Forthcoming in the *Journal of Asian Economics*

Did APEC's Trade Facilitation Action Plans Deliver the Goods?

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February 3rd, 2016.

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Did APEC's Trade Facilitation Action Plans Deliver the Goods?

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Abstract: This paper uses new data to examine whether APEC achieved its aim of reducing trade transaction costs by 10% over the 2002-2010 period. An inversion of the familiar gravity model makes it possible to infer trade costs based on the observed pattern of trade and production across economies. Analysis of trade costs calculated in this way shows that although intra- and extra-APEC trade costs fell during the sample period, they did not do so substantially more quickly than elsewhere in the world. Indeed, the region taken as a whole did not meet the 10% reduction goal. However, a considerable number of individual economies not only met the goal, they greatly exceeded it. Consistent with their outward oriented development strategies and leverage of global and regional value chains, some APEC economies saw very rapid falls in their trade costs over the 2002-2010 period, Viet Nam being a standout performer. Overall, about one third of the forum's membership for which consistent data are available met or exceeded the 10% reduction goal. APEC's two Trade Facilitation Action Plans can therefore be seen as having had mixed records of success.

JEL Codes: F13; F15.

Keywords: Trade Costs. Trade Facilitation. Asia-Pacific Economic Cooperation.

1 INTRODUCTION

The Asia-Pacific Economic Cooperation (APEC) has played a pathfinder role in relation to trade facilitation, having dealt effectively with the issue for over a decade before the WTO's Agreement on Trade Facilitation was signed. Whereas the WTO Agreement deals with issues such as customs and border procedures, as well as transit, APEC's approach to trade facilitation has always been more expansive and ambitious: the reduction of trade transaction costs.

Empirical work using computable general equilibrium (CGE) models of the world economy generally shows that the economic gains from trade facilitation—conceptualized as the reduction of trade costs, consistently with the approach taken in APEC—are larger than those from the complete abolition of tariffs on manufactured goods. There are two primary reasons for this striking result. First, tariffs in most countries are at historical lows in average terms, so the gains from additional reforms are correspondingly modest. Trade costs are much higher than tariffs, and so there is more room for reform. The reason for this is that the concept of trade costs embodies all factors that drive a wedge between producer prices in the exporting economy and consumer prices in the importing economy, and thus captures issues like non-tariff measures and behind-the-border barriers. Second, the economics of reducing trade costs is different from that of lowering tariffs. Tariff reductions primarily redistribute national income from producers (and the government) to

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consumers, with relatively small gains in overall economic welfare due to parties engaging in new transactions. Lowering trade costs, by contrast, lowers the real economic cost of doing business—it primarily creates new economic activity, rather than redistributing income, and so has correspondingly larger welfare effects. This contrast is the familiar one between "triangle" and "rectangle" gains (see e.g., Dee, 2005 in the related context of trade in services).

To give an idea of the orders of magnitude involved, WEF and World Bank (2013) provides a useful starting point. That study analyzes supply chain barriers to trade, but models them through reductions in trade costs. They find that if economies were to increase their performance halfway to global best practice (i.e., by lowering trade costs), GDP increases would be substantial in the Asia-Pacific: 4.3% in Oceania, 7.6% in China, Hong Kong, and Taiwan, 2% in Japan, 4.9% in Korea, and 9.3% in Southeast Asia. On a global basis, GDP would increase by 4.7%, compared with just 0.7% for the removal of all manufacturing tariffs globally. These results provide a striking illustration of the importance of trade costs and facilitation in the context of integrating markets and outward-oriented growth and development.

In light of these kinds of considerations, APEC leaders twice committed to regional trade cost reduction goals between 2002 and 2010. Implementation took place through two Trade Facilitation Action Plans (TFAPs). Based on a self-assessment by member economies, APEC leaders declared as achieved the target of a 5% reduction in trade transaction costs between 2002 and 2006. Progress under TFAP 2 was assessed in the form of a report, APEC (2012). It too declared that the target of a further 5% reduction in trade costs between 2007 and 2010 had been met.

Perhaps surprisingly, there has been no assessment of the effectiveness of APEC's TFAPs in the academic literature. In part, the reason may have to do with methodological problems: how can trade transaction costs be measured in a cross-country inter-temporal setting? This paper makes a first attempt to examine the evidence using a newly developed dataset on bilateral trade costs inferred using a standard theoretical framework applied to the observed pattern of trade and production. The analysis finds that although APEC as a whole reduced trade costs over the TFAP periods, it did not do so as rapidly as had been hoped, nor appreciably faster or deeper than the world as a whole. However, this performance obscures huge differences across economies. Some APEC economies far exceeded the TFAP goals, and reduced their trade costs by more than 10% over the 2002-2010 period. The result of the analysis is therefore a mixed message for APEC: difficulties at the level of the aggregate region, but considerable successes at the level of individual economies.

This paper makes three main contributions to the literature. First, it provides an important practical application of the trade costs measurement technique developed by Novy (2013). To date, that methodology has been used descriptively, and has also been subject to decomposition analysis to identify the components of trade costs (Chen and Novy, 2011; Arvis et al., 2015), but it has not been used to assess the impact of a major trade policy initiative. Although the methodology is not free from difficulties of interpretation—in particular due to the fact that changes in trade costs can be associated with changes in the domestic or international environment, and cannot easily be untangled—it provides a sensible starting point for a better understanding of APEC's track record on trade costs in the 2000s.

Second, it adds to the literature on trade facilitation by reinforcing the explicit link between APEC's operationalization of the concept, and the idea of trade costs familiar to economists from standard models of international trade. This paper marries the two concepts explicitly, which makes it

possible to use new empirical methods to undertake a thorough, theory-based examination of APEC's trade costs performance.

Third, by highlighting variation in outcomes within the APEC region, this paper helps identify successful case studies that can receive further attention in the policy literature. There is clearly much to be learned from some economies in terms of best practice in reducing trade costs, and this paper is a first step towards facilitating that process. APEC itself does not set goals for individual economies, but instead expresses joint aspirations and targets. As a result, its own assessment is at the level of the region, not individual economies. That approach is understandable politically, but this paper takes a more detailed approach in order to better understand the dynamics at play in individual economies, and the way they relate to overall results.

Against this background, the paper proceeds as follows. The next section discusses trade facilitation in APEC, focusing on the two trade cost reduction targets and the two TFAPs that go with them. Section 3 discusses data and methodology. The following section presents analytical results, and the final section concludes and discusses policy implications.

2 TRADE FACILITATION IN APEC

APEC was brought into existence to promote the Bogor goals of free and open trade and investment in the Asia-Pacific. APEC has always recognized that traditional trade liberalization is a necessary but not sufficient condition for achieving free and open trade. Trade facilitation also has an important role to play in eliminating administrative and other impediments to international trade flows. It also fits well with member economies' preference for non-discriminatory measures: APEC is not designed as a traditional free trade agreement, but rather as a cooperative forum in which member economies can jointly engage on a path of unilateral reforms that are as compatible as possible with the broader objective of global free trade. Trade facilitation measures, even if implemented as part of a regional forum, are often MFN in practice: the benefits accrue to all trading partners, not just those in the forum. Trade facilitation is thus a key element in APEC's "open regionalism".

2.1 TFAP 1

One of the most ambitious steps taken by APEC Member Economies in relation to trade facilitation was in 2001. At their Shanghai meeting, leaders agreed to reduce trade transaction costs by 5% over the following five years. With the aim of providing a roadmap for achieving that goal, APEC's Trade Facilitation Action Plan (TFAP 1) was released the following year. TFAP 1 established a set of trade facilitation measures covering four areas: customs procedures; standards and conformity assessment; business mobility; and electronic commerce. Member economies used their Individual Action Plans (IAPs) to provide annual progress reports.

APEC's Shanghai Goal and TFAP 1 are important because they give trade facilitation a broad substance compared with the other major forum in which that issue has been extensively discussed, and now negotiated, namely the WTO. In Geneva, trade facilitation is synonymous with customs and border procedures. The new WTO Agreement on Trade Facilitation contains important initiatives relating to their upgrading and harmonization. If implemented—and this remains an open question because of the wide flexibility given to developing countries to effectively opt out of some or all of its provisions—it has the capacity to boost trade considerably.

By contrast, APEC's approach to trade facilitation has always focused on the concept of trade transaction costs—although it was never defined either by leaders or in TFAP 1. Nonetheless, the

broad scope of the concept is clear: trade transaction costs are the factors that drive a wedge between producer prices in the exporting country and consumer prices in the importing country. The concept thus corresponds well to "iceberg" trade costs in the international trade policy literature—a fact that this paper exploits through the use of new data and methodological insights from that literature, applied to the case of APEC's TFAPs.

2.2 TFAP 2

Although TFAP 1 provided for monitoring through the IAPs, it did not include any evaluation component. No methodology was set out at the beginning of the period to obtain a benchmark or assess performance at the end of the period. Nonetheless, leaders welcomed in 2006 the achievement of the 5% trade cost reduction goal.

Building on the Shanghai goal and the TFAP 1 experience, leaders set an additional trade costs reduction target in 2005: 5% between 2007 and 2010. TFAP 2 provided a framework for moving towards this goal, and focused on the same four main components as TFAP 1. It placed greater emphasis on collective actions and "pathfinders", i.e. individual economies or groups of economies that move out ahead on a particular issue.

In contrast to the TFAP 1 experience, during implementation of TFAP 2 each APEC sub-forum identified key performance indicators (KPIs) designed to track performance towards the overall goal of a 5% reduction in trade transaction costs. However, there was still no general methodology set out to establish a baseline for trade costs in 2007, or measure their decline over the following years.

2.3 Assessment

TFAP 1 was declared to have been a success by leaders based on self-assessments by economies. There was, and has been, no independent verification of the extent to which TFAP 1 actually reduced APEC's trade costs.

TFAP 2, by contrast, was evaluated more thoroughly. A 2009 interim review resulted in a reassessment of the set of KPIs, due to the criticism that only some of the original set were effective in indicating progress towards the 5% goal, and none actually measured trade transaction costs—in other words, there was no means of assessing overall success or failure, even if individual actions could be tracked using selected KPIs.

APEC (2012) conducted a final assessment of the TFAP 2 goal of a 5% reduction in trade costs between 2007 and 2010. APEC's own definition of trade transaction costs for the purposes of TFAP 2 is as follows: "transaction costs along the entire logistics chain, including those incurred at, near, and behind the border". The definition is stated to include only those trade transaction costs that are directly imposed or largely influenced by governments. The definition therefore includes time costs and the cost of inland transit, but excludes tariffs and nontariff measures, and wholesale and retail distribution costs (which are common to international and intranational trade).

The report provides information on a range of indicators, some focused on trade costs in general, and others dealing with the four priority areas identified in the TFAPs, namely: customs procedures; standards and conformity assessment; business mobility; and electronic commerce. Although the report concludes that there is "strong evidence" that the 5% goal was met, it in fact cites a mix of trade cost increases and decreases, and it is difficult to reconcile the different figures into a single measure. The reason is that the report analyzes a selection of the contributing factors to trade costs, but does not have a measure of trade costs that is truly all encompassing, like the one used in this paper.

The APEC (2012) approach to assessment of the overall TFAP 2 goal is based on the Trading Across Borders Component of the World Bank's Doing Business database. Total trade transaction costs per container are derived as the sum of the monetary and time costs recorded in that database. Data are then scaled up to the economy level by taking account of shipment volumes, all considered in real terms.

Interpretation of the various results reported in APEC (2012) is nonetheless problematic. Indicators of time and monetary cost tend to move in opposite directions: for example, fees and charges for total trade (imports plus exports) increased by 4.8% between 2006 and 2010. However, time spent fell by 6.2%. The report concludes that the net effect is a reduction in trade transaction costs of 5.0%.

The authors of APEC (2012) were faced with a challenging assignment: assessing performance vis-à-vis the 5% goal in the absence of a benchmark or measurement criteria established at the beginning of the TFAP 2 period, and limited to existing data and methodologies. Their approach is an understandable one. However, Doing Business trade costs are not all inclusive. They only include certain factors, essentially red tape costs and inland transit (transport between the producer's factory and the dock, for example). No allowance is made for international transport, although it is a major source of international trade costs. Similarly, other factors in the business environment that affect firms' ability to buy and sell overseas are not taken into account. The TFAP 2 assessment, although informative, therefore only tells part of the story. This paper intends to give a more complete picture by using newly collected data unavailable to APEC (2012), and recently developed methodological insights.

Another issue that APEC (2012) addresses with difficulty is causal attribution: it is difficult to relate changes in trade costs to particular actions under the TFAPs, an issue that is clearly noted by the report's authors. The report contains detailed information on the actions taken by individual APEC sub-fore in the four core areas identified by TFAP 2. Although potentially indicative of causality, it is difficult to be certain of the impact of particular measures in the absence of a fully developed framework integrating actions, intermediate outputs, and outcomes.

Similarly, no comparison is made with trade cost reductions elsewhere in the world through the use of a control group (i.e., a group without a TFAP-like goal). Nor is any comparison made of the rate of decline in trade costs before and after TFAP 2—so it is impossible to say whether the trade costs fell more quickly, at the same rate, or more slowly during the TFAP 2 implementation period than before it. These issues are important because trade costs have been falling globally through the 1990s and 2000s. If TFAP 2 was effective, the rate of decline in APEC should be faster than elsewhere, at least as fast as during the TFAP 1 period, and faster than the pre-TFAP 1 period. Without this evidence of intensification of activity and outcome, it is difficult to conclude that the APEC TFAPs had the desired causal effect at the regional level.

3 THE UNESCAP-WORLD BANK TRADE COSTS DATABASE

This section introduces an inversion of the common gravity model as a way of inferring trade costs from the observed pattern of trade and production (Novy, 2013). Trade costs measured in this way accord with the "iceberg" approach commonly used in theoretical models, and thus capture all factors that drive a wedge between the producer price in the exporting country and the consumer price in the importing country. This concept is close to the idea of trade transaction costs as used by APEC, although somewhat broader than the definition given in APEC (2012). The approach outlined here is therefore suggestive of an overall measurement and benchmarking analysis. The first

subsection introduces the methodology, and the second discusses data and implementation. Full details, along with a detailed analysis of the dataset, can be found in Arvis et al. (2015). It should be noted that consideration is limited to trade in goods for reasons of data availability. In any case, merchandise trade, as opposed to services, was the focus of the APEC TFAPs. Services trade is quantitatively important in the region, but it is left to further research to examine the trade costs environment for services sectors among APEC economies.

3.1 Methodology

Anderson and Van Wincoop (2004) review the gravity model literature on trade costs. They sum together various estimates of particular barriers affecting the international movement of goods, and arrive at an estimate of 170% for the ad valorem equivalent trade costs faced by a representative developed country. The figure breaks down as 21% transportation costs, 44% border-related trade barriers, and 55% wholesale and retail distribution costs (2.70 = 1.21 * 1.44 * 1.55). The most important point to take away from this estimate is that trade costs are large—much larger than tariffs, which frequently average 5% or even less in developed countries, and even some developing countries. Many other factors are obviously at play.

Summing previous estimates in this "bottom up" way is one way of gaining an overall picture of the global trade costs environment. However, it suffers from two particular drawbacks. First, it cannot possibly take account of all factors that go into the "iceberg" trade costs commonly used in theoretical models, so there is a disconnect between theory and empirics. Second, the individual estimates used to create the sum are usually based on only a small subset of the relevant variables, which immediately gives rise to concerns over omitted variables bias to the extent that different sources of trade costs are correlated in practice.

Novy (2013), following Head and Ries (2001), takes a different approach to trade costs, starting from a "top down" perspective.[2] His approach can be applied to any theoretically-grounded gravity model that results in a bilateral trade costs term combined with exporter and importer fixed effects (abstracting from temporal and sectoral dimensions). Examples of such models include Anderson and Van Wincoop (2003), Eaton and Kortum (2002), and Chaney (2008). The interpretation of the fixed effects—and potentially trade costs (fixed versus variable)—changes from one model to another, but the basic structure of this class of models lends itself to some simple but informative manipulation.

Taking the Anderson and Van Wincoop (2003) model as a benchmark, we can consider two countries, i and j, with four gravity models for intra- and international trade:

$$(1)\ X_{ij} = \frac{Y_i E_j}{Y}\left(\frac{\tau_{ij}}{\Pi_i P_j}\right)^{1-\sigma};\ (2)\ X_{ji} = \frac{Y_j E_i}{Y}\left(\frac{\tau_{ji}}{\Pi_j P_i}\right)^{1-\sigma};$$

$$(3)\ X_{ii} = \frac{Y_i E_i}{Y}\left(\frac{\tau_{ii}}{\Pi_i P_i}\right)^{1-\sigma};\ (4)\ X_{jj} = \frac{Y_j E_j}{Y}\left(\frac{\tau_{jj}}{\Pi_j P_j}\right)^{1-\sigma}$$

where: X_{ij} represents trade between two countries (i to j or j to i) or within countries (goods produced and sold in i and goods produced and sold in j); Y_i represents total production in a

[2] Anderson and Yotov (2010) also adopt what could be termed a "top down" approach to calculating internal relative to multilateral trade costs for Canadian provinces. They focus, however, on a measure they call "constructed home bias", which represents the degree to which each province trades with itself relative to a frictionless benchmark. From an international policy standpoint, it is bilateral trade costs—rather than internal ones—that are more relevant, and so we focus on them rather than constructed home bias here.

country; E_j represents total expenditure in a country; τ_{ij} represents "iceberg" trade costs; and σ is the intra-sectoral elasticity of substitution (among varieties within a sector). The two terms Π_j and P_i represent multilateral resistance. From the expressions:

$$(5)\ \Pi_i^{1-\sigma} = \sum_{j=1}^{C} \left\{\frac{\tau_{ij}}{P_j}\right\}^{1-\sigma} \frac{E_j}{Y} \text{ and } (6)\ P_j^{1-\sigma} = \sum_{i=1}^{C} \left\{\frac{\tau_{ij}}{\Pi_i}\right\}^{1-\sigma} \frac{Y_i}{Y}$$

we can see that outward multilateral resistance Π_j captures the fact that trade flows between i and j depend on trade costs across all potential markets for i's exports, and that inward multilateral resistance P_j captures the fact that bilateral trade depends on trade costs across all potential import markets too. The two indices thus summarize average trade resistance between a country and its trading partners.

Multiplying equation (1) and equation (2), and then equation (3) and equation (4) gives:

$$(7)\ X_{ij}X_{ji} = \frac{Y_i E_j}{Y}\frac{Y_j E_i}{Y}\left(\frac{\tau_{ij}\tau_{ji}}{\Pi_i P_j \Pi_j P_i}\right)^{1-\sigma} \text{ and } (8)\ X_{ii}X_{jj} = \frac{Y_i E_i}{Y}\frac{Y_j E_j}{Y}\left(\frac{\tau_{ii}\tau_{jj}}{\Pi_i P_i \Pi_j P_j}\right)^{1-\sigma}$$

Dividing equation (7) by equation (8) eliminates terms and allows us to derive an expression for trade costs in terms of intra- and international trade flows:

$$(9)\ \left(\frac{X_{ij}X_{ji}}{X_{ii}X_{jj}}\right)^{\frac{1}{1-\sigma}} = \frac{\tau_{ij}\tau_{ji}}{\tau_{ii}\tau_{jj}}$$

Taking the geometric average of trade costs in both directions and converting to an ad valorem equivalent by subtracting unity gives:

$$(10)\ t_{ij} = t_{ji} = \left(\frac{\tau_{ij}\tau_{ji}}{\tau_{ii}\tau_{jj}}\right)^{\frac{1}{2}} - 1 = \left(\frac{X_{ii}X_{jj}}{X_{ij}X_{ji}}\right)^{\frac{1}{2(\sigma-1)}} - 1$$

In this paper, we refer to t_{ij} as "trade costs". It is the geometric average of international trade costs between two countries relative to domestic trade costs within each country. We examine the evolution of trade costs inside and outside APEC over various time periods to draw inferences as to the possible influence of the two TFAPs, and arrive at an assessment of APEC's performance relative to its trade costs reduction targets.

3.2 Data

This paper uses the data assembled by Arvis et al. (2015) and treated using the Novy (2013) methodology to produce the ESCAP-World Bank Trade Costs Database. This section describes the main features of the underlying data.

After assembling all components, the trade costs dataset covers up to 167 countries for the period 1995-2012. In sectoral terms, it covers trade in agricultural products and trade in manufactured goods, as well as total goods trade (the sum of the two sectors).

Implementing equation (10) in practice requires data on the value of bilateral trade in both directions, as well as data on intra-national trade in both countries. Trade data are readily available from

standard sources like WITS-Comtrade,[3] but production data are more challenging. Importantly, since the models behind the trade costs formula do not allow for input-output relationships among sectors, intra-national trade needs to be measured as gross shipments, not value added (which subtracts intermediate inputs). The ESCAP-World Bank database uses UN national accounts data[4] and proxies intranational trade by total production less total exports. Interpolation is used to fill in missing country pair-sector-year observations. Full details of data treatment are set out in in Arvis et al. (2015).

To produce trade costs in ad valorem equivalent terms, an assumption is needed as to the intra-sectoral elasticity of substitution σ. We follow Novy (2013) in assuming that it is constant across sectors and countries, and equal to eight—an estimate that is reasonable in terms of the existing literature. Although the choice of parameter is important for estimating ad valorem equivalent trade costs, the analysis in this paper does not depend on it in any major way. Novy (2013) shows that index numbers based on t_{ij} are quite insensitive to the choice of elasticity of substitution. We therefore focus on that approach for the dynamic trade costs analysis conducted in this paper.

3.3 Aggregation

The methodology described above produces inferred estimates of bilateral trade costs, t_{ij}. For purposes of policy-relevance and presentation, it would be desirable to aggregate across partner countries to produce a single consistent measure of trade costs for each economy. By analogy with the mercantilist trade restrictiveness index of Anderson and Near (2003), one desirable measure is the constant level of trade costs across all partners $\bar{t}_i$ that best reproduces observed total trade.

To construct such a measure, which is an extension of Novy (2013), equation (10) can be rearranged to produce a symmetrized gravity equation with trade in both directions set to be equal to the geometric average of actual trade, i.e. $X'_{ij} = X'_{ji} = \left(X_{ij}X_{ji}\right)^{\frac{1}{2}}$:

$$(11)\ X'_{ij} = X_{ii}^{\frac{1}{2}}X_{jj}^{\frac{1}{2}}\left(1+t_{ij}\right)^{1-\sigma}$$

where all terms are as defined above, and (11) follows directly from (10).

To derive $\bar{t}_i$, we set:

$$(12)\ \sum_{i\neq j} X'_{ij} = \sum_{j\neq i}(1+\bar{t}_i)^{1-\sigma}X_{ii}^{\frac{1}{2}}X_{jj}^{\frac{1}{2}} = \sum_{j\neq i}\left(1+t_{ij}\right)^{1-\sigma}X_{ii}^{\frac{1}{2}}X_{jj}^{\frac{1}{2}}$$

Solving gives:

$$(13)\ \bar{t}_i = \left(\frac{\sum_{i\neq j} X'_{ij}}{X_{ii}^{\frac{1}{2}}\sum_{j\neq i} X_{jj}^{\frac{1}{2}}}\right)^{\frac{1}{1-\sigma}} - 1$$

[3] For a small number of countries, Comtrade data are modified to better take account of re-exports.

[4] The UN National Accounts database provides gross shipments production data for up to 137 countries. For the remainder, we use value added data "scaled up" using average multipliers calculated for those countries where both gross shipments and value added data are available.

The resulting measure will be referred to in this paper as "average" trade costs. It represents an aggregation of trade costs across bilateral pairs so as to reflect the full gravity "push" from trading partners.

From its definition and the discussion in this subsection, it is clear that average trade costs lend themselves well to application in the context of regional aggregates like APEC. By using the appropriate sums, it is possible to obtain average trade costs in the sense in which this paper uses that term for intra- and extra-APEC trade, as well as for trade by the world with the world (i.e., for all economies). This application is an important one in the context of APEC's TFAPs, as they are regional instruments, not targets for each individual economy. In other words, the success or failure of the TFAPs has historically been assessed on a region-wide (aggregate) basis, even though additional detail on individual economy performance is obviously also of interest from a research and policy point of view.

4 PRESENTATION OF RESULTS

This section analyzes the data in the ESCAP-World Bank database, focusing on the extent to which APEC experienced reductions in trade costs over the period of the two TFAPs, namely 2002-2010. To do that, it first uses the aggregation methodology discussed in previous subsection, and treats APEC as an aggregate region. This treatment is appropriate given that APEC itself focuses on collective, rather than individual, goals. To provide a point of comparison, trade costs are calculated for the world as a whole in addition to APEC. The purpose of this comparison is to examine whether or not the rate and extent of trade cost reductions was sharper in APEC than elsewhere in the world.

By its nature, APEC's open regionalism is intended to be non-discriminatory. This approach should be reflected in the data. To examine the contention, we calculate trade costs for APEC's intra-regional trade and its trade with the rest of the world (i.e., non-APEC economies).

Results for manufacturing are in Figure 1. APEC's intra-regional trade costs are consistently lower than world average trade costs, and are much lower than APEC's trade costs with other world regions. It is important to be cautious in interpreting these results, however, for the reason noted above: ad valorem equivalents are sensitive to the choice of parameter for the intra-sectoral elasticity of substitution. Nonetheless, on the assumption that the parameter is reasonably constant through time and across countries, the ordering posited at the beginning of this paragraph stands.

Comparing Figure 1 with Figure 2 shows that there is a major difference in the level of trade costs in all regions between manufacturing and agriculture. Trade costs in agriculture are up to twice as high as in manufacturing. Also interesting is the fact that the three lines are bunched much more closely together in Figure 2 than in Figure 1, which indicates that performance is more similar as regards intra-APEC trade, extra-APEC trade, and the world average. Again subject to the caveat noted above relating to the assumed elasticity of substitution, it is striking that APEC's intra-regional trade costs in agriculture are close to the world average, even though in manufacturing they are much lower.

As pointed out above, one way of dealing with the parameter sensitivity issue with respect to ad valorem equivalents in practice is to shift to a presentation focused on index numbers. That is the approach we use from this point forward, as it has the added advantage of emphasizing the dynamics at play—and thus the rate of change of trade costs for the three groups. Although useful in making time rates of change explicit, it is important to keep in mind that the three groups under

consideration start from different baselines, so similarities in index numbers need to be interpreted as reflecting similar proportional, not absolute, dynamics.

Figure 3 presents the same data on trade costs in manufacturing for intra-APEC trade, extra-APEC trade, and the world as a whole, but sets each region's trade costs index equal to 100 in 1996. There is a very similar dynamic pattern in the evolution of trade costs in all three cases, with a rough split into two periods. Between 1996 and 2001, trade costs fall relatively rapidly, by 8.2% for intra-APEC trade, 7.5% for extra-APEC trade, and 7.6% for the world as a whole. The difference between APEC's performance and that of the rest of the world is not striking, but it is encouraging that intra- and extra-APEC trade costs have fallen at very similar rates, which is consistent with the forum's commitment to open regionalism.

The second period evident in the figure is one of slower decline in trade costs, from 2002 to 2010. Intra-APEC trade costs fell by 3.0%, extra-APEC by 4.2%, and the world as a whole by 2.7%. Again, it is encouraging that intra- and extra-APEC trade costs have fallen at similar rates, but the difference with the rate at which trade costs were falling in the world as a whole is not striking.

Most importantly, the second period in the figure, 2002-2010, corresponds to the implementation periods of TFAPs 1 and 2. It is no small irony that trade costs fell noticeably faster in the period before TFAP 1 than during the implementation of the two programs. In any case, in both periods it is difficult to see any major difference between the rate of change of trade costs in APEC and elsewhere in the world. Trade costs were falling everywhere, including in APEC. However, there appears to be little evidence that TFAPs 1 and 2 did much to intensify or speed up the process relative to what was happening elsewhere, at least at the level of the region considered as an aggregate. In any event, trade costs fell by far less than 10% between 2002-2010. So if it is accepted that this metric is appropriate for measuring trade facilitation performance in APEC, it must be concluded that on a region-wide basis and focusing on trade in manufactured goods, the two TFAPs did not succeed in reducing trade costs by as much as had been hoped by Leaders.

Figure 4 presents results for agriculture using the same approach. In this case, there is no clear division into two time periods: trade costs fall relatively consistently right through the sample period, and in a relatively similar way for intra-APEC trade, extra-APEC trade, and the world as a whole. Between 2002 and 2010, trade costs facing agricultural products fell by 5.5% for intra-APEC trade, 4.7% for extra-APEC trade, and 5.3% for the world as a whole. In this case, there is a small degree of APEC preference in terms of the pattern of trade cost reductions. However, there is no real difference between the rate of decline of trade costs in APEC and in the world as a whole. As was the case for manufactured goods, therefore, the only conclusion available based on this evidence is that the TFAPs did not attain the goal of reducing trade costs by 10% in agriculture over the 2002-2010 period.

Thus far, the analysis has been in terms of regional aggregates. This approach is appropriate as a means of evaluating the overall success of APEC's TFAPs because APEC as a forum sets collective goals, not a set of individual ones. From a research perspective, however, it is interesting to break out regional performance to the level of individual economies. A priori, it seems highly likely that trade costs may have fallen much more quickly in some economies than in others. The Asia-Pacific has a number of developing economies, for example, that have pursued outward-oriented growth strategies through the 1990s and 2000s, and which can be expected to display significant decreases in trade costs consistent with those policies.

Figure 5 therefore presents reductions in trade costs for individual APEC member economies for which sufficient data are available. To avoid composition effects, economy aggregate trade costs are calculated based on a common sample for the 1996-2010 period, so economies with substantial amounts of missing data drop out of the calculation. This restriction at a data level means that it is only possible to analyze performance in 14 of the 21 APEC economies.

A number of features are evident from Figure 5. First, some economies have not only met the TFAP target of a 10% reduction in trade costs between 2002 and 2010—they have greatly exceeded it. Viet Nam, for example, reduced its level of trade costs by 32.6% over that period, which is a very rapid rate of decline. This result is fully consistent with Viet Nam's outward oriented development strategy that takes maximum advantage of international markets and value chains.

Viet Nam is not the only high performer, however. Chile reduced its trade costs by 19.9%, Korea by 15.8%, China by 13.8%, and Peru by 13.7%. Thailand also deserves special mention for a 7.5% reduction, which is relatively close to the TFAP targets. Of the available sample, then, one-third considerably exceeded the TFAP targets, and one other economy came close to meeting them. These economies are all classified as developing economies under the APEC system.[5] The remaining economies typically lowered their trade costs by some amount, but not as rapidly as foreseen under the TFAPs. The only exceptions are Mexico, Malaysia, and the Philippines, where trade costs appear to have increased, in the latter case by a significant amount (14.7%). The Malaysian case is likely due to difficulties in treating re-exports in the original data: the country has a trade to GDP ratio of over 100% using standard data, so considerable adjustment is required, but it is widely believed that Comtrade fails to take full account of the extent of re-export activity. The case of the Philippines is more puzzling. One possible interpretation is that it is necessary to come back to the fact that trade costs as calculated in this report are a ratio of inter- to intra-national trade costs. A higher ratio could be consistent with domestic trade costs falling much more quickly than international trade costs, which is not implausible in the case of an economy like the Philippines where various market-based reforms have been underway, but trade integration remains somewhat piecemeal and focused on the immediate region (at least in goods).

These cases lay clear the fact that it is difficult to be too specific using these data as to the exact factors that have contributed to falling trade costs in particular cases. This paper is intended as a first analytical step: it paints a general picture, which can then be filled in by detailed economy-level and sub-regional analysis. Having said this, some general points can be made about the patterns observed across countries and some of the underlying changes that may have given rise to them. To enter into the discussion, it is important to refer to the work of Arvin et al. (Forthcoming), who use an econometric model to decompose trade costs into their various components. Their methodology makes it possible to identify those factors to which changes in trade costs are most sensitive. Table 1 reproduces their regression results to facilitate the discussion. The case of Vietnam—the economy with the largest trade cost reduction during the TFAP period—is taken as an example of how the overall numbers can be unpacked and related back to changes on the ground.

In terms of policy indicators, Arvis et al. (Forthcoming) identify maritime connectivity and logistics performance as the two most important determinants of trade costs. Concretely, 1% improvements in those variables are associated with reductions in trade costs of 0.2% and 1.6% respectively. Neither index—UNCTAD's Liner Shipping Connectivity Index or the World Bank's Logistics

[5] For official purposes, APEC only considers the following five economies to be industrialized: Australia, Canada, Japan, New Zealand, and the United States.

Performance Index—is available for the full sample period used in this paper. Nonetheless, changes in those indices over the period for which data are available could provide some indications as to the driving factors behind the observed trade cost reductions in some economies. However, the LPI changed little between 2007 and 2010, the two relevant years for which data are available: only 3.3%, which would translate into a reduction in trade costs of 5.3%.

Quite a different picture emerges when considering the case of maritime connectivity. Vietnam saw very significant gains in that area between 2004 (the first year for which data are available) and 2010 (the end of TFAP 2): its score increased from 12.9 to 31.4, an improvement of 143% in six years, during the TFAP period. Using the estimated elasticity from Table 1, that improvement alone would have translated into a reduction in trade costs of 35.4%, quite close to what was in fact observed. Underlying this very large change in the LSCI was a major program of infrastructure investment focused on the country's main ports. It greatly increased capacity, in line with the country's intent to achieve greater integration into international goods markets. Of course, maritime connectivity is in part endogenous to trade flows: more demand for Vietnamese goods from abroad translates into higher levels of service from the liner shipping companies, which is also reflected in the economy's score. A consideration of this single indicator suggests that the overall results produced by application of the trade costs methodology are certainly within the bounds of what would be expected given the economy's improvement in its underlying connectivity framework. It is important to note, however, that APEC is not an infrastructure development forum, and although economies are free to develop infrastructure in line with their needs, it was not a requirement of the TFAPs.

5 Conclusion and Policy Implications

APEC's trade cost reduction targets and TFAPs are important steps along the road to improved trade facilitation in the region and more broadly. From an economic perspective, APEC was right to focus on the reduction of trade costs as the core of its trade facilitation work program. Broadening out the scope of that concept beyond customs and border procedures is important for the development of a holistic strategy to tackle at-, between- and behind-the-border measures that impact trade. It is also consistent with trade economists' understanding of the factors that tend to reduce bilateral trade.

However, our analysis of APEC's trade costs over the 1996-2010 period has shown little apparent effect of the two regional targets supported by the TFAPs. Trade costs in both manufacturing and agriculture fell at more or less the same rate in APEC as elsewhere in the world. Indeed, manufacturing trade costs fell more quickly before the TFAPs than during their implementation period. These findings suggest that, as the authors of APEC (2012) acknowledged, it is difficult to establish causal attribution between APEC's TFAPs and economies' actions in those frameworks on the one hand, and falls in trade costs on the other.

Of course, this finding has to be interpreted cautiously because of the analytical approach used in this paper. Specifically, "trade costs" refers to the ratio of inter- to intra-national trade costs, which makes causal attribution difficult. This paper is intended as a step towards a more thorough evaluation of APEC's TFAPs than has taken place in the literature to date, and highlights that the data do not obviously support the contention that trade costs were in fact reduced at the desired rate.

Although the regional analysis is of primary interest for APEC as a forum, there are research and policy lessons to be learned from the analysis of individual economies. The data show that more than one-third of economies for which full data were available greatly exceeded the 10% target

under TFAPs 1 and 2. Viet Nam's performance is particularly striking, but other examples from Asia and Latin America, at different income levels, are also in evidence. As APEC continues to move forward on trade facilitation, it will be important to draw lessons from the successful experiences of these economies in reducing trade costs.

In light of these findings, what is next for APEC on the trade facilitation front? Policy attention is now focused on the concept of connectivity—a "next generation" trade facilitation initiative that focuses on improving the flows of goods, services, and factors of production through regional and global networks. Although there is no direct successor to TFAP 2, the closest relative is the Supply Chain Connectivity Framework Action Plan. In some ways, that document has learned some valuable lessons from the TFAP experience. It adopts a more precisely defined quantitative target: a 10% reduction in the time, cost, and uncertainty associated with supply chain transactions. More importantly, economies agreed on a set of indicators and an assessment framework at the beginning the process—a notable contrast with experience under the TFAPs. Although assessment of overall achievements and causal attribution will remain challenging, there is reason to be optimistic because the actions listed by economies under the Action Plan are precise and, in many cases, measurable at least as binary outcomes.

Another successor to the TFAPs is the APEC Connectivity Blueprint. That document identifies three overarching work areas: physical connectivity, institutional connectivity, and people-to-people connectivity. There is a clear movement from a focus on trade costs, a well defined economic concept, to broader issues of regional integration in terms of the way individuals and businesses relate to each other across borders. Again, assessment of APEC's success in the area of connectivity will be challenging, but the initiative is a welcome one—and another example of the forum playing a pathfinding role, in this case along with ASEAN, on an issue that is rapidly moving up the global economic policy agenda.

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FIGURES

Figure 1: Trade costs measure in manufacturing, APEC and World, percent ad valorem equivalent, 1996-2010.

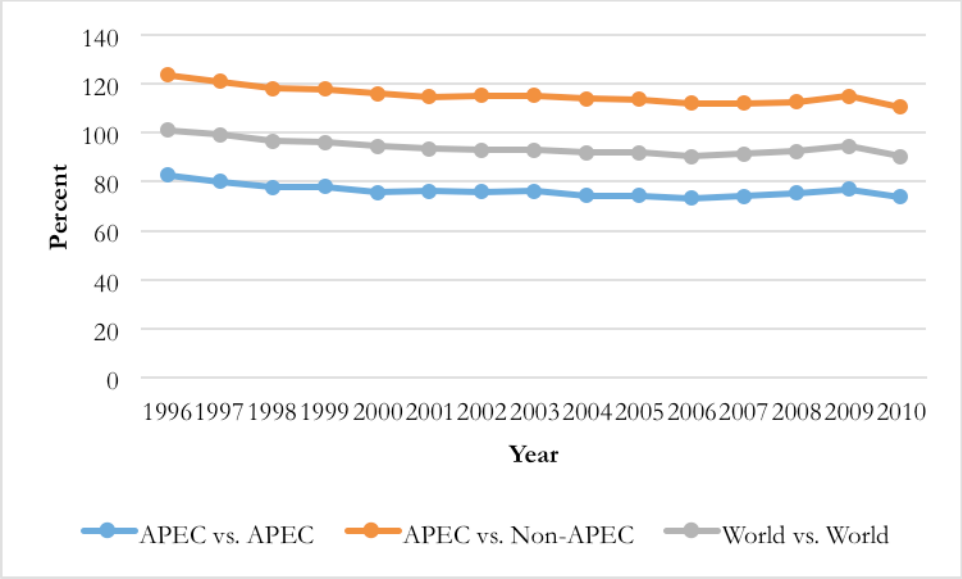


Figure 2: Trade costs measure in agriculture, APEC and World, percent ad valorem equivalent, 1996-2010.

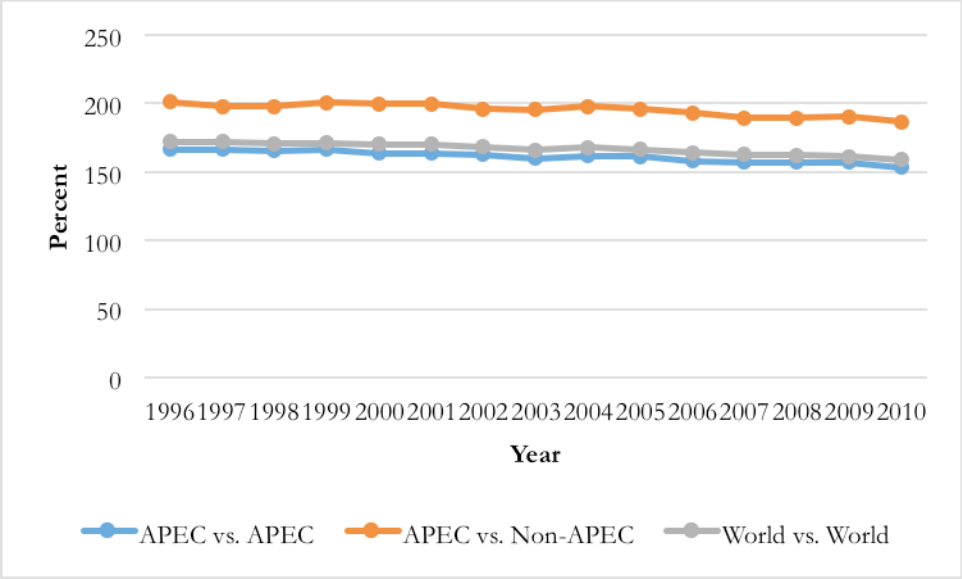


Figure 3: Trade costs measure in manufacturing, APEC and World, 1996=100, 1996-2010.

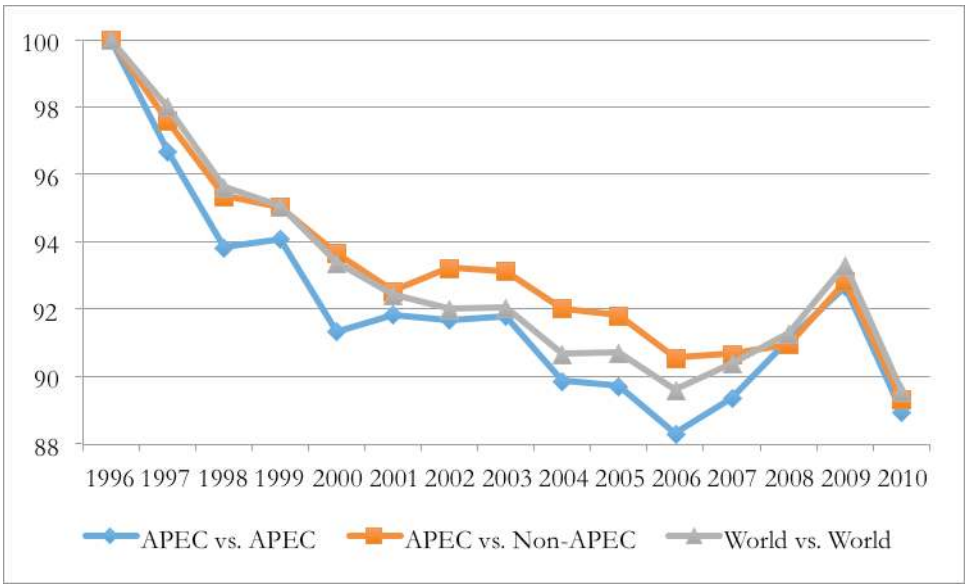


Figure 4: Trade costs measure in agriculture, APEC and World, 1996=100, 1996-2010.

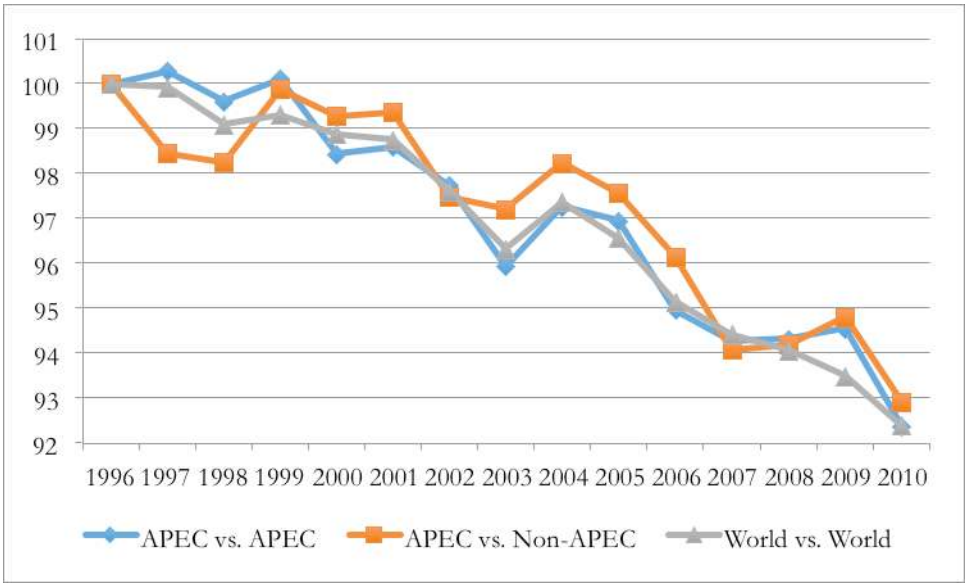
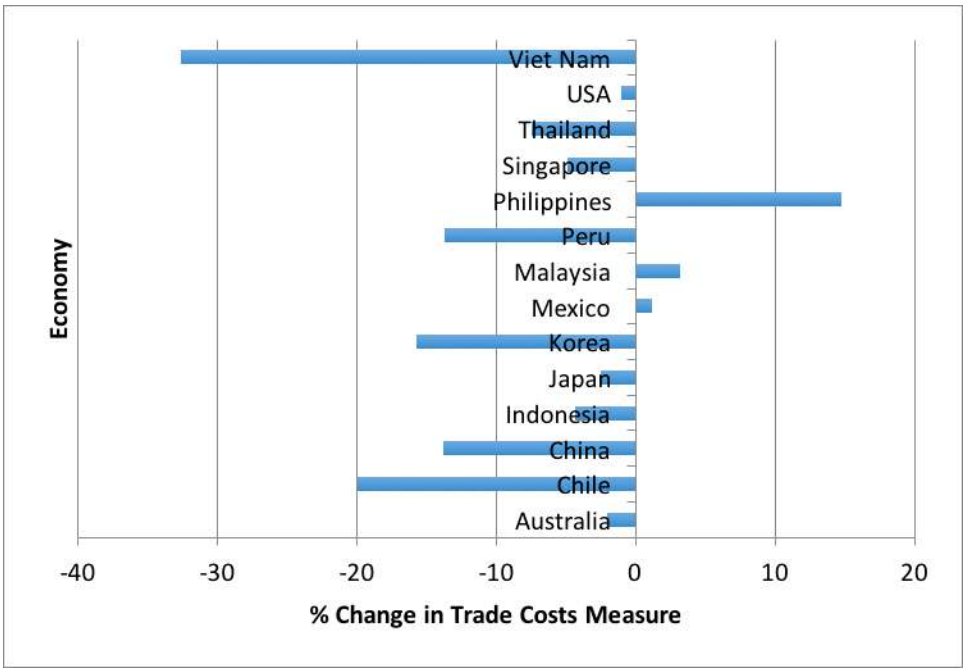


Figure 5: Change in trade costs measure in individual member economies, 2002-2010.



TABLES

	(1) All
Ln(Distance)	0.266***
	(32.52)
Common Border	-0.420***
	(-11.36)
Comm. Lang. Ethno.	-0.043*
	(-1.77)
Comm. Lang. Off.	-0.084***
	(-3.13)
Colony	-0.173***
	(-5.04)
Common Colonizer	-0.152***
	(-6.70)
Same Country	-0.169***
	(-3.12)
Landlocked	0.282***
	(25.08)
RTA	-0.169***
	(-10.19)
Ln(LSCI)	-0.248***
	(-25.76)
Ln(LPI)	-1.617***
	(-29.63)
Ln(Entry Cost)	0.018***
	(3.30)
Observations	11,291
R2	0.590

Source: Arvis et al. (Forthcoming). Note: Regression results are based on all countries for which data are available, not just APEC member economies.