

# Transparency and Trade Facilitation in the Asia Pacific:

## Estimating the Gains from Reform

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**Abstract:** Transparency is an important but under-researched aspect of trade facilitation. We define transparency of the trading environment in terms of two elements—predictability and simplification. Using factor analysis, we produce composite indices of exporter and importer transparency that summarize information on these two elements drawn from a wide range of sources. Estimation results from a gravity model of intra-APEC trade suggest that importer transparency is positively and significantly related to bilateral trade, and that its impact is quite separate from the nominal restrictiveness of tariffs and NTBs. This result is robust to the presence of zero trade flows, and holds even with application of an instrumental variables estimator to account for the potential endogeneity of transparency with respect to trade. Counterfactual simulations show that improving trade-related transparency could hold significant benefits for APEC: at least \$148bn, or 7.5% of baseline trade. We find evidence that these benefits are greater than for other ready alternatives, such as moderate reductions in the restrictiveness of tariffs and non-tariff barriers.

**Keywords:** Transparency, Uncertainty, Trade Costs, Non Tariff Barriers, APEC Economies

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<sup>2</sup> The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent.

# 1 Introduction

In the development context, it is increasingly recognized that tariff liberalization is not enough to ensure the integration of an economy into international markets (World Bank IEG, 2006). Barriers other than tariffs hinder firms in emerging economies from successfully entering export markets. It is therefore natural that as tariff levels have fallen over recent decades, attention has increasingly focused on non-tariff barriers (NTBs) and other “non-traditional” sources of trade costs. Measures to facilitate trade—and reduce such costs—have therefore become a key priority for policymakers and international development institutions.

Our aim in this paper is to explore the importance of a dimension of trade facilitation reform that has been relatively under-analyzed to date, namely the transparency of the trade policy environment. We draw on empirical evidence from APEC member economies to show that it is not only the restrictiveness of the trade policy environment that is important in determining the degree of an economy’s international integration, but also the way in which that environment is designed and administered. In particular, two dimensions of transparency—predictability and simplification—appear to contribute significantly to intra-regional trade costs, and their effects are discernable even after controlling for the restrictiveness of tariff and non-tariff barriers to trade.

More formally, we first use factor analysis to produce composite transparency indices covering exporting and importing economies in the APEC region. This methodology allows us to synthesize a wide range of transparency indicators, such as the prevalence of unofficial payments and hidden trade barriers, the complexity of import/export procedures, and the complexity of the national tariff schedule. We then use a gravity model of intra-regional trade to estimate the

sensitivity of bilateral flows to changes in importer and exporter transparency. Even with the use of instrumental variables estimation to take account of the possible endogeneity of our transparency measures, we find that the association between trade flows and importer transparency is both economically and statistically significant. Counterfactual simulations using the estimated gravity coefficients suggest that the potential gains from improving transparency are large: at least \$148bn, or 7.5% of baseline trade. Indeed, we find that these gains are greater than those associated with comparable reductions in the restrictiveness of tariff and non-tariff barriers.

This paper builds on and extends the existing literature in three main ways. First, we provide the first operational definition of transparency in the trade context in terms of two separate dimensions: predictability and simplification. We expand the existing trade facilitation agenda by showing how improvements along these dimensions can reduce the effective trade costs faced by firms. We also add to the literature on the role of institutions in international trade by examining in detail transparency as one particular example. Second, we combine information from existing sources, such as the *Global Competitiveness Report* and the World Bank's *Doing Business* database, into composite indices of importer and exporter transparency. Third, we take particular care when estimating our gravity model of intra-regional trade, so as to ensure that it adequately accounts for the presence of zero trade flows in disaggregated data, as well as the possible endogeneity of transparency to bilateral trade. We therefore use a Poisson quasi-maximum likelihood estimator (Santos Silva and Tenreyro, 2006), combined with an instrumental variables technique in which we use British colonization to identify exogenous variation in transparency. We find that endogeneity leads to significant bias in the estimated elasticity of trade with respect

to transparency, which has important implications for empirical international trade work which sometimes assumes that trade costs are exogenous.

The next Section briefly sets out the rationale for addressing transparency issues in the context of trade facilitation. Section 3 then presents the importer and exporter transparency indices. Our gravity model and estimation results are discussed in Section 4, while Section 5 concludes with some suggestions for further research in this area.

## **2 Transparency and Trade Facilitation: What are the Links?**

The concept of trade facilitation is open to many different interpretations. The narrow definition of trade facilitation takes it to be the streamlining of customs and border procedures, and this is the sense in which it is often used in the context of WTO negotiations (Finger and Wilson, 2006). At its broadest, the defining theme of trade facilitation involves lowering all types of transaction costs associated with international trade (Wilson et al., 2005). Whilst lowering the restrictiveness of at- and behind-the-border measures can be seen as one aspect of this process, there is also a case to be made for including this analysis within the alternative framework of transparency. The advantage of such an approach is to make clear that the trading environment is not adequately characterized by a consideration of nominal policy settings alone: it is also important to go further, and to address the ways in which policies affecting trade are designed and implemented. Thus, two of the three GATT articles on trade facilitation (Article VIII and Article X) explicitly promote transparency in the application and publication of trade policy instruments. Moreover, the current WTO negotiations on trade facilitation focus on streamlining customs procedures in order to reduce costs for traders, and thereby create a more transparent

and efficient trading environment. (See Wolfe, 2003, for a review of the role that transparency plays in the multilateral trading system.)

There is already a considerable literature examining the general effects of institutions on international trade. The most common approach is to use a gravity-type model of international trade to examine the relationship between institutional quality, or cross-country institutional differences, and bilateral trade flows. Examples include: De Groot et al. (2004), Jansen and Nordas (2004), and Francois and Manchin (2006). Meanwhile, Levchenko (Forthcoming) incorporates institutions into a general equilibrium framework, and shows that institutional differences can constitute a distinct source of comparative advantage.

However, despite these advances, relatively little attention has been paid to transparency as one major aspect of the institutional framework for international trade. Only Anderson and Marcouiller (2002) explicitly use transparency as one indicator of institutional strength. In the context of a structural gravity model, they find that transparency exerts a positive and statistically significant influence on bilateral trade flows.

In this paper, we view transparency as one part of the institutional framework for international trade which is of particular importance from a trade facilitation point of view. There is already a considerable literature attesting to the potential trade gains to be had from investing in trade facilitation (e.g., Wilson et al., 2005). To see more clearly the economic rationale for bringing together transparency and trade facilitation within a single framework, it is helpful to be more precise as to exactly the way in which we are using the term “transparency”. Although there is as yet no set definition of transparency in the trade context, the 2001 APEC Principles on Trade Facilitation provide a useful and policy-relevant starting point. We focus in on two of the areas

identified by APEC member economies, and use them to identify distinct dimensions of transparency:

**“Simplification, Practicability and Efficiency:** Rules and procedures relating to trade should be simplified to ensure that they are no more burdensome or restrictive than necessary...

**Consistency and Predictability:** Rules and procedures relating to trade should be applied in a consistent, predictable and uniform manner with integrity so as to minimize uncertainty to the trade and trade related parties. ...”

Both of these elements relate to the transparency of the trade policy environment, in the sense that they have more to do with the design and administration of trade-related policies than with the nominal restrictiveness of those policies. From the point of view of applied economic analysis, both dimensions of transparency—predictability and simplification—can be seen as potential sources of cost to importing and exporting firms, which makes them properly the subject of trade facilitation measures.

One example of the potential for unpredictable trade-related policies to generate additional costs for exporters and importers is given by Francois and Martin (2004). Those authors develop a simple economic model of the process of binding tariffs through multilateral commitments. They show that in a stochastic framework, greater policy predictability translates into higher expected profits for exporters, and is therefore associated with increases in the intensity of trade flows and economic welfare. They find that in the case of wheat tariffs pre- and post-Uruguay Round, reductions in tariff unpredictability were responsible for at least half the overall welfare gains in four of the seven economies studied.

The analysis by Francois and Martin (2004) focuses on the predictability of tariffs. This should not be taken to suggest, however, that this is the only part of the trade policy environment in which these factors matter. The argument can easily be extended to other types of trade costs.

For instance, transport and logistics costs—to which time delays contribute—can often make up a significant proportion of the wedge between international and domestic prices, particularly in developing economies. Arvis et al. (2007) show that unpredictable transport times can indeed impose significant economic costs on firms, in addition to the direct impacts of delays. This is because firms need to manage inventories based on expected transport delays, and they therefore tend to run larger inventories—and incur higher costs—when there is greater uncertainty surrounding those delays.

The same is generally true of corruption and unofficial payments, which constitute a significant trade cost in some economies. Fisman and Gatti (2006) show that the economic costs of corruption are lower in economies where institutional factors provide firms with relatively more predictability as to the level of payment required, and the service obtained in return.

Finally, multi-dimensional trade policy and procedures can impose significant information costs on potential exporters and importers, in addition to the direct costs of the policies and procedures themselves: firms need to identify the existence of each separate instrument, ascertain its current level of restrictiveness, assess the costs it imposes, and ensure compliance with necessary formalities. Thus, improving transparency through simplification of trade-related policies has the capacity to reduce these information costs and thereby make trading more profitable for exporters and importers, even if the nominal restrictiveness of the policies in question remains unchanged.

Recent research results show that simplification is indeed important for trade performance. For example, Djankov et al. (2006) use data from the World Bank's *Doing Business Report* to show that the time taken to move goods through port facilities and customs administrations is an

important determinant of the costs of trade, and can impact significantly on aggregate trade flows.

### **3 Measuring Transparency**

There does not exist any single measure for either of the two dimensions of transparency we have identified. Since both predictability and simplification can be viewed from a number of different angles, the first task in seeking to measure performance in these areas is to find a way of synthesizing a number of different indicators into a single, composite measure. We proceed as follows. First, we identify a set of indicators covering these two dimensions of transparency. We then use factor analysis to produce composite indices of exporter and importer transparency, defined in each case as the first principal factor of the given set of indicators. We refer to these as the Importer Transparency Index (ITI) and the Exporter Transparency Index (ETI).

The above methodology reflects the approach taken by Anderson and Marcouiller (2002) in producing a composite security index, and is close to the principal components methodology used by Francois and Manchin (2006) to produce summary indices of country performance in the areas of infrastructure and institutions. We prefer the first principal factor to the first principal component because the former allows for variation within the indicator set to be due to both common and individual causes, while the latter assumes that all variation is common.

Our composite indices capture predictability using the following set of indicators (see Table 1 for a full description of data and sources):

- Percentage of tariff lines that are bound (MAcMap): A greater percentage of bound lines equates with greater predictability, since it implies stronger constraints on policymakers.

- Standard deviation of applied tariffs (MAcMap): More complex tariff schedules are associated with greater potential for classification disputes over product definition or national origin. Lower tariff rate dispersion therefore equates with greater predictability.
- Absence of “hidden” trade barriers (Global Competitiveness Report): Trade barriers other than officially published tariffs and quotas make it more difficult for exporters and importers to accurately predict the trade costs their products will face.
- E-government readiness (United Nations): Publication of tariff schedules on the internet or using the internet to announce upcoming changes in trade policy can enhance predictability.
- Maximum/minimum spread of import/export delays (Logistics Perception Index): Greater certainty as to the time taken to move goods (i.e., a lower spread) tends to mean lower inventory costs for exporters and importers.
- Standard deviation of unofficial payments in imports/exports (Global Competitiveness Report): Where payment of bribes is common, institutional characteristics that promote greater certainty as to whether or not a bribe is required, and if so its amount, are associated with greater predictability for exporters and importers.
- Lack of favoritism in administrative decisions (Global Competitiveness Report): Excessive liberty for administrators to favor particular firms tends to reduce trade policy predictability.

We use the following additional indicators to capture simplification:

- Number of documents required for import/export and time taken (Doing Business): Fewer documentary requirements, and quicker clearance times, translate into lower administrative costs for exporters and importers. They can also mean lower information costs in terms of

understanding the set of steps that must be taken in order to ensure smooth passage through customs and border administrations.

- Fewer border agencies (Logistics Perception Index): We expect that fewer agencies will be associated with companies spending less time—and therefore money—on dealing with administrators and ensuring compliance with the separate requirements of each agency.
- Limited unofficial payments (Global Competitiveness Report): The need to make unofficial payments can in some cases impose an extra dimension of costs on exporters and importers. An example is the case when a bribe is required in order to “facilitate” access to the national market, even after payment of official duties and taxes.<sup>3</sup>

Results of factor analysis performed on the above indicator sets are presented in Figures 1 and 2, with index scores re-scaled to lie between 0 (least transparent) and 1 (most transparent). All APEC member economies are included in the sample, except for Brunei, Papua New Guinea, and Chinese Taipei, which are excluded due to lack of data on particular indicators. We find that both importer and exporter transparency vary considerably across the region. This is quite in line with expectations, given that APEC as a regional grouping is very diverse. The list of economies with relatively high ITI and ETI scores is unsurprising: Singapore and New Zealand are at the head of both lists. By contrast, Russia and Vietnam arrive at the opposite end of the scale in both cases.

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<sup>3</sup> We are aware, however, that the mechanism will not always work in this way. If a bribe is paid in order to avoid official duties, then by assumption it should result in lower nominal trade costs. Nonetheless, the importer or exporter will still need to deal with an added “layer” of costs, in the sense of having to deal with customs agents in order to “negotiate” an acceptable deal.

The ETI and ITI are effectively weighted averages of the set of underlying indicators discussed above. It is therefore important to be clear about the weights given to different components in calculating the overall score, so that the main drivers of variation in the index can be identified. The factor analysis weights presented in Table 3 show that in the case of importer transparency, it is import time, hidden trade barriers, and irregular payments (level and dispersion) that are weighted most strongly in the final index. For the ETI, irregular payments (level and dispersion) and export time again stand out as having particularly high weights. Our results therefore suggest that these variables are important determinants of transparency in the trade context. Consequently, if the trade gains from greater transparency are found in the next Section to be significant, then reform efforts might initially be focused in those areas in order to have maximum impact.

## 4 Estimating the Gains from Greater Transparency

In this Section, we provide a first assessment of the quantitative impact of transparency on trade flows amongst APEC economies. To do this, we use the workhorse of empirical international trade work, namely the gravity model. We first set out in detail our model and estimation results, and then discuss the additional insight gained from running counterfactual simulations and comparing results across various reform scenarios.

### 4.1 Empirical Model

Anderson and Van Wincoop (2003, 2004) derive a theoretically consistent gravity model of exports from economy  $i$  to economy  $j$  in sector  $k$  ( $X_{ij}^k$ ). It takes the following form:

$$\log(X_{ij}^k) = \log(E_j^k) + \log(Y_i^k) - \log(Y^k) + (1 - \sigma_k) \log(t_{ij}^k) - (1 - \sigma_k) \log(P_j^k) - (1 - \sigma_k) \log(\Pi_i^k) + \varepsilon_{ij}^k \quad (1)$$

where:  $Y_i^k$  = Output of economy  $i$  in sector  $k$ ;  $E_j^k$  = Expenditure of economy  $j$  in sector  $k$ ;  $Y_i^k =$  Aggregate (world) output in sector  $k$ ;  $\sigma_k$  = Elasticity of substitution in sector  $k$ ;  $t_{ij}^k$  = Trade costs facing exports from economy  $i$  to economy  $j$  in sector  $k$ ;  $\omega_i^k$  = Economy  $i$ 's output share in sector  $k$ ;  $\omega_j^k$  = Economy  $j$ 's expenditure share in sector  $k$ ; and  $\varepsilon_{ij}^k$  = Random error term, satisfying the usual assumptions. Inward resistance  $(P_j^k)^{1-\sigma_k} = \sum_{i=1}^N \Pi_i^{\sigma_k-1} \omega_i^k (t_{ij}^k)^{1-\sigma_k}$  captures the fact that  $j$ 's imports from  $i$  depend on trade costs across all suppliers. Outward resistance  $(\Pi_i^k)^{1-\sigma_k} = \sum_{j=1}^N P_j^{\sigma_k-1} \omega_j^k (t_{ij}^k)^{1-\sigma_k}$ , by contrast, captures the dependence of exports from  $i$  to  $j$  on trade costs across all importers.

Before implementing this model in an empirical setting, we need to specify bilateral trade costs  $t_{ij}^k$  in terms of observable variables. In addition to the ETI and ITI, we include the importer's applied tariff  $(1 + \tau_{ij}^k)$ , as well as the ad valorem equivalent of its non-tariff barriers ( $ntb_i^k$ ), as calculated by Kee et al. (2006). Additional factors are captured using a set of bilateral (economy-pair) fixed effects ( $\alpha_{ij}$ ).

$$\log(t_{ij}^k) = \beta_1 \log(1 + \tau_{ij}^k) + \beta_2 \log(ntb_i^k) + \beta_3 \log(ITI_i) + \beta_4 \log(ETI_j) + \sum_{i \neq j} \alpha_{ij} \quad (2)$$

Substituting (2) into (1) and including sector fixed effects in addition to economy-pair fixed effects gives our baseline estimating equation:<sup>4</sup>

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<sup>4</sup> In fact, this involves a slight simplification. A strict derivation from (1) would imply a large number of additional parameters, including fixed effects in the country-pair-sector dimension and interaction terms between each of the trade cost parameters and the sector fixed effects. See Baldwin and Taglioni (2006) on this and similar points. The expedient we have adopted represents a compromise between theoretical rigor and empirical tractability.

$$\log(X_{ij}^k) = \sum_{i \neq j} \alpha_{ij} + \beta_1 \log(Y_i) + \beta_2 \log(Y_j) + \beta_3 \log(1 + \tau_i^k) + \beta_4 \log(ntb_i^k) + \dots \quad (3)$$

$$\dots + \beta_5 \log(ITI_i) + \beta_6 \log(ETI_j) + \sum \gamma_k + \varepsilon_{ij}^k$$

We estimate (3) using Poisson pseudo-maximum likelihood (Santos Silva and Tenreyro, 2006) in order to take into account the presence of bilateral trade flows that are zero or missing from the dataset. Another option would be to estimate a Heckman sample selection model, as done by Helpman et al. (2007). However, we prefer the Poisson estimator since inclusion of a potentially large number of fixed effects does not lead to potential bias or inconsistency problems, as is the case for many non-linear panel data models including the first stage probit estimator used by the Heckman model. See Greene (2004) on this point.

Our data and sources are set out in full in Table 1. For our baseline results, we use bilateral trade data disaggregated to the HS 2-digit level. Our tariff data come from the MAcMap database (Laborde et al., Forthcoming). MAcMap applied tariffs are bilaterally disaggregated, and take full account of regional agreements and preference schemes. We aggregate the original HS 6-digit data to the HS 2-digit level using a reference group weighting scheme that limits endogeneity problems (Laborde et al., Forthcoming). Essentially, tariffs for economy  $i$  are weighted by the import patterns of comparable countries, rather than by those of economy  $i$  itself. We take ad valorem equivalents of non-tariff barriers from Kee et al. (2006)—and aggregate them to the 2-digit level in the same way—while GDP data are sourced from the World Development Indicators. We estimate for a cross-section of APEC member economies for the year 2004. Although it would be desirable to expand our analysis to a panel setting, we are currently constrained by data limitations (in particular the Doing Business, Logistics Perception Index, and MAcMap datasets).

## 4.2 *Estimation Results*

Table 4 presents our baseline estimation results. The first column covers all HS Chapters, while the second excludes raw materials (Chapters 1-27) and the third excludes in addition basic manufactures (Chapters 1-83). We find that coefficients generally carry the expected signs and are statistically significant at the 5% level. However, results are noticeably clearer in the case of the trade policy variables in the last two columns when raw materials are excluded. The reason is probably that the markets for agricultural goods and raw materials are often still heavily distorted through different economic policy interventions. For our analysis we therefore focus on the estimation results with this sector excluded.

Moving down column 2, we find that both importer and exporter market size (GDP) are positively associated with bilateral trade, with an income elasticity approaching unity. Similarly, higher bilateral tariffs are associated with reduced trade: it is approximately the case that a 1% cut in applied tariffs is associated with a 2.8% increase in trade. The same applies to non-tariff barriers, although the elasticity is less than half as strong. Finally, the two variables of main interest, namely the ETI and ITI are both strongly positive and statistically significant. Column 2 suggests elasticities of 6.8 and 8.9 respectively. Indeed, the effects for all dimensions of trade policy, including transparency, would appear to be even stronger on the basis of column 3. We take this as evidence indicating that the impact of transparency might be stronger for manufactured goods than for raw materials, since the former are more subject to problems of, for example, misclassification than are the latter.

To test this hypothesis more extensively, we re-estimate the gravity model separately for differentiated and homogeneous goods. We identify these products using the classification scheme due to Rauch (1999), who divides all products at the 4 SITC digit level into three groups:

goods traded on an organized exchange, reference priced goods, and differentiated products. We consider the first two as homogenous products and the later group as bringing together heterogeneous products. Running the same gravity equation on both groups yields the results which are presented in the last two columns of Table 4. In column (4), where only differentiated products entered the equation, the estimation results appear to support our earlier claim that transparency is of special importance for heterogeneous goods. Column (5) shows that the coefficients decrease considerably when homogeneous goods are considered.

In interpreting these results, we have been careful thus far to avoid references to causality. It would not be appropriate to conclude from Table 4, for instance, that improved transparency necessarily “causes” an increase in bilateral trade. This is because simple gravity results like those in Table 4 do not account for possible estimation bias due to the endogeneity of transparency with respect to trade. In other words, while Table 4 is consistent with a causal link running from transparency to bilateral trade, it is also consistent with a link running in the opposite direction: i.e., economies may tend to be more transparent because they have higher trade volumes, which leads to greater pressure for reform. Indeed, it is likely in reality that causation runs in both directions at once, and that improved transparency leads to more intense bilateral trade flows, while more trade also leads to greater transparency.

We adopt a simple instrumental variables technique to try and take account of the probable endogeneity of transparency with respect to bilateral trade. As usual, the principal difficulty lies in identifying an appropriate set of instruments for the ETI and ITI. One possible candidate in this case is colonial history (cf. Acemoglu et al., 2001). Pre-20<sup>th</sup> Century colonization generally leaves institutional marks on the colonized area, including potentially those institutions that govern trade policy formation and implementation. Indeed, our dataset reveals that in the APEC

sample, a dummy variable coded so as to capture colonization by Great Britain is strongly positively correlated with our two transparency indices: the simple correlation coefficient is 0.72 for the ITI and 0.74 for the ETI. Since British colonization took place in this region largely in the 18<sup>th</sup> and 19<sup>th</sup> centuries, we can be confident that it is exogenous to current (i.e., 2004) bilateral trade flows. We therefore use two dummy variables, one for exporter colonization by Great Britain and another for importer colonization by Great Britain, as instruments for exporter and importer transparency respectively.

Wooldridge (2002, pp. 663-665) sets out a straightforward methodology for instrumental variables estimation of Poisson models. In the first stage, the endogenous explanatory variables are regressed by OLS on the exogenous explanatory variables and the instruments. The residuals from the first stage regressions are then included as additional regressors in the final Poisson regression. We apply this approach to obtain the results in Table 5, treating ETI and ITI as the only endogenous variables. Tariffs and non-tariff barriers are treated as exogenous in this case, because the reference group aggregation scheme we have used to produce HS 2-digit data means that the endogeneity problem is far more limited than would be the case if, for instance, simple trade weighting had been used.

Moving down column 2, we see that both importer and exporter GDP retain their expected positive signs and are statistically significant at the 1% level, while tariffs and NTBs both impact negatively on bilateral trade. While NTBs are statistically significant at the 5% level, bilateral tariffs are only marginally significant at the 15% level. In both cases, however, the impacts of these variables on trade are economically significant: a 1% tariff cut or reduction on the ad valorem equivalents of NTBs increases bilateral trade flows by around 1%.

In terms of our transparency indices, it is primarily the ITI that has a discernable negative impact on trade: a 1% improvement in the economy's index score is associated with a nearly 2% boost to trade. In the case of the ETI, our results are less clear-cut. Although the coefficient on that variable in column 2 has a negative sign, we do not interpret that result literally. Rather, we conclude that the impact of exporter transparency is considerably less than for importer transparency, and in the context of the column 2 regression it is so weak as to be indistinguishable from zero. This interpretation sits well with the general thrust of our regression results in Tables 4-5, and would be consistent with the view that it is primarily import market, rather than export market, transparency which matters for bilateral trade. However, this interpretation must be regarded as tentative, and other possible reasons behind the unexpected sign of the ETI coefficient in Table 5 will need to be investigated further in future research on this subject.

Comparing Table 5 with Table 4 suggests that endogeneity of our transparency measures is indeed important, and has the capacity to impact results significantly. For example, the ITI elasticity in column (2) of Table 4 is 8.9, while it is only 1.9 in Table 5. Accounting for reverse causality running from trade flows to transparency can be seen to be important so as to avoid over-estimating the relevant elasticity. This is potentially an important point to be taken up in future research, since standard gravity model formulations tend to treat trade costs as exogenous, rather than potentially endogenous.

### ***4.3 Simulation of Possible Gains from Improved Trade Policy Transparency***

Results from our gravity equation suggest that higher levels of trade policy transparency, particularly in relation to importing, are indeed associated with stronger bilateral trade links. From a policy point of view, it is also important to be able to gauge the strength of that effect

relative to other policy options. To provide some first indications in this direction, we now use the gravity model results in column 2 of Table 5 to conduct some simple counterfactual simulations (cf. Wilson et al., 2005). For each simulation, we specify the counterfactual in terms of a given exogenous “shock” to a single policy variable. We then map that shock to trade impacts using the elasticities we have estimated. Comparing impacts from one simulation to another gives an idea of the relative trade gains involved.

Concretely, we consider three simulation scenarios, each of which represents an ambitious but, we believe, feasible medium-term objective within APEC:

- Scenario I: Improve importer transparency within the APEC region such that no economy is below the current regional average (0.54).
- Scenario II: Reduce applied tariffs within the APEC region such that no economy applies a higher level of protection than the regional average for each HS Chapter.
- Scenario III: Reduce the ad valorem equivalents of non-tariff barriers within the APEC region such that no economy applies a higher level of protection than the regional average for each HS Chapter.

In line with our estimations, trade impacts for these scenarios refer to intra-APEC trade only, and exclude raw materials (HS Chapters 1-27). Results show that APEC member economies can indeed boost intra-regional trade significantly by cutting tariffs, reforming NTBs, or promoting transparency. Relative to other ready alternatives, policies aimed at increasing trade policy transparency in the APEC region would appear to have the potential for high impact: improving importer transparency to the regional average is associated with an increase in intra-regional trade on the order of 7.5%, as compared with only 0.9% for scenario II and 1.8% for scenario III.

In monetary terms, these effects equate to approximately US\$148bn, US\$18bn, and US\$35bn respectively.

Region-wide aggregates obscure the fact that these results are subject to considerable heterogeneity across economies. In light of this dynamic, it is useful to look at trade impacts on an economy-by-economy basis (see Figures 3-5). Each of the three Figures shows that the import gains from reform tend to be concentrated in a few economies, while the export (market access) gains are spread more widely across the region. Such a distribution is inherent in the design of our counterfactuals: only those economies with transparency, tariff, or NTB scores below the regional average receive a policy “shock”, and therefore only those economies can reap an import gain from reform. However, to the extent that other APEC member economies export to reforming economies, then they can take advantage of a corresponding market access gain.

Overall, we conclude that the potential intra-regional trade gains from reform are substantial for all three counterfactual scenarios. This is reinforced by a consideration of the distribution of export and import gains, which shows that certain economies stand to benefit to a level far in excess of the regional average.

Before concluding this Section, it is important to stress that our results, like all simulation results, are subject to a number of caveats. First, we are dealing with trade effects and not economic welfare as such. Second, our results apply only to intra-regional trade in manufactures, and do not take account of possible extra-regional effects. Given that the policy reforms contemplated here—in particular in Scenario I—can be implemented in a non-discriminatory manner, there is considerable scope to produce gains for economies outside APEC as well. Assuming that non-discrimination is adhered to, our results could therefore be interpreted as a lower bound for the likely range of overall (worldwide) effects. Third, our simulations implicitly assume that the

elasticities on which they are based remain constant before and after the policy shock. While this may be the case for small policy changes, it is unlikely to hold for major regime shifts. Fourth, our simulations are based on data for the year 2004. As new data become available, we expect that the results for economies having undergone major policy shifts since then—such as WTO accession for Vietnam—may change significantly. Finally, Scenarios II and III do not take account of quantitative restrictions that may represent binding constraints on bilateral trade even once tariffs and other NTBs are lowered.

It is also important to note the issue of cost. Reductions in tariffs and ad valorem equivalents of NTBs impose relatively few direct resource costs on central governments. However, for trade facilitation measures including those aimed at transparency, the cost implications are potentially larger. While we do not have sufficient information available to assess the costs in this case, we would simply highlight that when compared with other trade facilitation measures—such as upgrades of “hard” infrastructure—the cost of improving performance across the set of transparency measures we are dealing with here is likely to involve manageable levels of costs. The government actions required are often legal and administrative in character, along with equipment upgrades in some cases (e.g., e-government readiness), and are therefore unlikely to involve costs on the level of, for instance, a port or road network upgrade. However, the nature of these actions also suggests an ongoing need for technical cooperation and capacity building, since the measures involved are often complex.<sup>5</sup>

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<sup>5</sup> On the basis of six case studies, including one APEC member economy, McLinden (2006) reports that the costs of implementing improved trade facilitation may be smaller than previously thought. The improvements considered by the author, based on the possible contours of a future WTO agreement, would involve costs ranging from US\$165,000 to US\$1.3m per economy.

## 5 Conclusions and Suggestions for Further Research

The results we have presented suggest that APEC member economies have been right to make a close link between transparency and trade facilitation. Not only are the two ideas closely related on a conceptual level, but in a practical sense they tend inevitably to overlap. As tariff barriers continue to fall around the world, it becomes all the more important for economies to focus on additional ways of reducing trade transaction costs. Improving the transparency of the trading environment by making it simpler and more predictable is likely to hold significant trade payoffs for reformers.

This paper constitutes one of the first efforts to comprehensively examine the possible economic gains from increased trade policy transparency within a quantitative framework. We expect that future research will add considerable detail and nuance to these results, and will provide additional insights for policymakers. However, even at this relatively early stage, we can draw some significant, policy-relevant conclusions:

- Trade policy reform efforts need to focus not just on the restrictiveness of traditional measures such as tariffs, but also on transparency or the way in which these measures are designed and administered.
- Making trade policy more transparent involves policy reforms in two main areas: predictability and simplification. Both types of measures can help reduce the transaction costs associated with international trade.
- Simulations from a standard gravity model of international trade suggest that the potential intra-regional trade gains from improved transparency are substantial compared with alternative policies: approximately \$148bn, or 7.5% of baseline (2004) trade. Assuming non-

discriminatory implementation of policy reforms, the overall gains will be larger once extra-regional trade is taken into account.

- Based on the indicators most heavily weighted in our importer and exporter transparency indices, future transparency priorities for APEC member economies could include unofficial payments, “hidden” trade barriers, and trading times.

At the same time, there are a number of areas in which additional policy-relevant research could assist policymakers in identifying national and regional priorities in relation to transparency. First, the results we have presented suggest that the impact of improved transparency may differ from sector to sector. In particular, we would argue that the effect appears to be relatively stronger for trade in differentiated products. In future research, it will therefore be important to identify in greater detail the mechanisms that lead to this outcome. In the APEC context, one aspect of this issue that is likely to be significant is the role of transnational production networks, which often rely on being able to move highly differentiated inputs across borders quickly, cheaply, and reliably. Future empirical work may well show that transparency is particularly important for these business models.

Second, while this study has focused on the general area of trade in goods, this is not the only domain in which increased transparency could potentially have benefits in terms of regional integration. Issues of regulatory transparency are also crucial in relation to trade in services, and more broadly in terms of regulatory reform affecting services sectors. However, measuring the extent of barriers to services trade, and quantifying their economic impacts, is an extremely challenging task. This is because such barriers are almost always linked to important issues of “behind-the-border” regulation. Similar comments apply to the issue of international investment flows. Behind-the-border barriers, including transparency-related factors, are important in

understanding the determinants of foreign direct investment. However, just as for services trade, they tend to be extremely difficult in terms of identification and impact assessment. It will therefore be important for future research on transparency to cover all of these dimensions.

Finally, a question as to the mechanics of reform underlies all of the above points. Although increased transparency and regulatory reform might be in the national interest, such moves might be opposed by vested interests and lobby groups. The political economy of reform is thus an important area for future research—including most importantly in relation to corruption and unofficial payments. Corruption does not exist in a vacuum, but is the outcome of a complex set of interactions amongst traders and officials, taking place against the background of national trade policy choices.<sup>6</sup> Moving forward on corruption therefore requires detailed analysis of its determinants, as well as on the design of incentive-compatible policy reforms.

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<sup>6</sup> On this point, see: Fisman and Wei (2004), Gatti (1999, 2004), Javorcik and Narciso (2007), and Fisman and Gatti (2006).

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## 7 Tables

**Table 1 Data and Sources**

<b>Variable</b>	<b>Description</b>	<b>Year</b>	<b>Source</b>
<b>Bound Lines<sub>i</sub></b>	Measures the percentage of bound lines in the tariff schedule of economy i.	2002-2004	MAcMAP (2007)
<b>Clearance Time<sub>i</sub></b>	Measures the number of days needed for import or export clearance in economy i.	2006	Doing Business (2007)
<b>E-Readiness<sub>i</sub></b>	Measures the state of e-government readiness of UN Member States in economy i. It is a composite index comprising the Web measure index, the Telecommunication Infrastructure index and the Human Capital index.	2005	United Nations Government E-Readiness (2007)
<b>Favoritism<sub>i</sub></b>	Measures the extent of favoritism in economy i. Based on responses to the question: "When deciding upon policies and contracts, government officials (1=usually favor well-connected firms and individuals, 7=are neutral among firms and individuals)".	2004	Global Competitiveness Report (2005)
<b>GDP Exporter</b>	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates.	2004	World Bank, World Development Indicators (2007)
<b>GDP Importer</b>	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates.	2004	World Bank, World Development Indicators (2007)
<b>Hidden Barriers<sub>i</sub></b>	Measures the extent of favoritism in economy i. Based on responses to the question: "When deciding upon policies and contracts, government officials (1=usually favor well-connected firms and individuals, 7=are neutral among firms and individuals)".	2004	Global Competitiveness Report (2005)
<b>Imports<sub>ijk</sub></b>	Imports of economy i from economy j in sector k. Aggregated at the HS 2 digit level and SITC 4 digit level.	2002-2004	MAcMAP (2007)
<b>Irreg. Paym.<sub>i</sub></b>	Measures the extent of irregular payments in economy i. Based on responses to the question: "In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with import and export permits (1=common, 7=never occur)".	2004	Global Competitiveness Report (2005)
<b>No. of Agencies<sub>i</sub></b>	Counts the average number of border agencies involved in imports or exports in economy i.	2006	Logistics Perception Index (2007)
<b>No. Documents<sub>i</sub></b>	Counts the average number of documents needed for imports or exports in economy i.	2006	Doing Business (2007)
<b>NTB<sub>i</sub> (RG Weighted)</b>	Non-tariff barriers in economy i are calculated as the difference between the overall trade restrictiveness index (OTRI) and the trade restrictiveness index (TRI) for each tariff line. It is weighted by reference group weights and converted to logarithm of (1 + NTB).	2001/2004	Kee et al. (2006)
<b>Std. Dev.</b>	Standard deviation for the answer to the question on irregular	2004	Global

Variable	Description	Year	Source
<b>Irreg. Paym.<sub>i</sub></b>	payments in economy i.		Competitiveness Report (2005)
<b>Tariff<sub>i</sub> (RG Weighted)</b>	The tariff rate of economy i is measured as the effective applied MFN rate, which is defined as (specific applied MFN tariff/Unit Value) + ad valorem applied MNF tariff. It is weighted by reference group weights and converted to logarithm of (1 + tariff).	2002-2004	MAcMAP (2007)
<b>Tariff Dispersion<sub>i</sub></b>	Standard deviation of effective applied MFN tariffs in HS 4 digit product groups in economy i.	2002-2004	MAcMAP (2007)
<b>Time Spread<sub>i</sub></b>	Difference between the maximum and minimum number of days for clearance needed for imports or exports in economy i.	2006	Logistics Perception Index (2007)

**Table 2 Economies included in the dataset.**

Group	Members
<b>Importers</b>	Australia*, Brunei, Canada*, Chile*, China*, Hong Kong China*, Indonesia*, Japan*, Korea*, Malaysia*, Mexico*, New Zealand*, Papua New Guinea, Peru*, Philippines*, Russia*, Singapore*, Chinese Taipei, Thailand*, USA*, Vietnam*.
<b>Exporters</b>	Australia*, Brunei, Canada*, Chile*, China*, Hong Kong China*, Indonesia*, Japan*, Korea*, Malaysia*, Mexico*, New Zealand*, Papua New Guinea, Peru*, Philippines*, Russia*, Singapore*, Chinese Taipei, Thailand*, USA*, Vietnam*.

*Note: \* indicates economies included in the effective sample for the regression.*

**Table 3: ITI and ETI principal factor weights.**

	ITI	ETI
<b>Percent unbound</b>	0.05413	NA
<b>Std. dev. tariffs</b>	0.01701	NA
<b>Std. dev. irreg. pay.</b>	0.18255	0.26815
<b>Std. dev. time</b>	0.0498	0.05531
<b>Lack e-readiness</b>	0.10241	0.14315
<b>Time</b>	0.22514	0.25988
<b>Documents</b>	0.04792	0.03612
<b>Agencies</b>	0.06361	0.14932
<b>Favoritism</b>	0.11891	0.09455
<b>Irreg. payments</b>	0.15849	0.1532
<b>Hidden barriers</b>	0.19511	NA

*Note: Time, documents, and agencies refer to import time, number of import documents, and number of import agencies for the ITI, and the corresponding export variable for the ETI.*

**Table 4 Gravity equation estimation results (baseline)**

	All goods	HS > 27	HS > 83	Diff. Goods	Homog. Goods
GDP Importer	0.771*** [0.050]	0.844*** [0.060]	0.860*** [0.074]	0.792*** [0.078]	0.691*** [0.053]
GDP Exporter	0.788*** [0.061]	0.933*** [0.068]	0.977*** [0.078]	0.934*** [0.093]	0.596*** [0.063]
Tariff (RG Weighted)	-0.784 [0.488]	-2.807*** [0.921]	-3.132** [1.597]	-0.936 [1.015]	-0.923 [0.691]
NTB (RG Weighted)	0.305 [0.462]	-1.045** [0.434]	-2.034*** [0.663]	-0.069 [0.220]	1.046*** [0.365]
Imp. Transparency	<b>6.886***</b> [2.028]	<b>8.901***</b> [2.401]	<b>9.622***</b> [2.817]	<b>8.371***</b> [3.324]	<b>2.379</b> [2.052]
Exp. Transparency	<b>4.842***</b> [1.655]	<b>6.826***</b> [2.069]	<b>7.258***</b> [2.463]	<b>5.170**</b> [2.677]	<b>2.046</b> [1.745]
Observations	29,376	2,1114	4,284	76,500	50,694

Robust standard errors in brackets; \* significant at 15%; \*\* significant at 10%; \*\*\* significant at 5%

**Table 5 Gravity equation estimation results (instrumental variables)**

	All goods	HS > 27	HS > 83	Diff. Goods	Homog. Goods
GDP Importer	0.605*** [0.023]	0.596*** [0.016]	0.599*** [0.018]	0.577*** [0.021]	0.641*** [0.028]
GDP Exporter	0.660*** [0.020]	0.745*** [0.017]	0.789*** [0.016]	0.770*** [0.770]	0.557*** [0.026]
Tariff (RG Weighted)	-0.701 [0.588]	-1.421 [0.988]	-2.121 [1.603]	0.138 [1.194]	-0.875 [0.702]
NTB (RG Weighted)	0.414 [0.469]	-0.951** [0.439]	-1.881** [0.805]	0.076 [0.023]	1.057*** [0.367]
Imp. Transparency	<b>1.828***</b> [0.302]	<b>1.864***</b> [0.373]	<b>2.583***</b> [0.401]	<b>3.889*</b> [2.533]	<b>1.987</b> [2.049]
Exp. Transparency	<b>-0.406</b> [0.260]	<b>-0.856***</b> [0.239]	<b>-0.681***</b> [0.199]	<b>3.071*</b> [2.113]	<b>1.939</b> [1.749]
Observations	29,376	21,114	4,284	76,500	50,694

Robust standard errors in brackets, \* significant at 15%; \*\* significant at 10%; \*\*\* significant at 5%. Estimation method is Poisson QML. Importer and exporter transparency are instrumented by British colonization of the importer and exporter. First stage F-statistics are 374.68\*\*\* and 306.88\*\*\* respectively.

**Table 6 Import and export gains by economy for Scenario I (% of baseline)**

	Scenario I		Scenario II		Scenario III	
	Imports	Exports	Imports	Exports	Imports	Exports
<b>AUS</b>	0.00	11.42	0.40	1.11	0.55	2.50
<b>CAN</b>	0.00	1.22	0.08	0.09	0.10	0.50
<b>CHL</b>	0.00	10.69	0.59	0.23	0.36	9.01
<b>CHN</b>	28.99	3.81	2.83	0.83	2.00	1.89
<b>HKG</b>	0.00	16.90	0.00	2.41	0.10	4.60
<b>IDN</b>	20.25	7.71	1.59	1.21	0.06	4.88
<b>JPN</b>	0.00	10.94	0.07	1.83	1.46	1.56
<b>KOR</b>	0.40	14.13	0.92	1.86	0.00	1.38
<b>MEX</b>	17.73	0.48	1.72	0.08	4.04	1.10
<b>MYS</b>	12.13	7.78	3.75	0.63	7.52	1.40
<b>NZL</b>	0.00	5.01	0.10	0.44	2.55	2.55
<b>PER</b>	31.00	2.04	3.88	0.17	0.71	2.53
<b>PHL</b>	47.59	8.21	0.20	0.44	11.15	1.38
<b>RUS</b>	100.66	13.93	5.44	1.50	5.90	1.95
<b>SGP</b>	0.00	12.90	0.00	0.63	7.59	1.32
<b>THA</b>	36.65	8.49	7.62	0.75	0.19	2.87
<b>USA</b>	0.00	8.46	0.03	0.45	1.22	2.12
<b>VNM</b>	73.55	5.41	8.16	1.19	0.00	7.24

## 8 Figures

Figure 1 Importer Transparency Index

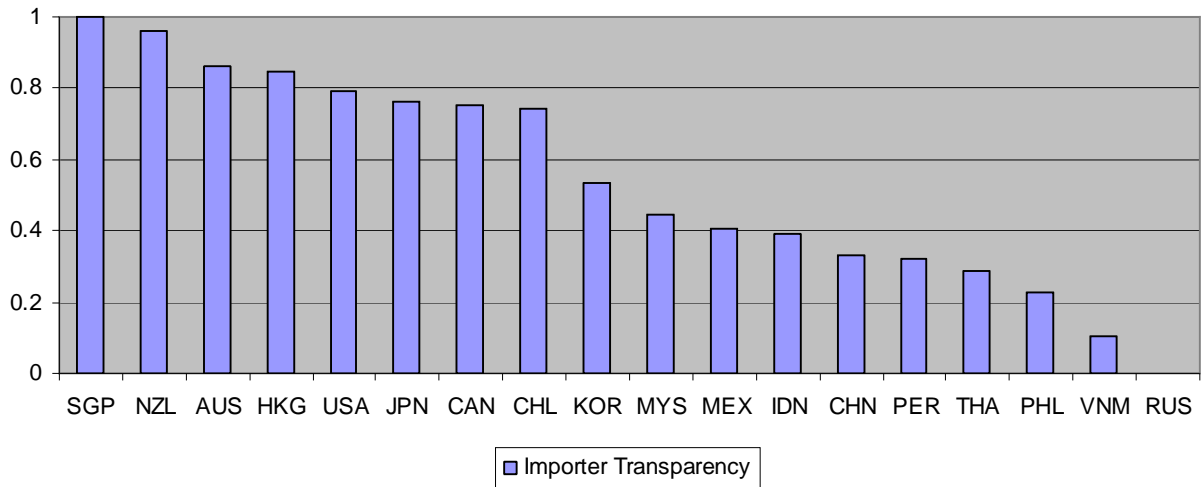


Figure 2 Exporter Transparency Index

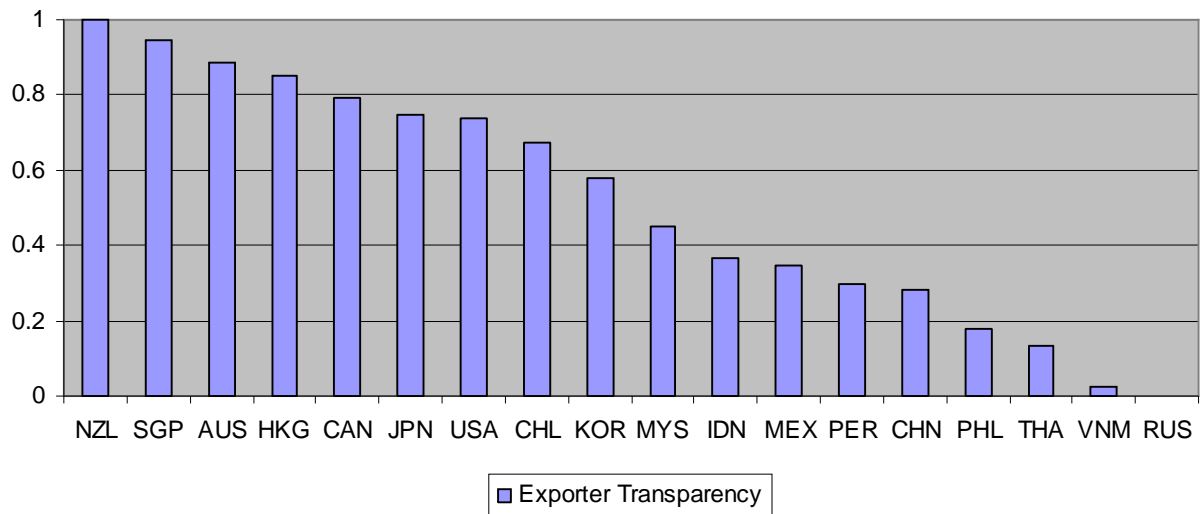


Figure 3 Breakdown of simulation results by economy (Scenario I).

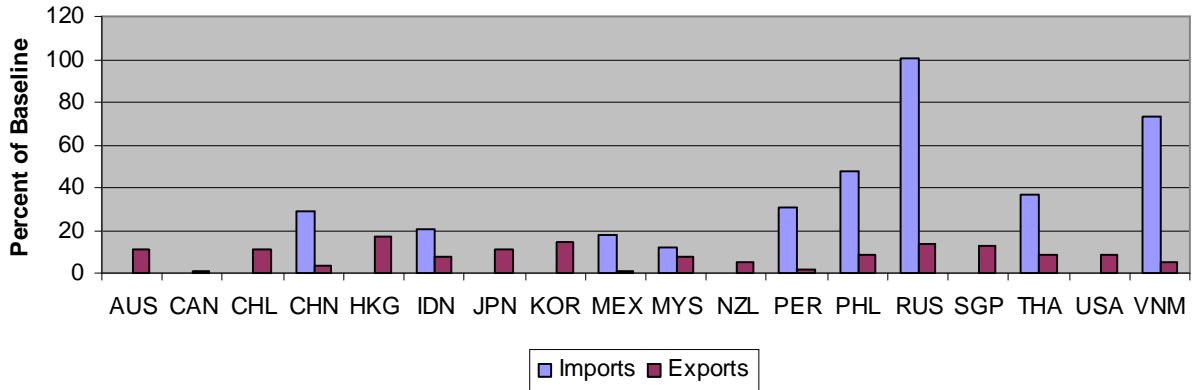


Figure 4 Breakdown of simulation results by economy (Scenario II).

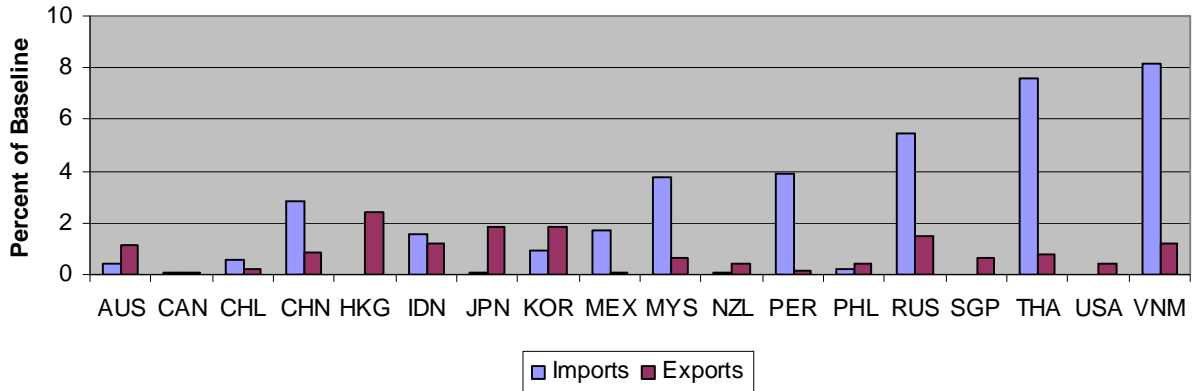


Figure 5 Breakdown of simulation results by economy (Scenario III).

