redistribute income and wealth more efficiently and in ways that better matched society's wishes, concerns about the distributional consequences of trade liberalization also would be lessened.

The past decade has seen vastly increased scope to separate in time and space the various productive tasks along each value chain, thanks to the information and communication technology revolution. Firms are thus increasingly able to take advantage of factor cost differences across countries for specific tasks without having to sacrifice gains from product specialization or move the whole of their production operation offshore (Hanson, Mataloni and Slaughter 2005). Trade in many tasks (e.g., emailing data files) is not even recorded in official trade statistics and so is not directly subject to trade policies. That suggests the variance of import protection across all traded items is even greater than across just recorded trade in goods, so the welfare gains from reducing the latter could well be greater than that captured by conventional trade models.

Dynamic Economic Gains from Own-Country Trade Reform

The standard comparative static analysis needs to be supplemented with links between trade and economic growth. The mechanisms by which openness contributes to growth are gradually getting to be better understood by economists, thanks to the pioneering work of such theorists as Grossman and Helpman (1991), Rivera-Batiz and Romer (1991) and the literature those studies spawned, including econometric papers based on firm-level databases. Channels through which openness to trade can affect an economy's growth rate include the scale of the market when knowledge is embodied in the products traded, the degree of redundant knowledge creation that is avoided through openness, and the effect of knowledge spillovers (Romer 1994, Taylor 1999, Acharya and Keller 2007). The latest surge of globalization has been spurred also by the technology 'lending' that is involved in

[8] The argument for allowing such monopolies is that they could provide greater technical efficiency via their larger scale. The contrary argument is that, being sheltered from competition, they fall so short of that potential as to be less productive than two or more smaller-scale competing suppliers.

off-shoring an ever-rising proportion of production processes. As Baldwin (2011) point out, this joining of a supply chain has made industrialization potentially far less complex and far faster – especially for countries with reliable workers, a hospitable business environment and located near large industrial countries such as China.

The dynamic gains from openness can be greater when accompanied by reductions in domestic distortions. As one example, Helpman and Itskhoki (2010) develop a two-country two-sector model of international trade in which one sector produces homogeneous products while the other, which produces differentiated products, has firm heterogeneity, monopolistic competition, search and matching in its labor market, and wage bargaining (so that some of the workers searching for jobs end up being unemployed). The two countries are similar except for frictions in their labor markets. They show that both countries gain from trade but that the country with lower labor market frictions gains proportionately more, and that its flexible labor market confers comparative advantage: the flexible country is a net exporter of differentiated products. Either country benefits by lowering frictions in its labor market, although that harms the other country; but a simultaneous proportional lowering of labor market frictions in both countries benefits both of them. With trade integration both countries benefit (even though it may raise their rates of unemployment), but the flexible country has higher total factor productivity in this model.

When that trade reform includes financial markets, more is gained than just a lower cost of credit. The resulting financial deepening can stimulate growth too (Townsend and Ueda 2010). Kose et al. (2009) add two other indirect growth-enhancing benefits of financial reform: they discipline firms to look after the interests of shareholders better, and they discipline governments to provide greater macroeconomic stability.

Importantly from a policy maker's viewpoint, the available empirical evidence strongly supports the view that open economies grow faster (see the surveys by USITC 1997, Winters 2004, Billmeier and Nannicini 2009 and Francois and Martin 2010). Notable early macroeconometric studies of the linkage between trade reform and the rate of economic growth include those by Sachs and Warner (1995) and Frankel and Romer (1999). More-recent studies also provide some indirect supportive econometric evidence. For example, freeing up the importation of intermediate and capital goods promotes investments that increase growth (Wacziarg 2001). Indeed, the higher the ratio of imported to domestically produced capital goods for a developing country, the faster it grows (Lee 1995; Mazumdar 2001). Greater openness to international financial markets also boosts growth via the stimulation to investment that more risk-sharing generates.

Rodrigeuz and Rodrik (2001) examine a number of such studies and claim the results they surveyed are not robust. However, in a more recent study that revisits the Sachs and Warner data and then provides new time-series evidence, Wacziarg and Welch (2008) show that dates of trade liberalization do characterize breaks in investment and GDP growth rates. Specifically, for the 1950-1998 period, countries that have liberalized their trade (defined as those raising their trade-to-GDP ratio by an average of 5 percentage

points) have enjoyed on average 1.5 percentage points higher GDP growth compared with their pre-reform rate.

There have also been myriad case studies of liberalization episodes. In a survey of 36 of them, Greenaway (1993) reminds us that many things in addition to trade policies were changing during the studied cases, so ascribing causality is not easy. That, together with some econometric studies that fail to find that positive link, led Freeman (2004) to suggest the promise of raising the rate of economic growth through trade reform has been overstated. But the same could be (and has been) said about the contributions to growth of such things as investments in education, health, agricultural research, and so on (Easterly 2001). A more-general and more-robust conclusion that Easterly draws from empirical evidence, though, is that people respond to incentives. Hence getting incentives right in product, input and factor markets is crucial – and removing unwarranted subsidies and trade barriers is an important part of that process. Additional evidence from 13 new case studies reported in Wacziarg and Welch (2008) adds further empirical support to that view, as does the fact that there are no examples of autarkic economies that have enjoyed sustained economic growth, in contrast to the many examples since the 1960s of reformed economies that boomed after opening up.

Specifically, economies that commit to less market intervention tend to attract more investment funds, ceteris paribus, which raise their stocks of capital (through greater aggregate global savings or at the expense of other economies' capital stocks). This is consistent with the findings by Faini (2004) that trade liberalization in the 1990s fostered inward foreign investment (and both had a positive impact on investment in education) while backtracking on trade reform had a negative impact on foreign investment. More-open economies also tend to be more innovative, because of greater trade in intellectual capital (a greater quantity and variety of information, ideas and technologies, sometimes but not only in the form of purchasable intellectual property associated with product and process innovations), and because greater competition spurs innovation (Aghion and Griffith 2005; Aghion and Howitt 2006), leading to higher rates of capital accumulation and productivity growth (Lumenga-Neso, Olarreaga and Schiff 2005).[9]

A growing body of industry studies, including ones based on firm-level survey data that capture the reality of firm heterogeneity, provides additional support for the theory that trade reform boosts the rate of productivity growth.[10] It appears more-productive firms are innately better at exporting, so opening an economy leads to their growth and the demise of the least-productive firms (Bernard et al. 2007). That leads to better exploitation of comparative advantage in terms not only of industries but also of firms within each industry. If those more-productive firms are also foreign owned, as is clearly the case in China (Whalley 2010), then being open to FDI multiplies the gains from product trade openness. And if those foreign firms are involved in retailing, and they enter a country with suppliers whose productivity is below best-practise, they can put pressure on those

[9] More open economies also tend to be less vulnerable to foreign shocks such as sudden stops in capital inflows, currency crashes and severe recessions (Frankel and Cavallo 2008).

[10] For an overview of this new theory, see Helpman, Marin and Verdier (2008).

suppliers to raise their productivity (and perhaps alert them as to ways to do that). Walmart's influence in Mexico provides one example of this force at work (Javorcik, Keller and Tybout 2008). Furthermore, if the foreign firms are supplying lower-cost services inputs into manufacturing, that can boost the productivity growth of local manufacturers using those service inputs, according to a recent study of the Czech Republic (Arnold, Javorcik and Mattoo 2011).[11]

It need not be just the most-productive firms that engage in exporting. For lower-productivity firms, incurring the fixed costs of investing in newly opened foreign markets may be justifiable if accompanied by the larger sales volumes that come with exporting. Lower foreign tariffs will induce these firms to simultaneously export and invest in productivity (while inducing higher-productivity firms to export without more investing, as in Melitz 2003, Melitz and Ottaviano 2008, and Melitz and Redding 2014). Lileeva and Trefler (2010) model this econometrically using a heterogeneous response model. Unique 'plant-specific' tariff cuts serve as their instrument for the decision of Canadian plants to start exporting to the United States. They find that those lower-productivity Canadian plants that were induced by the tariff cuts to start exporting increased their labor productivity, engaged in more product innovation, and had high adoption rates of advanced manufacturing technologies. These new exporters also increased their domestic (Canadian) market share at the expense of non-exporters, which suggests that the labor productivity gains reflect underlying gains in total factor productivity.

Liberalizing international financial flows also has been shown to have boosted economic growth, especially in the first wave of globalization up to 1913 (Schularick and Steger 2010, Bordo and Rousseau 2012). A study by Hoxha, Kalemli-Ozcan and Vollrath (2013) examines potential gains from financial integration and find that a move from autarky to full integration of financial markets globally could boost real consumption by 9 percent permanently in the median developing country, and up to 14 percent in the most capital-scarce countries.[12]

In short, international trade and investment liberalization can lead not just to a larger capital stock and a one-off increase in productivity but also to higher rates of capital accumulation and productivity growth in the reforming economy because of the way reform energizes entrepreneurs. For growth to be maximized and sustained, though, there is widespread agreement that governments also need to (a) have in place effective institutions to efficiently allocate and protect property rights, (b) allow domestic factor and product markets to function freely, and (c) maintain macroeconomic and political stability (Rodrik 2007; Wacziarg and Welch 2008; Baldwin 2004; Chang, Kaltani and Loayza 2005).

One paper that has brought these ideas together using a numerical open economy growth model is that by Rutherford and Tarr (2002). Their model allows for product variety, imperfect competition, economies of scale and international capital flows. It is dynamic, so

[11] For a survey of the growth effects of opening to trade in services, see Francois and Hoekman (2010).
[12] In a case study of Thailand, Townsend and Ueda (2010) estimate welfare gains from financial liberalization as high as 28 percent.

the model can trace out an adjustment path to trade reform; and it is stochastic in that it draws randomly from uniform probability distributions for eight key parameters of the model. They simulate a halving of the only policy intervention (a 20 percent tariff on imports) and, in doing so, fully replace the government's lost tariff revenue with a lump-sum tax. That modest trade reform produces a welfare increase (in terms of Hicksian equivalent variation) of 10.6 percent of the present value of consumption in their central model. Systematic sensitivity analysis with 34,000 simulations showed that there is virtually no chance of a welfare gain of less than 3 percent, and a 7 percent chance of a welfare gain larger than 18 percent of consumption. Several modeling variants and sensitivity analysis on all the key parameters found that the welfare estimates for the same 10 percentage point tariff cut ranged up to 37 percent when international capital flows are allowed, and down to 4.7 percent when using the most inefficient replacement tax (a tax of capital). The latter result shows that even the very inefficient tax on capital is superior to the tariff as a revenue raiser. Increasing the size of the tariff cuts results in roughly proportional increases in the estimated welfare gains. Large welfare gains in the model arise because the economy benefits from increased varieties of foreign goods, which dominate the decrease in varieties of domestic goods. In order to assess the importance of variety gains, they then assume that one of the two sectors is subject to constant returns to scale and perfect competition (CRS/PC) – and find in that case that the additional varieties do not increase total factor productivity. Instead, a small welfare gain of about 0.5 percent of the present value of consumption emerges, which is of the same order of magnitude as in the many comparative static CRS/PC computable general equilibrium studies. Their results also illustrate the importance of complementary reforms to fully realize the potential gains from trade reform. In particular, with the ability to access international capital markets the gains are roughly tripled; and use of inefficient replacement taxes significantly reduce the gains. These combined results underscore the point that complementary macroeconomic, regulatory, and financial market reforms to allow capital flows and efficient alternate tax collection are crucial to realizing the potentially large gains from trade liberalization.

Key Opportunities for Trade Barrier Reductions

Among the most-feasible opportunities available today for encouraging trade negotiations to stimulate significant market opening, the most obvious is a non-preferential, legally binding, partial liberalization of goods and services trade following the WTO's current round of multilateral trade negotiations, the Doha Development Agenda (DDA). That continues to prove to be difficult politically to bring to a conclusion, however, notwithstanding the progress made at the Bali Trade Ministerial in December 2013 (including on trade facilitation – see Neufeld 2014).[13]

Three other opportunities considered here involve prospective sub-global regional integration agreements. One is the proposed Trans-Pacific Partnership (TPP) among a subset of twelve member countries of the Asia Pacific Economic Cooperation (APEC) grouping; another involves extending the free-trade area among the ten-member Association of South East Asian Nations to include China, Japan and Korea (ASEAN+3); and

[13] If WTO member countries can agree to sign up to the proposed Trade Facilitation Agreement negotiated in Bail, the gains could be very considerable. See Moïsé and Sorescu (2013) and Zaki (2014).

the third opportunity is a free-trade area among all APEC countries.[14] Also considered below is a potential opportunity to include on the WTO's agenda, namely, bringing discipline to export restrictions to match those for import restrictions on farm products.

The TPP began in 2006 when just four small APEC members (Brunei, Chile, New Zealand and Singapore) got together to begin negotiations for greater economic integration. Being already open liberal economies, their leaders saw this not as an end in itself but rather as a pathway for a more-expansive club. In September 2008 the United States announced its interest in joining the TPP. By 2010 Australia, Malaysia, Peru and Vietnam also joined in, and since then Canada, japan and Mexico have joined the negotiations, to make a total of twelve of APEC's 21 members as of April 2014.

Meanwhile, discussions have been under way between the ten members of ASEAN, who already have their own free-trade agreement (AFTA), and their three big northern neighbours (China, Japan and Korea), with a view to forming a broader East Asian FTA that is generally referred to as ASEAN+3.

APEC leaders have endorsed both of those regional integration tracks and see them as potential pathways to an FTA involving all APEC members (APEC 2010). In what follows we therefore consider this more-encompassing prospect as the third regional opportunity.

While all these initiatives are in the Asia-Pacific region, their importance to other regions is very considerable and continues to rise along with this region's share of the global economy. According to the World Bank's International Comparison Project (http://icp.worldbank.org), at current exchange rates this region represented almost 60 percent of the global economy in 2011, compared with just 3 percent for each of South Asia, Western Asia, Africa, the Commonwealth of Independent States, and the rest of Latin America plus Caribbean.

The final opportunity considered below, bringing greater discipline to export restrictions, has become important as a result of policy responses to the three spikes in international food prices between 2008 and 2012. Some grain-exporting countries responded by restricting their exports, while some grain-importing countries lowered or suspended their import tariffs. Both groups' actions pushed international food prices higher still, but that meant each group tended to neutralize the other's attempt to prevent prices in their domestic market from rising. This exposed the asymmetry in WTO disciplines, which are much tougher on import measures than on those affecting exports. It also underlined the potential value in having food exporting members convert their export restrictions to trade taxes, bind them, and agree to phase them out.

[14] Whether such reciprocal preferential trade agreements are stepping stones or stumbling blocks to freer global trade is a much-debated point among economists. For a survey of the impact of regionalism on the multilateral trading system, see Baldwin (2009).

Estimates of Benefits from Reducing Trade Barriers

Empirical comparative static model simulation studies of the potential economic welfare gains from prospective multilateral or large regional trade liberalization agreements typically generate positive gains for the world and for most participating countries (as do econometric studies of past trade reforms). In this section we review the latest economy-wide analyses of those prospects.

All the estimates considered below of the costs of current policies and the potential economic welfare gains from these reform opportunities are generated using computable general equilibrium (CGE) models of the global economy. The CGE welfare gains refer to the equivalent variation in income (EV) as a result of each of the shocks described.[15] While not without their shortcomings (see Anderson 2003, Francois and Martin 2010 and the caveats below), CGE models are far superior for current purposes to partial equilibrium models, which fail to capture the economy-wide nature of the adjustments to reform whereby some sectors expand when others contract and release capital and labor. They are also superior to macroeconometric models which typically lack sufficient sectoral detail and are based on time series analysis of the past which may no longer be relevant for the near future (Francois and Reinert 1997). CGE models were first used in multilateral trade reform analysis in ex post assessments of the Tokyo Round of GATT negotiations in the late 1970s/early 1980s (Cline et al. 1978; Deardorff and Stern 1979, 1986; Whalley 1985). Since then they have been used increasingly during and following the Uruguay Round, as well as for ex ante assessments of the Doha Round, of bilateral and other preferential economic integration agreements, and of unilateral reforms such as when a country considers acceding to the WTO.

In the case of sub-global preferential trade reform studies, the estimated gains to the countries involved are almost always smaller, and some excluded countries – and even some participating ones – may lose. When increasing returns to scale and monopolistic competition (IRS/MC) are assumed instead of constant returns to scale and perfect competition (CRS/PC), and firms are assumed to be heterogeneous rather than homogeneous, and when trade is liberalized not just in goods but also in services and investment flows, the estimates of potential gains can increase several fold. Virtually all such studies are in comparative static mode however, and so are unable to capture the crucially important growth-enhancing dynamic effects of trade reform described in the previous section. It is therefore not surprising that they generate results for gains from trade reform that are typically only a small fraction of GDP.

Such low estimated gains seem to fly in the face of casual empiricism. Irwin (2002), for example, notes that three different countries in three different regions chose to liberalize in three different decades (Korea from 1965, Chile from 1974 and India from 1991 – see Irwin 2002, Figures 2.3 to 2.5), and per capita GDP growth in each of those countries accelerated markedly thereafter by several percentage points per year. Admittedly those historical

[15] EV is defined as the income that consumers would be willing to forego and still have the same level of well-being after as before the reform. For a discussion of the merits of EV versus other measures of change in economic welfare, see for example Just, Hueth and Schmitz (2004).

liberalization experiences involved also complementary reforms to other domestic policies and institutions that would have contributed significantly to the observed boosts in economic growth. Even so, they support the point made in the previous section that trade can generate not only static efficiency gains but also important dynamic gains.

Some CGE modellers have tried to proxy that dynamic effect by adding an additional one-off total factor productivity shock to their trade reform scenarios. But reform may also raise the rate of factor productivity growth and/or of capital accumulation. Such endogenous growth has yet to be satisfactorily introduced into CGE models, and in any case it is unclear how to interpret a model's estimated welfare effects if households are reducing current consumption in order to boost their or their descendants' future consumption by investing more.

With this as background, consider the estimated gross economic consequences of first Doha multilateral reform under the WTO and then each of the identified opportunities for preferential trade reforms in the Asia-Pacific region.

Economic Consequences of Doha Multilateral Reform

In a previous Copenhagen Consensus Project undertaken in 2008, hopes were still high that the Doha Round would be soon concluded, and numerous studies of the Round's possible economic effects were available. The one chosen for inclusion in the contribution to that project by Anderson and Winters (2009) was the modeling work of Anderson, Martin and van der Mensbrugghe (2006). That simulation exercise made use of the World Bank's Linkage Model of the global economy. With the stalling of the Round since 2008, there have been few new studies of its prospective effects. An important exception is a new pair of papers by Laborde, Martin and van der Mensbrugghe (2011, 2012) that not only analyses what is currently on the Doha negotiation table but also incorporates new and better ways of including estimates of the price distortions caused by trade and farm subsidy policies. It again uses the World Bank's Linkage model (version 7.1, see van der Mensbrugghe 2011), and again provides estimates of gains from partial global liberalization of all merchandise trade and subsidies, assuming constant returns to scale and perfect competition in all product and factor markets.[16]

Laborde, Martin and van der Mensbrugghe (2011) estimate that if the basic formula approach to reducing trade barriers and subsidies, as currently proposed, were to be adopted by all WTO member countries, then global GDP would be 0.36 percent higher. However, that study notes that there are many flexibilities in the current Doha proposals, especially for developing countries. It is not possible to be certain as to how various countries might make use of those flexibilities, but the authors draw on political economy reasoning to suggest likely take-up and then re-do their simulation. With that degree of flexibility the gains as a share of GDP drop to 0.22 percent globally, made up of 0.25 percent for high-income (including Europe's transition) economies and 0.17 percent for developing

[16] Laborde, Martin and van der Mensbrugghe (2011) provide three sets of results, but for simplicity here we include just the middle set ('sigma = 2') which they consider to be the most likely.

countries. This is considered here as the lower-bound estimate of the gains from this opportunity. Not all developing countries are estimated to gain though: GDP would drop 0.19 percent in Bangladesh and 0.10 percent in Sub-Saharan Africa. That loss is partly because of the erosion of tariff preferences which they currently enjoy at the expense of other developing countries, and partly because developing and especially least-developed countries are not required to open their own markets as much as more-advanced economies in the Doha proposals. However, they could avoid being worse off simply by opening their own markets more, if they so choose.

When economies of scale and monopolistic competition are assumed instead of constant returns to scale and perfect competition, and firms are assumed to be heterogeneous rather than homogeneous, and when trade is liberalized not just in goods but also in services and investment flows, the estimates of potential gains tend to be raised several fold. In their previous contribution to this project, Anderson and Winters (2009) reviewed past literature of modelling efforts that added such features and concluded that an upper-bound estimate of those gains could be five times the lower bound estimate. That would bring the gains as a share of GDP to 1.1 percent globally, made up of 1.25 percent for high-income countries and 0.85 percent for developing countries.

As for timing, again following Anderson and Winters (2009), it is assumed those gains would accrue fully after 2020, following a six-year phase-in period during which the gains will begin in 2015 at one-sixth the full amount as of 2025 and rise by a further one-sixth each year until 2020.

There are dynamic gains from trade to consider in addition to the above comparative static ones. The past experiences of successful reformers such as Korea, China, India and Chile suggest trade opening immediately boosts GDP growth rates by several percentage points per year for many years. An estimate might be that reform boosts GDP growth rates – projected from 2010 to 2025 by the Asian Development Bank (2011, p. 57) and Fouré, Bénassy-Quéré and Fontagné (2010) to be around 2.0 percent for high-income countries and 5.0 percent for developing countries and so 3.0 percent globally[17] – by 0.4 of a percentage point for high-income countries and 0.6 of a percentage point for developing countries, that is, to 2.4 and 5.6 percent, respectively, and hence from 3.0 to 3.6 percent globally through to 2025.[18] As for the period after 2025, a review of the literature by Winters (2004) suggests that while the growth increments due to trade liberalisation will not go on forever, they could last several decades. Thus we assume the incremental boost to GDP declines linearly from its 2025 value to the long run average growth rate by 2050,

[17] The growth rate of developing countries typically converges on that of high-income countries over time. Hence it is assumed in the baseline that the GDP of developing countries grows at a rate of 4.0 percent during 2025-2050 and at 3.0 percent during 2050-2100.

[18] Econometric support for the claim that this assumed increase in GDP growth rates is conservative is provided by Romalis (2007), who estimates that the elimination of just import tariffs, and only by high-income countries, would boost annual GDP growth in developing countries by up to 1.6 percentage points. In the model by Rutherford and Tarr (2002), their ten percentage point cut in tariffs led to a rise in the steady-state growth rate of 2 percent p.a. to 2.6 percent over the first decade and 2.2 percent over the first five decades (and even after fifty years their annual growth rate is 2.1 percent).

so there is just the continuing comparative static gain of 0.22 percent globally, 0.25 percent for high-income countries and 0.17 percent for developing countries from 2050 to 2100.

Economic Consequences of Preferential Reforms in the Asia-Pacific Region

The proposals and negotiations currently under way within the Asia-Pacific region that are considered here are a Trans-Pacific Partnership (TPP) among a subset of member countries of the Asia Pacific Economic Cooperation (APEC) grouping (namely Australia, Brunei, Chile, Malaysia, New Zealand Peru, Singapore and Vietnam); an extension of the free-trade area that is already in place among the 10-member Association of South East Asian Nations to include China, Japan and Korea (ASEAN+3); and a free-trade area among all the APEC countries. Each of these trade liberalization initiatives is assumed to be preferential, in the sense that trade is freed within the group but not between group members and the rest of the world.

Estimates of prospective gains from these three opportunities are provided by Petri, Plummer and Zhai (2012). They use the latest GTAP database (version 8.1, with a 2007 baseline, see Narayanan et al. 2012) but their CGE model of the global economy is, in several respects, more sophisticated than the one used in the above Doha analysis (see Zhai 2008). In particular, it is distinguished from the standard Linkage model in two important ways. First, it assumes economies of scale and monopolistic competition in the manufacturing and private services sectors instead of constant returns to scale and perfect competition. Second, following Melitz (2003), firms are assumed to be heterogeneous rather than homogeneous: each industry with monopolistic competition consists of a continuum of firms that are differentiated by the varieties of products they produce and their productivity. Furthermore, trade is liberalized by these authors not just by reducing applied bilateral tariffs on goods but also by raising utilization rates of tariff preferences, lowering non-tariff barriers to both goods and services, and reducing costs associated with meeting rules of origin (for details see the Appendixes in Petri, Plummer and Zhai 2012). Even so, the results summarized below can be considered conservative for reasons mentioned in the caveat section below.

With these model refinements, the estimated gains from preferential liberalization of trade within this region are non-trivial. This is in part because the Asia-Pacific region is projected to become a much more important part of the global economy by 2025. Specifically, the TPP12 countries are projected by Petri, Plummer and Zhai to account for one-quarter of the global economy, the ASEAN+3 economies for just over one-quarter, and the whole of APEC's 21 members for more than half of global GDP in 2025 (column 1 of Table 1).

Table 1: Comparative static effects on economic welfare of trade reform under three different prospective Asia-Pacific preferential free-trade agreements, 2025

(Annual difference from baseline, 2007 US dollars and percent)

	Baseline share of world GDP (%), 2025	US$ billion			Percent of GDP		
		TPP12	ASEAN+3	FTAAP	TPP12	ASEAN+3	FTAAP
TPP12 countries	26	112	26	172	0.42	0.11	0.73
ASEAN+3 countries	28	129	219	596	0.45	0.78	2.12
All 21 APEC countries	57	239	216	912	0.41	0.37	1.57
All non-APEC countries	43	-16	-1	-50	-0.00	-0.00	-0.11
WORLD	100	223	215	862	0.22	0.21	0.85

Source: Petri, Plummer and Zhai (2012, Table 7)

The Trans-Pacific Partnership, even if it involves just the current twelve members and excludes China and Korea, would get a 0.42 percent boost to their GDP if they removed their bilateral barriers to trade in goods and services; and it would boost global GDP by 0.22 percent (column 5 of Table 1). If instead the three large northeast Asian countries formed an FTA with the ASEAN members, global GDP growth would rise by a similar amount (0.21 percent). But if all 21 APEC members were to form a free-trade area (FTAAP), the global gains would be four times greater than either of those other two (0.85 percent). The corresponding gains for all developing countries would be 0.06 percent of GDP from TPP, 0.33 percent from ASEAN+3 and 1.17 percent from FTAAP, and for all high-income and transition countries the gains would be 0.36, 0.10 and 0.56 percent of GDP (Table 2). This progression in gains is due to several factors: greater trade complementarity as the mix of economies broadens, greater trade barriers (especially in agriculture) between the full set of APEC economies and the two smaller subsets prior to their removal, and greater scope for exploiting gains within the manufacturing sectors among the ASEAN+3 countries than among the TPP12 countries.

Table 2: Assumptions used in the benefit/cost calculus

Baseline GDP levels and assumed growth rates to 2100:

	Real GDP (US$ billion)		Real GDP growth rate, %/year		
	2010	2025	2010-2025	2025-2050	2050-2100
Developing countries	19,400	40,331	5.0	4.0	3.0
High-income countries	38,800	50,342	2.0	2.0	2.0
World	58,200	90,674	3.0	3.0	2.6

Higher growth rates in alternative policy reform scenarios, 2010-25:

	Doha 'Low'	Doha 'High'	TPP12	ASEAN+3	FTAAP
Developing countries	5.6	5.6	5.1	5.5	5.6
High-income countries	2.4	2.4	2.2	2.2	2.2
World	3.6	3.6	3.1	3.3	3.4

Additional comparative static gross benefit from reform (expressed as % of GDP for each year after 2020, and phased in linearly from 1/6th of that rate in 2015 and 1/6th more each year to 2020):

	Doha 'Low'	Doha 'High'	TPP12	ASEAN+3	FTAAP
Developing countries	0.17	0.85	0.06	0.33	1.17
High-income countries	0.25	1.25	0.36	0.10	0.56
World	0.22	1.10	0.22	0.21	0.85

Cost of reforms (US$ billion per year), for each year from 2015 to 2020 inclusive:

	Doha 'Low'	Doha 'High'	TPP12	ASEAN+3	FTAAP
Developing countries	7	17	4	13	24
High-income countries	13	33.5	10	10	15
World	20	50	14	23	39

A High-income includes Eastern European and former Soviet Union transition economies.
Source: See text

Two other points are worth noting. One is that non-APEC countries lose very little in aggregate, reflecting the fact that trade creation dominates trade diversion in these three cases. China would lose from being excluded from the TPP, however. The other point is that the estimated gain from full liberalization of trade among all APEC countries is higher than that estimated for the partial Doha multilateral reform summarized above. That would provide the wherewithal for those participating countries to share some if their gain with those poorer countries elsewhere that may lose from such regional trading arrangements.

To make the present value of estimated gains from these prospective preferential reforms comparable with the above estimates of gains from partial multilateral reform under the WTO's Doha agenda, it is assumed the gains would accrue fully after 2020, following a six-year phase-in period during which the gains begin in 2015 at one-sixth of the full amount as of 2025 and rise by a further one-sixth each year until 2020.

These regional results are from more-complete model simulations of proposed changes than was possible in the Doha analysis, but neither fully captures the dynamic gains from trade reform. Consistent with the Doha analysis, we assume that reform boosts the GDP growth rates of the participating APEC countries and their key trading partners by one-fifth between 2010 and 2025. For the period after 2025, we assume, again very conservatively, that the dynamic boost to GDP growth diminishes linearly after 2025 and disappears by 2050 so the benefits from reform return to just the comparative static gains for the latter half of the century.

Economic Consequences of not Insulating Domestic Markets from Price Volatility

When both food-exporting and food-importing countries alter their trade restrictions to reduce the extent to which a spike in international prices is transmitted to their domestic food markets, each has less impact domestically because of the other group's action. As well, the exporter group gains at the importer group's expense because each of their actions (increased export taxation and reduced import taxation) turn the terms of trade even more in favour of the exporter group. Whether there is a net gain or loss globally depends on whether total world trade expands or contracts. And whether the actions reduce or increase the number of people pushed into poverty also is an empirical question which needs to take account of the poverty effects not only in these responding countries but also in third countries (which face an even higher price spike as a result of the insulating behaviour of the other two country groups).

A recent study by Anderson and Nelgen (2012) found that both exporting and importing countries contributed substantially to the international food price spike of 2006-08. In that period international prices rose 113 percent for rice, 70 percent for wheat and 83 percent for maize. Using a simple model they estimated that the insulating actions of national governments were responsible for 0.4 of the price rise for rice, 0.2 for wheat and 0.1 for maize. A more-sophisticated study using the global economy wide GTAP model by Jensen

and Anderson (2014) came up with a smaller number for wheat (0.05) but very similar estimates for rice (0.36) and maize (0.09). It also found that, because exporters responded more than importers, global welfare fell slightly, but the more-dramatic effect was a large transfer of economic welfare from importing to exporting countries. And both studies found that – consistent with the above-summarized theory – domestic prices of those grains in developing countries rose almost as much as they would have if neither group had tried to insulate their domestic market.

Anderson, Ivanic and Martin (2014) take the analysis one step further and ask whether the insulating behaviour of national governments prevented more people from falling into poverty. They found that on its own, each government's action helped more than hindered nationally; but, when the international price consequences of those governments' combined actions are taken into account, the number of poor in the world is estimated to have risen slightly.

Together these results suggest that using trade policy to deal with a domestic social concern exacerbates price spikes and runs the risk of reducing global welfare and raising global poverty. Anderson and Nelgen (2012) also show that an equal and opposite outcome is possible when national governments respond in the opposite way to a slump in world prices – as they did in the mid-1980s, for example. A clear implication of this result is that what the G-33 group of developing countries are calling for as part of the WTO Doha Development Agenda's agricultural negotiations, namely a Special Safeguard Mechanism, is exactly the opposite of what the world needs (Hertel, Martin and Leister 2010, Thennakoon and Anderson 2014).

It is not possible to predict the frequency of future price spikes and slumps, so we cannot undertake the same type of benefit/cost analysis for an agreement to desist from insulating domestic markets as is done for the types of trade agreements discussed above.[19] Nonetheless, stronger disciplines on export as well as import measures at the WTO (e.g. tariffying and binding export measures) would reduce the tendency to insulate and would thus add to the gains from general trade reform.

Estimated Costs Associated With Trade Reform

The benefits from reform are not costless. Expenditure on negotiating, and on supporting policy think tanks and the like to develop and disseminate a convincing case for reform, would be needed. But more significant in many people's eyes are the private costs of adjustment for firms and workers, as reform forces some industries to downsize or close to allow others to expand (Matusz and Tarr 2000; Francois 2003). Those costs are ignored in the CGE models discussed above, where the aggregate level of employment is held constant. There are also social costs to consider. They include social safety net provisions in so far as such schemes are drawn on by losers from reform (e.g., unemployment payments plus training grants to build up new skills so displaced workers can earn the same wage as before).

[19] Even so, see Bouët and Laborde-Debucquet (2012) on the potential costs of export restrictions.

Those one-off costs, which need to be weighed against the non-stop flow of economic benefits from reform, tend to be smaller, the longer the phase-in period or smaller the tariff cut per year (Furusawa and Lai 1999). The adjustment required also tends to be small when compared with the changes due to exchange rate fluctuations, technological improvements, preference shifts and other economic shocks and structural developments associated with normal economic growth (Porto and Hoekman 2010). In recent debates about trade and labor, analysts have not found a significant link between import expansion and increased unemployment. One example is a study of the four largest EU economies' imports from East Asia (Bentivogli and Pagano 1999). Another is a study of the UK footwear industry which found liberalizing that market would incur unemployment costs only in the first year, because of the high job turnover in that industry, and they were less than 1.5 percent of the estimated benefits from cutting that protection (Winters and Takacs 1991). A similar-sized estimate is provided by de Melo and Tarr (1990) using a CGE model that focuses just on US textile, steel and auto protection cuts and drawing on estimates of the cost of earnings lost by displaced workers (later reported by Jacobson, LaLonde and Sullivan 1993). For developing countries also the evidence seems to suggest low costs of adjustment, not least because trade reform typically causes a growth spurt (Krueger 1983). In a study of 13 liberalization efforts for nine developing countries, Michaely, Papageorgiou and Choksi (1991) found only one example where employment was not higher within a year.[20]

If the adjustment costs are so small and may lead to more rather than less jobs even during the adjustment period, why are governments so reluctant to open their economies? The reason is because the anticipated losses in jobs and asset values are very obvious and concentrated whereas the gains in terms of new job and investment opportunities are

[20] A further impact of trade policy reform about which concern is often expressed is the loss of tariff revenue for the government. This is of trivial importance to developed and upper middle-income countries where trade taxes account for only 1 and 3 percent of government revenue, respectively. For lower middle-income countries that share is 9 percent, and it is more than 20 percent for more than a dozen low-income countries for which data are available, so how concerned should those poorer countries be? The answer depends on whether/how much that revenue would fall and, if it does fall, on whether/how much more costly would be the next best alternative means of raising government revenue. On the first of those two points, government revenue from import taxes will rise rather than fall with reform if the reform involves replacing, with less-prohibitive tariffs, any of import quotas or bans, or tariffs that are prohibitive (or nearly so) or which encourage smuggling or under-invoicing or corruption by customs officials. It is possible even in a tariff-only regime that lower tariffs lead to a sufficiently higher volume and value of trade that the aggregate tariff collection rises. Examples of trade policy reforms that led to increased tariff revenue are Chile and Mexico (Bacchetta and Jansen 2003, p. 15) and Kenya (Glenday 2002). See also Greenaway and Milner (1993) and Nash and Takacs (1998). Since the economy is enlarged by opening up, income and consumption tax collections will automatically rise too. On the second point, about the cost of raising government revenue by other means if tax revenue does fall, Corden (1997, Ch. 4) makes it clear that in all but the poorest of countries it will be more rather than less efficient to collect tax revenue in other ways. Even countries as poor as Cambodia have managed to introduce a value added tax. Hence from a global viewpoint there is no significant cost that needs to be included in response to this concern. Income and consumption tax revenue also will rise as the economy expands following reform. In any case CGE modellers typically alter those other tax rates when trade tax revenues change so as to keep the overall government budget unchanged.

thinly spread, are less-easily attributed to the trade reform, and are taken up often by people other than those losing from the reform. Moreover, there is considerable uncertainty as to who in fact will end up bearing the costs or reaping net benefits, leading all groups to be less enthusiastic about reform (Fernadez and Rodrik 1991). As discussed above, the few losers are prepared to support politicians who resist protection cuts, while the gains are sufficiently small per consumer and unassisted firm as to make it not worthwhile for those many potential gainers to get together to lobby for reform, particularly given their greater free-rider problem in acting collectively (Olsen 1965). Thus reform has political, and possibly employment, costs for politicians and one should not under-estimate the difficulties of political action to reduce/eliminate trade protection measures. We do not factor these into the economic cost/benefit analysis for society as a whole, however, because they are not of a comparable form. Nor do we count the transfers among people within each country as part of the gross benefits and costs of reform, since they are clearly transfers within rather than net costs or benefits to each national society. Rather, we implicitly assume society costlessly compensates the losers using the extra tax revenue from those whose incomes rise.

The existing estimates of the adjustment costs to trade reform are very small, but they are concentrated on particular individuals and so perhaps deserve a large weight socially. It is certainly possible that those estimates omit some elements too, such as the disutility of one-off uncertainty and disruption experienced by everyone in adjusting to policy changes. Hence, so as not to exaggerate the estimated net gains from trade reform, it is assumed here that there would be an adjustment period of six years following the beginning of liberalization (assumed to start in 2015), and that in each of those years the adjustment costs would be 10 percent of the estimated annual comparative static benefits as of 2025 (and zero thereafter) in the case of Doha 'low' and also in the cases of sub-regional FTA formation in the TPP12 and ASEAN+3 cases.[21] For the more-comprehensive Doha 'high' and the FTAAP cases, where benefits are far higher because reform is far more widespread, costs of adjustment are assumed to be 2.5 times greater than in the other cases (that is, 5% of the 2025 comparative static benefit).

Net Benefits and Benefit/Cost Ratios

The assumptions used to calculate the present (i.e. 2015) value of the net benefits in real (2007) US dollars, and the benefit/cost ratios associated with the policy reform opportunities described in the two previous sections, are summarized in Table 2. Those indicators are calculated using two alternative discount rates: 3 and 5 percent per year. In the Doha trade reform scenarios, the 'low' case refers to global comparative static gains of just 0.22 percent of GDP while the 'high' case refers global gains five times that lower benefit, to take into account the unmeasured gains due to such things as economies and scale, imperfect competition, and services and foreign investment reforms.

In present value terms the net benefit of a Doha agreement are shown in Table 3 to range from $291 trillion to $772 trillion. The costs are less than $300 billion in present value

[21] Except for developing countries in the case of the TPP12, where the aggregate adjustment cost is assumed to be one-fifth that in high-income countries.

terms: they are mostly private rather than government costs and are dwarfed by the gross benefits. Today's developing countries would reap around half of those net gains, as their share of the global economy is assumed to grow throughout this century (although at a progressively slower rate after 2025). Their benefit/cost ratios from the trade reform opportunity offered by the Doha round are between ~2,100 and 4,700 for developing countries, which means it is an extremely high payoff activity, if only the political will to bring about a successful conclusion to the Doha round can be found. The global benefit/cost ratios from Doha are lower but still impressive, at between 1,300 and 2,800

Table 3: Net present value of benefits and costs to 2100, and benefit/cost ratios, from reducing trade barriers and farm subsidies globally under the WTO's Doha Development Agenda

Benefit/cost ratio

	3% discount rate		5% discount rate	
	Low	High	Low	High
World	6011	2769	2730	1252
Developing countries	10093	4721	4606	2130

Net present value in 2015 of benefits and costs (in 2007 US TRILLION dollars)

	3% discount rate						5% discount rate					
	Low			High			Low			High		
	Gross Benefit	Cost	Net Benefit	Gross Benefit	Cost	Net Benefit	Gross Benefit	Cost	Net Benefit	Gross Benefit	Cost	Net Benefit
World	671	0.1	671	772	0.3	772	291	0.1	291	334	0.3	333
Developing countries	394	0.04	394	448	0.1	448	172	0.04	172	193	0.1	193

Source: Author's calculations based on Table 2 and assumptions in text

If for political reasons the Doha round cannot be brought to a successful conclusion with all the flexibilities demanded by developing countries and assumed in the above calculus, governments still have the opportunity to form preferential trade agreements. Of the three possibilities being discussed among countries in the Asia-Pacific region, Table 4 shows that the greatest estimated gain would come if all APEC member countries agreed to form a region-wide free-trade area (FTAAP). That is assumed to involve completely freeing all trade, albeit preferentially within the Asia-Pacific region (including Russia and China), in contrast to a Doha agreement which would only partially open up trade, albeit non-preferentially so that all engaged trading partners are involved. Since the APEC members are projected to comprise nearly three-fifths of global GDP by 2025 (see Table 1), it is not surprising that an FTA among them could yield a benefit to the world that is three-quarters of what Doha is projected to deliver. Furthermore, the FTAAP is projected to deliver a slightly greater benefit to developing countries as a group than is Doha. This is partly because under Doha developing countries are assumed to reform less than high-income countries, and partly because by 2025 the APEC grouping will account for around two-thirds of the GDP of all developing countries.

Table 4: Net present value of benefits and costs to 2100, and benefit/cost ratios, from reducing trade barriers and subsidies under three alternative Asia-Pacific regional trade agreements

Benefit/cost ratio

	3% discount rate			5% discount rate		
	TPP12	ASEAN+3	FTAAP	TPP12	ASEAN+3	FTAAP
World	1693	2631	2380	765	1196	1076
Developing countries	3308	4712	3532	431	2163	1586

Net present value in 2015 of benefits and costs, 3% discount rate (in 2007 US trillion dollars)

	TPP12			ASEAN+3			FTAAP		
	Gross Benefit	Cost	Net Benefit	Gross Benefit	Cost	Net Benefit	Gross Benefit	Cost	Net Benefit
able	126	0.07	126	338	0.1	338	518	0.2	518
Developing countries	74	0.02	74	342	0.1	342	473	0.1	473

Net present value in 2015 of benefits and costs, 5% discount rate (in 2007 US trillion dollars)

	TPP12			ASEAN+3			FTAAP		
	Gross Benefit	Cost	Net Benefit	Gross Benefit	Cost	Net Benefit	Gross Benefit	Cost	Net Benefit
World	55	0.1	55	147	0.1	146	224	0.2	223
Developing countries	39	0.1	39	150	0.1	150	203	0.1	203

Source: Source: Author's calculations based on Table 2 and assumptions in text

The two other opportunities analysed involve sub-regional FTAs in the Asia-Pacific region, and so necessarily yield smaller benefits than an FTA for the entire APEC region: fewer countries are liberalizing, and only for their trade with a subset of APEC members. Of those two, the ASEAN+3 proposal would yield slightly more global and developing country benefits than the Trans-Pacific Partnership between the US and a number of small APEC economies, even though the latter's global benefit/cost ratios are slightly higher (Table 4).

Social and Environmental Benefits and Costs of Trade Reforms

Because trade reform generates large and on-going economic gains while incurring comparatively minor one-off adjustment costs, it would allow individuals and governments the freedom to spend more on other pressing problems, thereby indirectly contributing to society's other post-2015 agenda targets.[22] But in addition, trade reform would also directly to some of those goals. This section first focuses on the impact of trade reform on poverty alleviation, since that is the solution to many of the world's problems. It then turns to trade reform's impact on the environment and on malnutrition and hunger.[23]

Poverty Alleviation

Evidence presented by Dollar and Kraay (2002), Sala-i-Martin (2006), Dollar, Kleineberg and Kraay (2014) and others carefully surveyed in Ravallion (2006), suggests aggregate economic growth differences have been largely responsible for the differences in poverty alleviation across regions. Initiatives that boost economic growth are therefore likely to be helpful in the fight against poverty, and trade liberalization is such an initiative. But cuts to trade barriers also alter relative product prices domestically and in international markets, which in turn affect factor prices. Hence the net effect on poverty depends also on the way those price changes affect poor households' expenditure and their earnings net of remittances. If the consumer and producer price changes (whether due to own-country reforms and/or those of other countries) are pro-poor, then they will tend to reinforce any positive growth effects of trade reform on the poor.

The effects of trade reform on global poverty can be thought of at two levels: on the income gap between developed and developing countries, and on poor households within developing countries. On the first, CGE estimates such as by Anderson, Martin and van der Mensbrugghe (2006) and Valenzuela, van der Mensbrugghe and Anderson (2009) suggest that current developing countries, which produce just one-fifth of global GDP, would enjoy nearly half of the net present value of the global static plus dynamic gains from reducing

[22] On the intrinsic benefits of freedom of opportunity and action that freer markets provide people, apart from their positive impact in boosting income and wealth, see Sen (1999). A recent examination of the evidence from globalization suggests that indeed the benefits of greater openness do spread well beyond just narrow economic ones (Potrafke 2014).

[23] The economic and social impacts of freeing up international migration are not discussed here, but they were explicitly included in the predecessor to the present project, where they are shown to be potentially enormous in aggregate (Anderson and Winters 2009). Not every small developing country will have less poverty if migration is freed up, because it will depend on the skill mix of the migrants and the extent of remittances they send back, among other things; but in most cases the evidence on international migration's impact on poverty is overwhelmingly positive (World Bank 2006, Ch. 3).

trade barriers. Clearly that will lower substantially the income gap between developed and poorer countries on average.

How poor households within developing countries are affected is more difficult to say (Winters 2002, Winters and Martuscelli 2014). We know that agricultural policies of developed countries could provide a major source of developing country gains from reform, and lowering barriers to textiles and clothing trade also is important. Both would boost the demand for unskilled labor and for farm products produced in poor countries. Since two-thirds of the world's poor live in rural areas and, in least-developed countries, the proportion is as high as 90 percent (OECD 2003a, p. 3), and since many poor rural households are net sellers of farm labor and/or food, one would expect such reforms to reduce the number in absolute poverty. A set of analyses reported in Anderson, Cockburn and Martin (2011), in which global and national CGE model results are carefully combined with household income and expenditure survey data for nearly a dozen developing countries,[24] tests this hypothesis. It finds strong support for it in most of the country case studies considered. If full global trade reform were to be undertaken, The Linkage Model results in that study concludes that it would reduce by at least 26 million the number of people in extreme poverty, and 87 million would be alleviated from $2/day poverty, while the GTAP Model results (scaled up from a sample of 15 representative developing countries) suggests the number in extreme poverty would fall by 70 million (Anderson, Cockburn and Martin 2011, Table 4).

Those estimates are only from comparative static models of just goods trade reform, and so are under-estimates because they do not include services trade and investment liberalization nor the poverty-reducing dynamic growth effects of such reforms. In the Appendix to this paper we undertake a crude estimate of how many people might be pulled out of poverty under the Doha High scenario when both the comparative static and dynamic growth effects are included. While based on crude assumptions, that calculation suggests that by 2030 the number of poor could be reduced by one-quarter or around 160 million people if an ambitious outcome were to emerge from the WTO's Doha Development Agenda. The reduction would be about somewhat less under the Doha Low scenario. If liberalization was confined just to the Asia-Pacific region, which now has only a minority of the world's poor, the impact on global poverty would be considerably smaller.

The Environment

The effects of trade reform on the environment have been the focus of much theoretical and empirical analysis since the 1970s (Beghin et al. 2002; Copland and Taylor 2003). Until recently environmentalists have tended to focus mainly on the direct environmental costs they perceive from trade reform, just as they have with other areas of economic change.[25] That approach does not acknowledge areas where the environment might have been improved, albeit indirectly, as a result of trade reform (e.g., from less production by pollutive industries that were previously protected). Nor does it weigh the costs of any net

[24] For more on this methodology, see Hertel et al. (2011).
[25] See the critique by Lomborg (2001).

worsening of the environment against the economic benefits of policy reform of the sort described above.

The reality is that while the environmental effects of reform will differ across sectors and regions of the world, some positive and some negative, there are many examples where cuts to subsidies and trade barriers would reduce environmental damage (Anderson 1992; Irwin 2002, pp. 48-54). For some time the OECD has been encouraging analysis of these opportunities (OECD 1996, 1997, 1998, 2003b). Environmental NGOs are increasingly recognising them too. They and many development NGOs seem to be coming to the view that the net social and environmental benefits from reducing subsidies and at least some trade barriers may indeed be positive rather than negative, and that the best hope of reducing environmentally harmful subsidies and trade barriers is via the WTO's multi-issue, multilateral trade negotiations process (see, e.g., Cameron 2007; de Melo and Mathys 2012).

If there remains a concern that the net effect of trade reform on the environment may be negative nationally or globally, that should be a stimulus to check whether first-best environmental policy measures are in place and set at the optimal level of intervention, rather than a reason for not reducing trade distortions. This is because if they are so set, we would then know that the direct economic gains from opening to trade would exceed society's evaluation of any extra environmental damage, other things equal (Corden 1997, Ch. 13).

Much environmental damage in developing countries is a direct consequence of poverty (e.g., the slash-and-burn shifting agriculture of landless unemployed squatters). In so far as trade reform reduces poverty, so it will reduce such damage. More generally, the relationships between per capita income and a wide range of environmental indicators have been studied extensively. Because richer people have a greater demand for a clean environment, income rises tend to be associated with better environmental outcomes once incomes rise above certain levels.[26] Even though more pollutive products are being consumed as incomes rise, many abatement practices have been spreading fast enough to more than compensate. And openness to trade accelerates that spread of abatement ideas and technologies, making their implementation in developing countries affordable at ever-earlier stages of development.

Estimating the global cost to society of all environmental damage that might accompany a reduction in trade barriers, net of all environmental gains, is extraordinarily difficult both conceptually and empirically.[27] In the absence of any sufficiently comprehensive estimates it is safest to assume that the net effect of reform on the environment would be zero.

[26] This is the theme of the book by Hollander (2003). For statistical evidence of the extent to which different environmental indicators first worsen and then improve as incomes rise (sometimes called the environmental Kuznets curve), see the special issue of the journal *Environment and Development Economics*, Volume 2, Issue 4 in 1997 and the more-recent papers by and cited in Harbaugh, Levinson and Wilson (2002), Cole (2003), Johansson and Kristrom (2007) and Vollebergh, Melenberg and Dijkgraaf (2009).

[27] A beginning nonetheless has been made, with several governments funding ex ante evaluations of the WTO Doha round's potential impact on the environment. The EU's efforts include a workshop on methodological

When the environmental impact is global rather than local, as with greenhouse gases and their apparent impact on climate change, international environmental agreements may be required (see Cline 2004; Yohe et al. 2009; de Melo and Mathys 2012). When developing countries are not party to such agreements, however, it is difficult to prevent 'leakage' through a re-location of carbon-intensive activities to those non-signatories. An alternative or supplementary approach that is likely to achieve at least some emission reductions, and at the same time generate national and global economic benefits rather than costs, involves lowering coal subsidies and trade barriers. Past policies encouraged excessive production of coal in a number of industrial countries and excessive coal and petroleum product consumption in numerous developing countries including transition economies. Phasing out those distortionary policies has both improved the economy and lowered greenhouse gas emissions globally, which is a 'no regrets' outcome or win-win Pareto improvement for the economy and the environment (Anderson and McKibbin 2000).

Malnutrition and Hunger

Food security is always a great concern in poor countries, especially those dependent on food imports where there are fears that reducing agricultural subsidies and protectionism globally will raise the price of those imports. But food security is defined as always having access to the minimum supply of basic food necessary for survival, so enhancing food security is mainly about alleviating poverty. That suggests this issue needs to be considered from a household rather than national perspective. And the discussion above argues that poverty is more likely than not to be alleviated by cuts to trade barriers.

Hunger and under-nutrition can be eased by trade not only in goods but also in agricultural technologies, in particular newly bred varieties of staple crops. The introduction of high-yielding dwarf wheat and rice varieties during the Green Revolution that began in Asia in the 1960s is a previous case in point, whereby producers and consumers shared the benefits in terms of higher farm profits and lower consumer prices for cereals.

A prospective case in point is the possibility of breeding crop varieties that are not only less-costly to grow but are 'nutriceuticals' in the sense they contain vitamin and mineral supplements. The most promising is so-called 'golden rice'. Consumers in many of poor countries suffer from chronic vitamin A deficiency that can lead to blindness, weakened immune systems, and increased morbidity and mortality for children and pregnant and lactating women. Golden rice has been genetically engineered to contain a higher level of beta-carotene in the endosperm of the grain and thereby provide a vitamin A supplement. By being cheaper and/or more nutritionally beneficial, it would improve the health of poor people and thereby also boost their labor productivity. Anderson, Jackson and Nielsen (2005) estimate that the latter economic benefit from this new technology could be as much as ten times greater than just the traditional benefits of lower production costs – not

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issues which are laid out in CEPII (2003), and further work has been contracted to the University of Manchester whose progress can be traced at http://idpm.man.ac.uk/sia-trade/Consultation.htm. Ex post analyses are also being undertaken by NGOs. See, for example, Bermudez (2004) for WWF's sustainability impact assessment of trade policies during 2001-03.

to mention that poor people would live longer and healthier lives. This new technology has yet to be adopted, however, because the European Union and some other countries will not import food from countries that may contain genetically modified organisms (GMOs) – even though there is no evidence that GM foods are a danger to human health (see, e.g., King 2003; EASAE 2013). The cost of that trade barrier to developing countries – which is not included in the above estimates– has been very considerable (Anderson 2010).

Caveats

Measuring both the benefits and the costs of liberalizing trade is still an inexact science, despite the huge amount of progress that has been made over the past two decades in global CGE modelling.[28] We have tried to accommodate shortcomings by providing a range of estimates and by erring on the conservative side in the above analysis. Nonetheless it is worth reviewing the key areas where analytical improvements are still needed. On the cost side, more empirical research on the real costs of adjustments to trade policy changes, and how they are spread over time for different groups, would be helpful. Those costs may in fact be only a small fraction of that assumed in the above benefit/cost calculus, in which case those ratios may be underestimated by several orders of magnitude. On the benefit side, economists have made more progress but plenty of scope remains for further improvements, particularly on the size and longevity of dynamic gains from trade reform. Key areas, discussed in turn below, are the assumed policy counterfactual and measurement of distortions in markets for service products.

The standard approach used in evaluating the consequences of international trade agreements is to compare the agreed tariff binding with the previously applied tariff rate, and to treat the post-agreement tariff rate as the lesser of the two rates. This essentially involves treating the current applied rate as a deterministic forecast of future protection rates in the absence of the agreement.

There are two potentially serious problems with this specification of the counterfactual. One is that the trend rate of protection responds systematically to underlying determinants that evolve over time. The second is that annual protection rates fluctuate substantially around that trend. Taking account of either or both of these counterfactuals can have large impacts on the estimated benefits of international trade liberalization agreements.

Anderson and Hayami (1986) and Lindert (1991) provide insights into the likely evolution of agricultural trade policies in the absence of international agreements. Key findings include a strong tendency for agricultural protection to rise with economic development because of fundamental changes in the structure of the economy. In particular, there is a tendency for agricultural protection to be low or negative in very poor countries because the number of farmers is large and it is difficult for them to organize to apply pressure on governments. Because farmers are mainly subsisting at that stage, their real incomes are not greatly affected by increases in farm output prices. By contrast, the urban population in a poor country is far smaller and easier to organize, and food is an important part of

[28] Parts of this section draw on the survey by Francois and Martin (2010).

consumer budgets. As economies develop, however, all of these economic factors change in ways that shift the political-economy balance more towards agricultural protection. Farmers become fewer in number and find it easier to organize themselves. They also become more commercial in orientation, so that their real incomes are more strongly influenced by agricultural output prices. At the same time, the urban population becomes larger and hence harder to organize, and the importance of food in consumer budgets and hence in real wage determinations declines. The end result can be a very rapid increase in agricultural protection rates in high-growth economies – as is already showing up in Asia's three largest economies (see Anderson 2014). Without the new discipline of the Uruguay Round's Agreement on Agriculture, agricultural protection rates in Europe and Northeast Asia may well have kept rising over the past 15 years, and may continue to rise in fast-growing middle-income countries whose tariff and subsidy bindings in WTO are still well above applied rates (Anderson and Nelgen 2011).

Also striking is the large variation in national rates of agricultural protection over time. This is because trade and subsidy policies are frequently used also to stabilize domestic agricultural prices in the face of variations in world prices (Tyers and Anderson 1992; Anderson and Nelgen 2012). The value of legal bindings on those policies via trade agreements, even when the bindings are well above applied rates at the time of the agreement, is non-trivial and yet is not captured in most models because those models are not stochastic. As Francois and Martin (2004) show, even bindings that are set well above average rates of protection may greatly diminish the costs of protection when international prices peak. They estimate, for example, that the European tariff binding on wheat, at 82 percent, reduced the cost of protection to this commodity by almost a third, despite being substantially above the average rate of protection prevailing during the preceding 15 years for which data were available. This is another reason why current CGE models are understating the gains from reducing tariff and subsidy bindings, particularly for farm products.

As for services, new estimates of the extent to which policies inhibit their efficient provision (see Francois and Hoekman 2010; Borchert et al. 2014) suggest reforms to those policies, particularly in developing countries, could generate far greater benefits than previous estimates have suggested. Moreover, those potential benefits are multiplying as the importance of global value chains grows with the fragmentation of production into ever-more footloose processes. This is yet another reason to expect the above estimates of net benefits and associated benefit/cost ratios from reform of trade-related policies to be very much on the low side.

Conclusion

The theory and available evidence surveyed above show that trade-restricting policies are very wasteful. Pre-announced, gradual reductions in trade barriers, especially if agreed multilaterally under the WTO's DDA, would yield huge economic benefits and relatively little economic cost, and hence extremely high benefit/cost ratios (up to 2,800 globally and between ~2,100 and 4,700 for the developing country group). Moreover, the net social and environmental effects of such reform also would be very positive, assisting in the

achievement of several of the other targets in the UN's Post-2015 agenda including alleviating poverty, promoting equality among nations, reducing malnutrition and hunger, and boosting employment and economic growth sustainably, particularly in rural areas. A successful DDA outcome would also make it less pressing to lower immigration barriers insofar as trade in products is a substitute for international labor movements. Cuts in trade barriers also would provide a means for citizens to spend more on other pressing problems (because under freer trade the world's resources would be allocated more efficiently), thereby indirectly contributing to opportunities to alleviate other challenges facing the world.

Should a successful conclusion to the WTO's DDA prove to be elusive, freeing up trade in the biggest part of the world economy not yet covered by a comprehensive regional integration agreement, namely the Asia-Pacific region, provides the next-best targets for the trade part of the post-2015 agenda. The Trans-Pacific Partnership (TPP) would yield a B/C ratio of ~800-1,700 for the world economy and 1,800-3,300 for developing countries; but if that were to be expanded into a free trade area of the Asia-Pacific (FTAAP) those ratios would rise to ~1,100-2,400 for the world economy and ~1,600-3,500 for developing countries. While the latter ratios are only slightly below those for the WTO's DDA, the total net present value of benefits is higher with the DDA (up to $772 trillion in 2007 US dollars globally) than with a full FTAAP (up to $448 trillion globally). The FTAAP may be able to deliver a little more to the developing country group, but those benefits would be concentrated mostly in the relatively affluent developing countries of East Asia and may be – because of trade diversion – at the expense of some poorer developing countries in South Asia and Sub-Saharan Africa. That outcome could be avoided though if the more affluent countries that benefit from participating in these regional arrangements were to share some of their gain with any poorer countries elsewhere that lose, so as to ensure no country is worse off. Aid-for-trade initiatives are being designed to contribute to that outcome, and would do so even more effectively if the countries of South Asia or Africa were to liberalize their own trade unilaterally. Those regions may of course also form or strengthen their own regional free trade or customs union arrangements.

Finally, it is important to recognize the great progress that has been made – thanks to the information and communication technology revolution – in lowering hugely the cost of providing conditional cash transfers to targeted groups in developing countries. This revolution is making it more and more feasible for governments to provide social protection to any losers from any policy reforms who might otherwise fall into poverty (World Bank 2014). More than that, such social protection can even contribute to economic growth, thereby potentially also pulling more people out of poverty (Alderman and Yemtsov 2014). To the extent that the more-widespread scope for providing social protection lowers the political resistance to trade policy reforms, there may be room for more optimism in the future than there has been in the past about prospects for both unilateral and plurilateral trade liberalization.

Appendix: Estimates of Poverty Effects of Trade Reform

By how much might the static and dynamic growth effects of the High Doha scenario reduce global poverty by 2030? To obtain an order-of-magnitude estimate of individuals living on less than $1.25 measured in 2005 PPP$, we make use of the global income distribution estimated by Lakner and Milanovic (2013) from 1988 and in 5-year increments to 2008. They also estimate the growth rate for the twenty ventiles (plus the top 1%) for the four 5-year intervals and the entire 20-year period 1988-2008. Their global poverty estimate from the 1988-distribution is 1,885 million, which is very close to the World Bank (2012) estimate of 1,814 million.

Using the growth estimates 1988-2008 for the 20 ventiles and the top 1%, and assuming stochastically distributed increases for individuals, produces a density distribution of global incomes for 2008 that is roughly comparable to the actual 2008 distribution. The actual 2008 distribution (Lakner and Milanovic 2013) shows 1,343 million poor, which again is very close to the World Bank estimate of 1,289 million.

Using the global 2008 income distribution, we assume the income growth rates are the same for all income groups across every year to 2030, in both the baseline scenario and the High Doha reform scenario. Population estimates for 2010 and 2030, taken from the UN medium variant in the 2012 update (UNDESA 2013, p. 3), are used to estimate the two scenarios' per capita GDP growth rates across 2010-2030 (2.0% baseline and 2.5% under High Doha). Those assumptions give rise to the income distributions in Figure A1. They indicate that poverty will drop from 1,343 million in 2008 to 714 million in 2030 with no change in trade policies, and to 569 million under the High Doha trade round allowing for both static and dynamic growth impacts of that partial trade liberalization. That is, the Doha High scenario could reduce poverty by 145 million according to this crude estimate. These estimates are entirely within the envelope of the recent survey of estimates of poverty to 2030 by Chandy, Ledlie and Penciakova (2013), as indicated in Figure A2

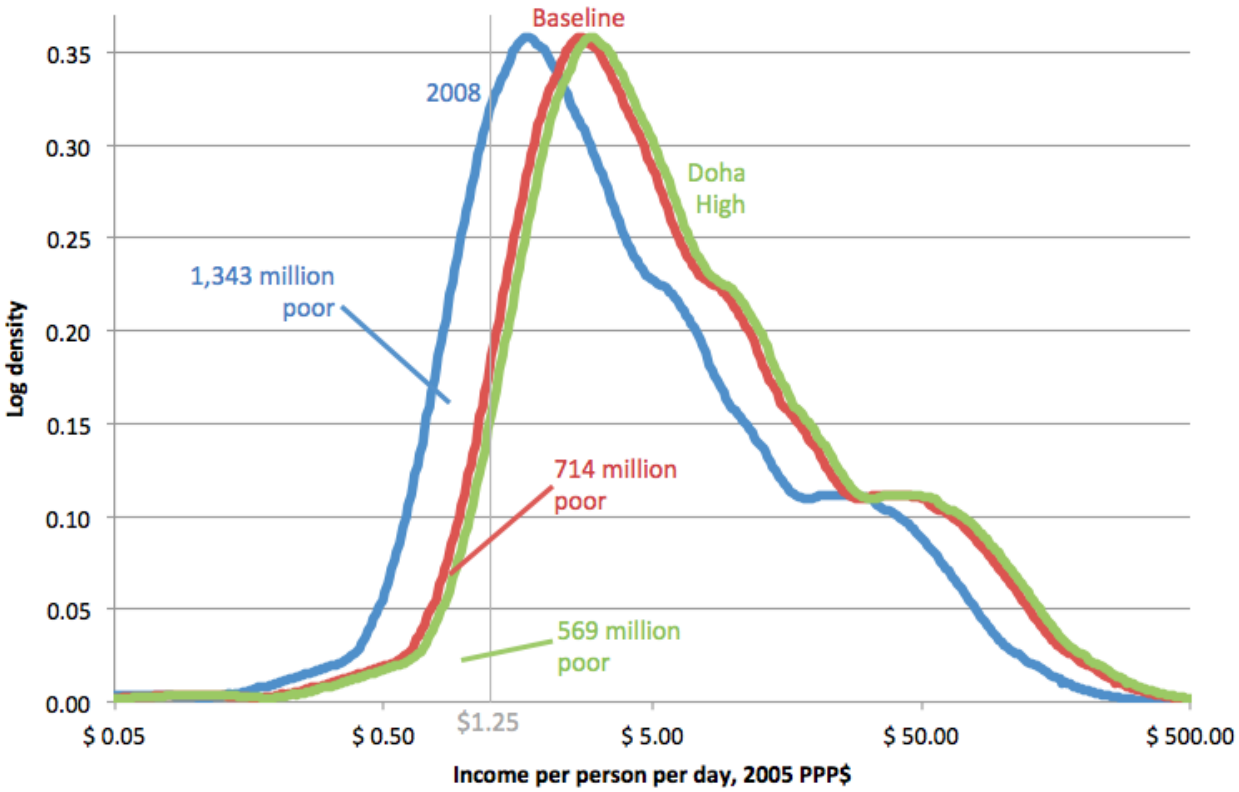

Figure A1. Global income distribution and poverty estimates, based on Lakner and Milanovic (2013), with uniform per capita growth rates as implied in the baseline and Doha High scenario, assuming a $1.25 poverty line

An alternative to assuming uniform per capita growth rates for the various ventiles through to 2030 is to use ventile-differentiated growth rates from Lakner and Milanovic (2013). For example, we can use both their growth rates from 1988-2008 as well as their growth rates from 1993-1998, 1998-2003 and 2003-2008 (as seen in Figure A3), scaled to the appropriate per capita income growth rates in the baseline and Doha High scenario from 2008-2030.[29]

The estimates can be seen in Figure A4 for the different growth profiles from 1988-2008, 1993-1998, 1998-2003 and 2003-2008. The outcome in percent and millions of poor are indicated in Table A1. Notice that because most of the period 1988-2008 involved significant losses of income for the upper middle class (around 70-95%), the outcome in poverty reduction depends crucially on the relative weight of growth in the poor base versus the rich 5-10%.

It is clear that all the scenarios show a substantial reduction in the number of poor, of between 130 and 260 million. 1993-1998 growth is the low outlier because it had exceptionally low growth for the very poor. 1998-2003 growth is the high outlier because low growth for the percentiles just below the poverty line made the baseline include dramatically more individuals than in the Doha High scenario. The average result of around 160 million, substantiated by both the scenario assuming uniform growth as well as that based on differentiated growth rates drawing on the longest empirical period, is equivalent to reducing the number of poor in 2030 by one-quarter. The reduction would be about one-eighth less under the Doha Low scenario. The liberalizations confined just to the Asia Pacific region, where there are fewer poor than elsewhere, may have a considerably smaller impact on global poverty.

[29] The growth rates for 1988-1993 with the collapse of the Soviet Union were so unusual that they cannot be scaled to 2008-2030 without some income groups obtaining negative incomes.

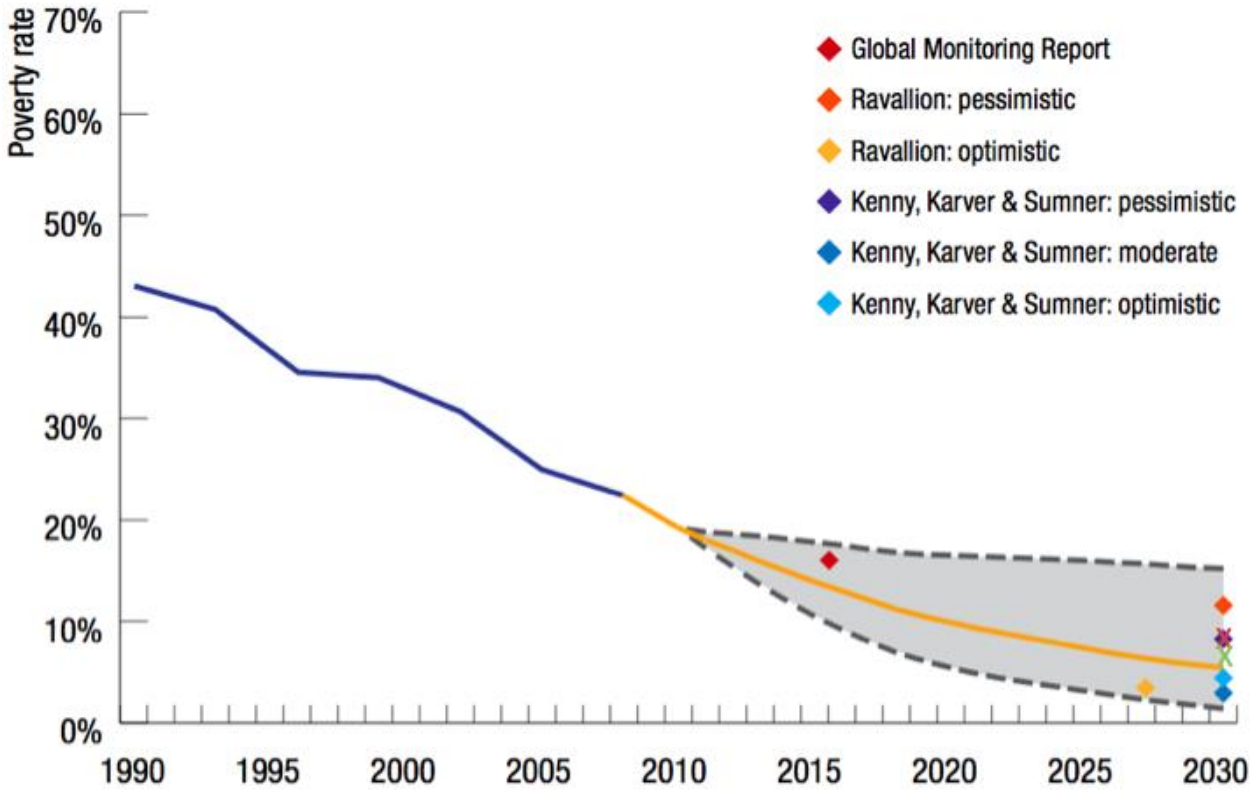

Figure A2. Showing various estimates of poverty, from 1990-2008, with predictions to 2030, ranging from 1.6% to 15%. Our two estimates of 8.5% and 6.8% are marked with a red and green x, right above the baseline scenario (5.8%) from the report. Source: drawn from Chandy, Ledlie and Penciakova (2013).

Figure A3. Estimated growth rates across ventiles from 1988-2008. Source Lakner and Milanovic (2013).

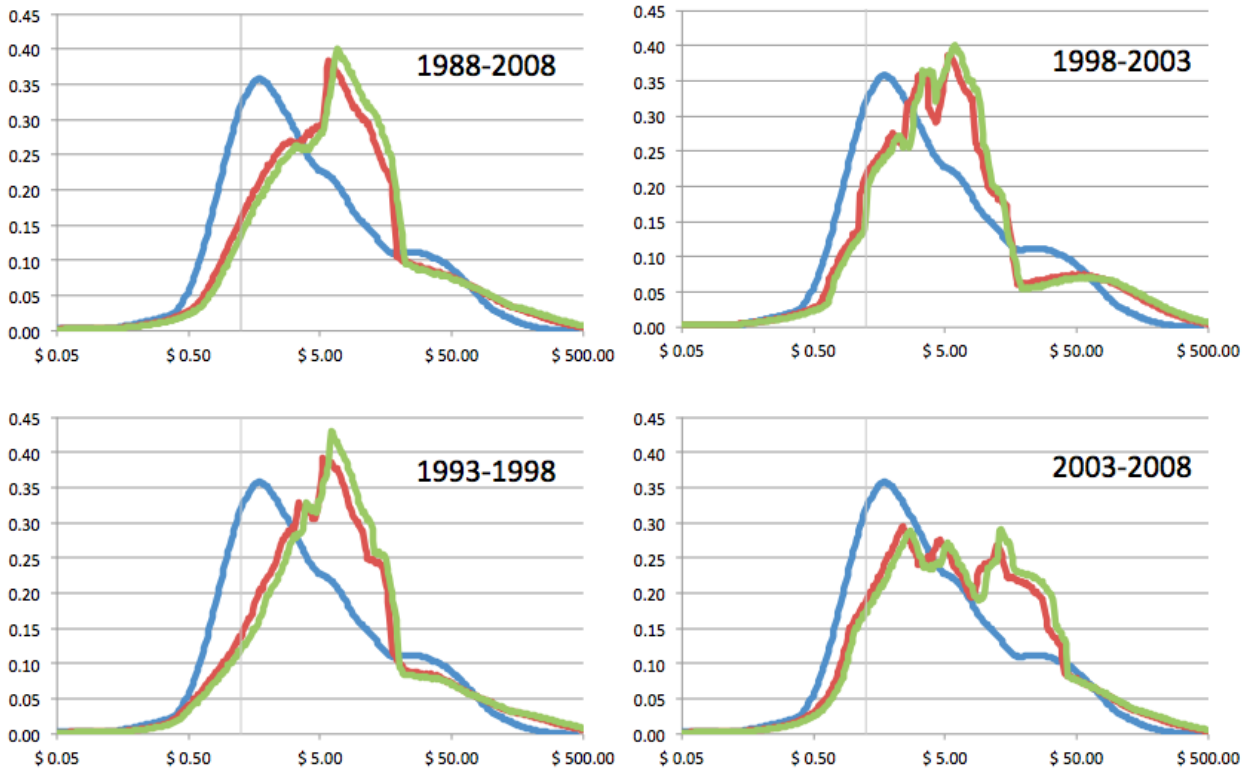

Figure A4. Estimates of global income distribution from 2008 (blue) to 2030 baseline (red) and Doha High (green), with ventile differentiated growth rates from 1988-2008, 1993-1998, 1998-2003 and 2003-2008. The estimated poverty consequences are shown in Table A1.

		Uniform growth	Growth like 1988-2008	Growth like 1993-98	Growth like 1998-2003	Growth like 2003-2008
Baseline	Poverty %	8.48%	8.11%	9.67%	10.53%	8.86%
	Poverty (million)	714	683	81	887	747
Doha High	Poverty %	6.75%	6.44%	8.11%	7.40%	7.07%
	Poverty (million)	569	542	683	623	596
Difference	Poverty %	1.72%	1.66%	1.57%	3.13%	1.79%
	Poverty (million)	**145**	**140**	**132**	**264**	**151**

Table A1. Scenario outcomes of poverty in percent and number of millions by 2030.

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This paper was written by Kym Anderson, Professor of Economics at the University of Adelaide and Australian National University. The project brings together 62 teams of economists with NGOs, international agencies and businesses to identify the goals with the greatest benefit-to-cost ratio for the next set of UN development goals.

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