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Transparency and Regional Integration in the Asia Pacific

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1. INTRODUCTION

IN the development context, it is increasingly recognised that tariff liberalisation, while necessary, is not on its own sufficient to ensure the integration of an economy into international markets (World Bank Independent Evaluation Group, 2006). Barriers other than tariffs, as well as supply-side constraints, hinder firms in emerging economies from successfully entering export markets. With falls in applied tariff rates in many countries over recent decades, attention has increasingly shifted to non-tariff barriers (NTBs) and other non-traditional sources of trade costs. Gradually, the boundaries of the trade policy space have moved further behind the border, as analysts and policy-makers have come to recognise the very broad range of economic and institutional features that can impact international trade flows.

The key contribution of this paper is to provide a framework within which to analyse an important but under-researched aspect of the trading environment, namely its transparency. Our contention is that exporters' and importers' incentives are impacted not just by *what* governments do, but by *how* they do it. The nominal restrictiveness of trade policy makes up most of the 'what', while transparency is an important part of the 'how'. We provide transparency with precise analytical content by defining it in terms of a set of commonly available indicators, all of

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The findings, interpretations and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the World Health Organization or the World Bank, its Executive Directors, or the countries they represent.

which relate primarily to the simplicity and predictability of the trading environment. Using APEC member economies as a case study, we show that a more transparent trading environment is associated with increased bilateral trade.

While a number of previous studies have examined the broader links between institutions and trade, ours is the first to analyse in detail the issue of transparency. Anderson and Marcouiller (2002) find that weak institutions act as significant barriers to international trade: import/export transactions are inherently risky due to, for example, imperfect contract enforceability, and such factors are in effect given free rein under weak institutional regimes.¹ Those authors use World Economic Forum data to construct an index of the strength of institutions that support trade, focusing on contract enforcement and the existence of impartial and transparent government policies. Thus, while the concept of transparency is crucial to their work, their empirical development of its scope is much broader than ours: whereas they consider the general transparency of a country's governance structure, we focus on the trading environment itself to develop a multi-dimensional measure of transparency that is as closely related as possible to the processes of exporting and importing.

Levchenko (2007) complements the Anderson and Marcouiller (2002) approach by embedding cross-country institutional differences affecting contract enforceability in a general equilibrium model of trade. Using import share data for the United States, he shows empirically that higher institutional quality in the exporting country is associated with stronger trade flows in complex products, which are argued to be institutionally intensive due to the need to contract for intermediate goods. He measures institutional quality using the rule of law component of the World Bank's *World Governance Indicators* dataset.

By contrast, de Groot et al. (2004) take a much broader approach to examining institutions and trade, including all of the *World Governance Indicators* in their measure of institutional quality. In addition to rule of law, they also take account of voice and accountability, political stability, government effectiveness, regulatory quality and control of corruption. Using a gravity model, they find that both institutional quality and the existence of similar institutions in trading partners are positively associated with bilateral trade.

Finally, Francois and Manchin (2007) measure institutional quality through the lens of economic freedom, focusing on aspects such as the size of government, freedom of trade, protection of property rights and business regulation. They find that strong institutions in this sense are associated with increased trade at both the intensive and extensive margins. That is, they result not only in stronger bilateral trade flows, but also in an increased probability that countries will trade at all.

¹ Ranjan and Lee (2007) report similar findings using more detailed data on contract enforcement. They also find evidence that the link between contract enforcement and trade is stronger for differentiated goods than for homogeneous ones.

We extend this recent work in three ways. First, ‘unbundling’ institutions and focusing on one important aspect – transparency in the trading environment – allows us to bring additional focus and clarity to what is potentially a very wide-ranging area. In this sense, our approach is complementary to the recent work on contract enforcement referred to above: it too concentrates on just one aspect of the broader links between institutions and trade.

Second, we develop a comprehensive set of indicators that measure the transparency of a country’s trading environment from a number of different perspectives. Using APEC member economies for our empirical work, we examine both perceptions-based and ‘objective’ data taken from sources such as the *Global Competitiveness Report*, the *Doing Business* dataset, and a new *Logistics Performance Index* developed by the World Bank. These data cover issues such as the prevalence of trade-related corruption, political favouritism, efficiency of customs and border agencies, the extent of hidden trade barriers, and uncertainty surrounding trade policy settings, logistics performance and corruption. We then use factor analysis to combine these indicators into two composite measures of transparency: the Importer Transparency Index (ITI) and the Exporter Transparency Index (ETI).

Third, our empirical work using a gravity model of intra-APEC trade attempts to account for the possible endogeneity of transparency using an instrumental variables strategy. In our APEC sample, we find that British colonisation prior to the twentieth century is closely associated with higher transparency today. We therefore exploit variation in the pattern of British colonisation to identify exogenous changes in transparency. That our core result is robust to instrumental variables estimation is an important finding, since existing work on institutions and trade assumes – but does not test for – exogeneity.

The paper proceeds as follows. In the next section, we discuss in greater detail the links between transparency and trade. Section 3 introduces our dataset, and provides an overview of trading environment transparency in the APEC region. After reviewing individual indicators, we synthesise them into two comprehensive measures: the ITI and ETI. Results from a theory-consistent gravity model in Section 4 provide evidence in favour of our contention that transparency of the trading environment can impact trade over and above the effects from trade policy measures such as tariffs and NTBs, which we control for explicitly. Section 5 concludes with some preliminary policy implications of our work, as well as suggestions for future research in this area.

2. TRANSPARENCY, TRANSACTION COSTS AND TRADE: WHAT ARE THE LINKS?

The extent of a country’s integration into the world trading system depends on the trade transaction costs facing its potential importing and exporting firms. To

make clear that the variety of costs is much broader than the set of measures traditionally subsumed under the heading of trade policy, we refer to these factors as a country's *trading environment*. By analogy with the literature on investment climate (World Bank, 2005), we envisage the concept of trading environment as encompassing the full set of location-specific factors that shape opportunities and incentives for firms to engage in import and export transactions. The trading environment thus includes the full range of transaction costs affecting trade, both 'hard' (e.g. infrastructure and geography) and 'soft' (e.g. institutional quality). Trade facilitation, in the broad sense in which Wilson et al. (2005) use that term, can be seen as the set of policy instruments aimed at improving a country's trading environment by reducing unnecessarily high transaction costs across all of these fronts.

In this paper, we seek to broaden the scope of discussions on trade transaction costs and their impacts by recognising that the trading environment has a procedural aspect in addition to the substantive ones examined in previous research. In a nutshell, we will argue that it is not just *what* governments do that matters for trade transaction costs, but also *how* they do it. Unpredictability and undue complexity in the design, implementation and administration of trade policy can constitute independent sources of transaction costs, over and above those flowing from the nominal restrictiveness of the trade policy measures themselves.

a. Tariff Bindings and Internet Use: Two Examples of Promoting Transparency

Francois (2001) and Francois and Martin (2004) show that while reductions of applied tariffs can have obvious, first-order impacts on exporters' and importers' incentives, locking in those cuts – or 'binding' them in WTO terms – can have additional economic impacts over and above those of the tariff cut itself. The economic logic behind this is simple, and is an example of an important, more general argument in relation to transparency: increased predictability can reduce the effective trade costs faced by business. To give an idea of the orders of magnitude involved, Francois and Martin (2004) find that in the case of wheat tariffs pre- and post-Uruguay Round, reductions in tariff uncertainty were responsible for at least half the overall welfare gains in four of the seven economies studied.

In addition to its direct costs, trade policy can also impose indirect costs on firms due to the need to gather information on the set of measures in place and the steps required to comply with them. The complexity of the trading environment is clearly a key variable in assessing the potential magnitude of these information costs. For the hypothetical case in which the only trade cost is a bound, *ad valorem* tariff published through a government website, the associated

information costs for traders are clearly very small. When a nominally equivalent level of cost is achieved using a combination of an *ad valorem* tariff, licensing requirements, product standards and certification, complex customs procedures, delays at port, and perhaps the occasional bribe to avoid one or all of these hurdles, then the information costs facing potential exporters or importers can be very high indeed.

An important example of this dynamic is the role played by the internet in expanding trade over recent years. Freund and Weinhold (2004) argue that the spread of the internet could be one factor reducing the costs of export market entry, since it makes foreign information easier (and cheaper) to obtain. Those authors conclude that growth in web hosts contributed on average to a 1 per cent rise in annual export growth between 1997 and 1999. Thus, simplification of the trading environment through a reduction in effective information costs can be a useful force in promoting bilateral trade.

b. Transparency as Predictability and Simplification

Transparency is a very broad concept. If it is to be of use in empirical research and policy work, it must be given more precise analytical content so that it can plausibly be related to observable data. As the above discussion suggests, viewing transparency in terms of the ‘how’ side of the trading environment assists us in identifying two important aspects of the concept: predictability and simplification. The first of these is a way of reducing ‘soft’ transaction costs stemming from uncertainty – as in the case of tariff bindings – while the second reduces information costs related to an overly complex cost environment.

There is as yet little quantitative evidence as to country performance in relation to transparency, or economic impacts of reform. However, transparency as a concept is well entrenched in the architecture of the multilateral system (see Wolfe, 2003, for a review). As already noted, binding tariffs (GATT Article II) is one way of promoting transparency through increased predictability. In addition, Article VIII recognises the desirability of simplifying import and export formalities and documentation, while Article X requires prior publication of certain trade-related laws and regulations, as well as their impartial administration. Finally, the WTO’s Trade Policy Review mechanism contributes to transparency by ensuring that basic trade policy information is regularly put into the public domain, and gives members the opportunity to ensure that the rules of the game are being complied with.

As this discussion suggests, transparency is a broad and flexible concept. The remainder of the paper focuses on developing a methodology for measuring country performance in this area using a wide variety of indicators, and on assessing the quantitative impact that transparency thus defined has on international trade flows.

3. MEASURING THE TRANSPARENCY OF THE TRADING ENVIRONMENT: AN APEC CASE STUDY

The member economies of APEC provide an ideal case study platform for the approach to transparency developed in this paper. APEC is an extremely diverse regional grouping, including economies at markedly different levels of economic development, and with vastly different institutional environments. Moreover, APEC has been active in promoting a wide-ranging approach to reducing trade transaction costs through its initiatives on trade facilitation. In its 2001 Principles on Trade Facilitation, the role that transparency can play in improving the trading environment is brought out by explicit references to the two dimensions of primary interest here, predictability and simplification:

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 minimise uncertainty to the trade and trade-related parties. (Source: APEC Principles on Trade Facilitation.)

We now proceed to develop in greater detail our proposed measures of transparency in the trading environment by reference to the situation prevailing among APEC member economies. First, we present data on individual indicators related to predictability and simplification. We then use factor analysis to produce composite indices of transparency from the exporter and importer perspectives.

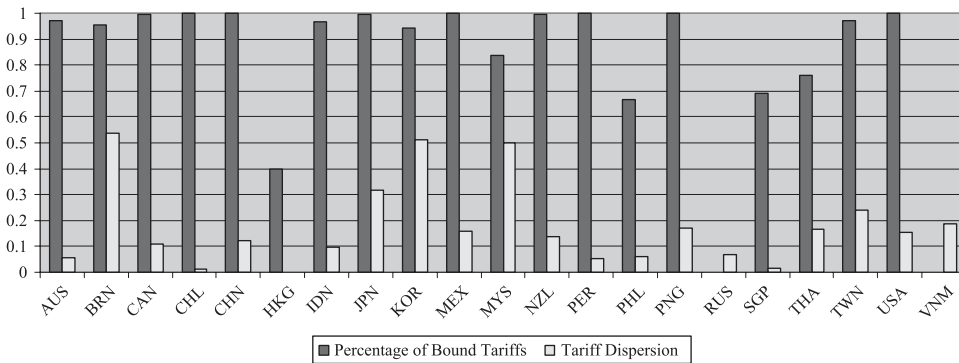
a. Structure of Trade Policy

As mentioned above, an important indicator of predictability in tariff policy is the percentage of bound tariff rates. WTO members are able to bind their tariffs at a certain rate, which cannot easily be exceeded.² Tying the authorities' hands with respect to the level of tariffs translates into a higher predictability for traders, which ultimately reduces costs of doing business. Gauging the percentage of bound tariff rates reveals the degree of tariff certainty that traders face.

Another empirical measure of the complexity of a tariff schedule is the dispersion of tariff rates across products. A high dispersion would indicate that the tariffs fluctuate substantially and therefore can render the expected applied tariffs less predictable and more complicated. In the extreme case of a 'flat' tariff – i.e. the same *ad valorem* rate applied to almost all goods, as in Chile or Hong Kong China – there is no scope for dispute between a foreign exporter and the customs administration as to the rate of duty that should be applied to a particular

² WTO members are allowed to apply a lower tariff level and freely change it as long as it stays below the bound rate. WTO members therefore often prefer to bind their tariffs at a relatively high level in order to maintain considerable freedom in their tariff policy decisions.

FIGURE 1
Bound Tariffs and Tariff Dispersion in the Case of APEC



shipment of goods. However, the more complex a national tariff schedule becomes, the more scope exists for classification disputes to arise.

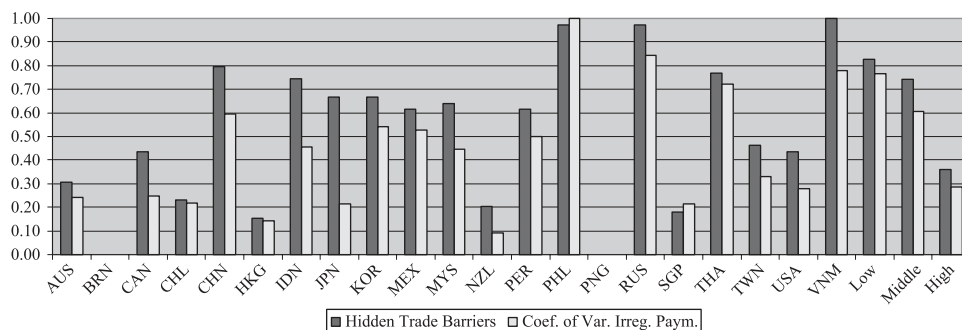
The second column of Figure 1 depicts the standard deviation of effective applied MFN tariffs³ in the Harmonised System (HS) six-digit product groups for all 21 APEC economies. It is interesting to observe that Chile, which applies for almost every product line a flat tariff, Hong Kong China, which allows duty-free trade across all lines, and Singapore, all show relatively low levels of tariff dispersion – as expected given their respective policy choices.

Managing the tariff schedule is not the only trade policy instrument where transparency becomes important. Governments can apply a number of trade policy measures other than tariffs. They are often summarised as non-tariff barriers (NTBs) and encompass all measures that have potential trade effects, such as technical standards, trade remedies or quotas. As multilateral, regional and bilateral trade liberalisation efforts have pushed the overall tariff level down, NTBs are gaining more and more significance in the international trading system. Comparative analyses of NTBs are relatively rare, mainly because many NTBs are not easily quantifiable.⁴ However, we are not primarily interested in the presence of NTBs,

³ The effective applied MFN rate takes into account specific tariffs by dividing them by the unit value. For more information see the Appendix.

⁴ Ching et al. (2004) provide an insightful analysis of the presence of NTBs in the Pacific Rim region using a small firm-level survey. According to their study, NTBs are frequently encountered in this region and they have a significant impact on firms' production costs, revenue and expansion plans. Recently, the World Bank Development Research Group (see Kee et al., 2006) developed an index of trade restrictiveness that covers a large number of developing and developed economies. Trade restrictiveness is measured taking into account the tariff level, but also NTBs. Among the NTBs considered are price and quantity measures, monopolistic measures as well as technical regulations. The exact data sources and methodologies are described in detail in Kee et al. (2006). As for tariffs, we control for the presence of NTBs in our gravity equation, using the available data from Kee et al. (2006).

FIGURE 2
Hidden Trade Barriers and Irregular Payments (Coef. of Var.) in the Case of APEC



but in the transparency of NTBs. The *Global Competitiveness Report (GCR)* published by the World Economic Forum (WEF) provides useful information in this respect, based on trade barriers as identified by the business community.⁵ In the 2004 GCR, survey participants were asked to assign a score from seven (strongly agree) to one (strongly disagree) to each of the following questions:

- (i) 'In your country, hidden import barriers (that is, barriers other than published tariffs and quotas) are an important problem or not an important problem?'
- (ii) 'In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with the import and export permits?'

The first question aligns well with the subject of interest here and the answer serves as a proxy to gauge the degree of transparency in the application of non-tariff measures. The second question goes in a similar direction, but focuses more on NTBs related to red-tape and corruption.

We have collected the answers to these two questions for 19 available⁶ APEC economies and rescaled the results from zero (hidden import barriers/extra payments or bribes are not a problem) to one (hidden import barriers/extra payments or bribes are a problem). The results are presented in the first and second columns of Figure 2. In order to allow a comparison of APEC economies with other economies, we also report the average performance of economies classified by the World Bank as low-income, lower- and upper-middle income, as well as high-income.

According to the GCR data, Hong Kong China, New Zealand and Singapore take the lead in this comparison. Most of the middle-income economies in APEC

⁵ The WEF conducts each year an international survey assessing the competitiveness of a large number of developed and emerging economies.

⁶ Brunei Darussalam and Papua New Guinea were not covered in the GCR 2004.

do better than the world income group average. However, in China, the Philippines, Russia and Thailand, the business community perceives hidden trade barriers that are above the world-average for middle-income economies. Finally, in the one APEC economy which belongs to the low-income group, namely Vietnam, traders still appear to struggle with hidden trade barriers, also compared to other low-income economies.

The GCR provides not only the average score for each of these questions, but also the standard deviation of the replies. The standard deviation reveals important information about the certainty of traders to be confronted with hidden trade barriers or irregular payments. Even though the standard deviation is not a direct measurement of uncertainty, the dispersion of answers indicates how differently the issue is perceived and therefore helps us gauge the uncertainty among traders. The second column of Figure 2 depicts the coefficient of variation for the replies given to the question on irregular payments for imports and exports. The two extremes are New Zealand on the one hand and the Philippines on the other. In New Zealand, irregular payments appear not only to be rare, but traders also know what to expect. In the Philippines irregular payments for imports and exports remain present and their size varies substantially.

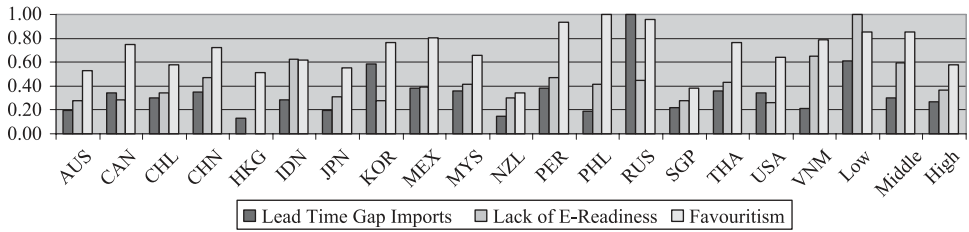
b. Logistics, Supply Chain Development and Policy Implementation

The Logistics Performance Index (LPI) 2006 of the World Bank is another valuable source to measure particular dimensions of transparency in the trading environment (Arvis and Mustra, 2007). The LPI tries to capture the logistics 'friendliness' of economies and is based on a survey of global freight forwarders and express carriers. The data covers 100 economies, including all APEC economies except Brunei Darussalam, Papua New Guinea and Chinese Taipei. The LPI contains variables that can be used to derive measures of predictability.

The LPI records the maximum and minimum lead time for exports and imports. The gap between both reveals interesting information about the predictability of clearance time for traders. If the difference between both variables is small, traders are able to manage the supply chain with great accuracy. On the other hand, as the gap between the two variables becomes large, it indicates that the clearance time can vary substantially. This implies a high degree of uncertainty for traders, which ultimately translates into additional business costs due to the need to maintain larger inventories (Arvis et al., 2007).

In the first column of Figure 3, we present the gaps in clearance times for imports for APEC economies as well as the average for low-, middle- and high-income economies. Figure 3 illustrates that Vietnam, the only low-income economy in APEC covered by LPI, has very small gaps in both dimensions, placing it among the best performers, such as Singapore. The middle-income economies in APEC have similar gaps to the world average for the middle-income group.

FIGURE 3
Lead Time Gap (Imports), Lack of E-Readiness, and Favouritism in the Case of APEC



Among the high-income economies, Hong Kong China and New Zealand take the lead.

Effective use of information technology is another possible way in which governments can make the trading environment more transparent. We assess this dimension using the UN's ranking of the e-government readiness of its member states.⁷ It measures the level of telecommunication and human capital infrastructure development in an economy, and reflects to what extent governments make use of this infrastructure for the provision of information, products and services.

In the second column of Figure 3 we summarise the performance of APEC economies with respect to e-government readiness (lower values indicate a higher degree of e-government readiness).⁸ In this comparison, nearly all middle- and high-income APEC economies do far better than the world average of the corresponding income group. Australia, Canada, Korea, New Zealand, Singapore and the USA have achieved a particularly high level of e-government readiness. In Papua New Guinea as well as Vietnam much work remains to be done in order to increase the government's use of the internet and to build up a comprehensive information technology infrastructure.

Finally, the GCR asks one question that captures the extent of favouritism in administrative decisions. The question is as follows:

- (i) When deciding upon policies and contracts, government officials (1 = usually favour well-connected firms and individuals, 7 = are neutral among firms and individuals).

We argue that excessive liberty for administrators to favour particular firms signals a lack of transparency. The results of the GCR on favouritism are summarised in the last column of Figure 3. New Zealand and Singapore stand

⁷ The ranking is based on a composite index comprising the Web measure index, the Telecommunication Infrastructure index and the Human Capital index.

⁸ The UN Global E-government Readiness Report does not contain data for Hong Kong China and Chinese Taipei.

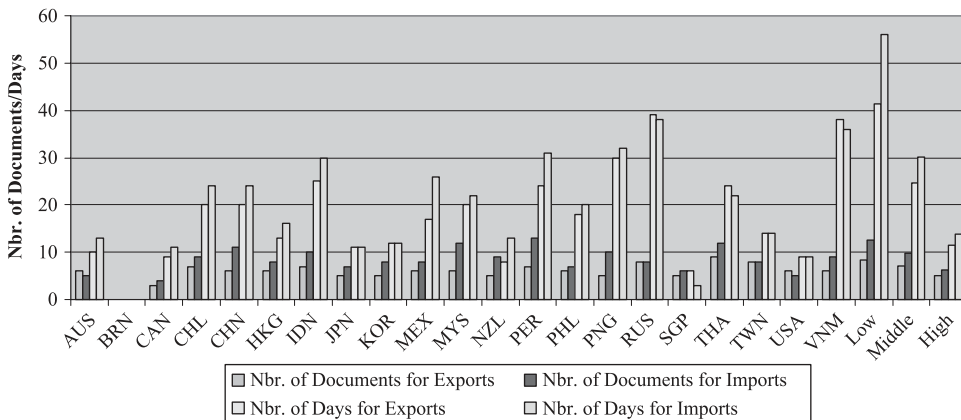
out as economies in which favouritism is perceived as almost absent. Chile shows the strongest performance in their income group. Favouritism seems to severely impact business in other economies, especially several developing member economies.

c. Customs and Border Procedures

The annual *Doing Business* Report of the World Bank collects, among other data, detailed data on trade facilitation measures that relate to the concept of enhanced transparency through simplification. For example, the efficiency of customs is documented in data which record the number of documents as well as the number of days needed for importing or exporting. 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.

In Figure 4 we present the respective *Doing Business* data for 20 APEC economies (Brunei was not covered by the survey) as well as the average results for the low-, middle- and high-income groups. The first interesting observation is that the number of documents and days needed for exports are lower in most economies compared to imports. Only in the case of Australia and the United States are more documents required for exports than for imports. Furthermore, only in Russia, Thailand and Vietnam does the delay for exports exceed the delay for imports. The two low-income economies among the APEC economies, namely Papua New Guinea and Vietnam, require less documentation for exports and imports than the low-income average. Most middle-income APEC

FIGURE 4
Number of Days/Documents for Import/Export in the Case of APEC



economies require a number of export or import documents that is similar to the world average for this income group. The Philippines and Mexico perform particularly well in this comparison. Among the high-income APEC members, Canada achieves the best score, asking for only three export and four import documents.

The difference in APEC economies is particularly pronounced concerning the days needed for imports and exports. Several empirical studies have pointed out the importance of timeliness for the trading performance of economies (e.g. Hummels, 2001; Evans and Harrigan, 2005). In a recent World Bank study, Djankov et al. (2006) find that a one-day delay before shipping is estimated to reduce trade by 1 per cent. In nearly all APEC high-income economies, the number of days required for imports and exports is lower than the world average for this income group. In particular, Singapore has been very successful in streamlining the customs procedures. The majority of middle-income APEC economies show a similar above-average performance in the category. Furthermore, it is promising to see that Papua New Guinea and Vietnam have clearance times that are similar to the middle-income average and substantially superior to the average of low-income economies.

The LPI also contains two variables which are worthwhile studying in this context, namely the number of border agencies involved in imports or exports. We expect that fewer agencies will be associated with firms spending less time – and therefore money – on dealing with administrators and ensuring compliance with the separate requirements of each agency. The majority of APEC economies demonstrate a strong performance in this respect (results are not reported). Compared to the three different world averages, they have fewer border agencies involved in imports than the respective average. Especially Singapore appears to possess a highly efficient structure of customs.

Finally, as mentioned above, the GCR measures the extent to which unofficial payments in imports and exports play a role in an economy. Being obliged to make unofficial payments imposes 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.⁹ Looking at the APEC economies (results are not reported), one finds that all high-income economies do better than the world average, the only exception being Korea which has a score close to the average of middle-income economies. However, in Indonesia, the Philippines, Russia, as well as Thailand, extra payments or bribes connected with import and export permits are apparently widespread.

⁹ 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.

d. Importer and Exporter Transparency Index

In the previous sections we have presented a large number of indicators that all coalesce around the two principal dimensions of trade policy transparency that we are interested in, namely predictability and simplification. In order to provide a straightforward summary indicator of overall performance against these benchmarks, we will now present results of statistical analysis designed to summarise the above information into just two variables: *importer transparency* and *exporter transparency*. This approach also facilitates the econometric analysis in Section 4, since it makes it possible to avoid technical problems caused by strong correlation among these indicators. Both importer transparency and exporter transparency are constructed as regional indices on a scale of zero (lowest) to one (highest). Each index is a weighted average of a number of the measures examined above in terms of predictability and simplification. To decide on the weight to be given to each component when taking the average, we use results from a statistical method known as factor analysis.

Factor analysis refers to a set of statistical techniques that can be used to produce an index summarising performance across a number of correlated indicators. In broad terms, the index is derived by assuming that an unobserved factor ('transparency') is responsible for the common variation in the original set of indicators. Statistical techniques can be used to identify that unobserved factor in terms of a weighted average of the original indicators.

This 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 (2007) 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.¹⁰

The above variables are available for all APEC member economies except Brunei Darussalam, Papua New Guinea and Chinese Taipei. The importer transparency index has more variables than does the exporter transparency index, since there are a number of aspects of transparency (e.g. tariff rate dispersion) that are relevant only from an importing point of view. Final results for the two indices are reported in Figures 5 and 6.

¹⁰ In technical terms, the difference between the two is that the first principal component is based on the largest eigenvalue of the correlation matrix for the series being analysed, while the first principal factor is based on the largest eigenvalue of a correlation matrix in which the main diagonal is replaced with R^2 's from regressions of each variable in the dataset on all of the others. Thus, principal factor analysis seeks primarily to explain common variance in a set of indicators, whereas principal component analysis focuses on explaining total (common and unique) variance.

FIGURE 5
Importer Transparency Index for APEC Economies

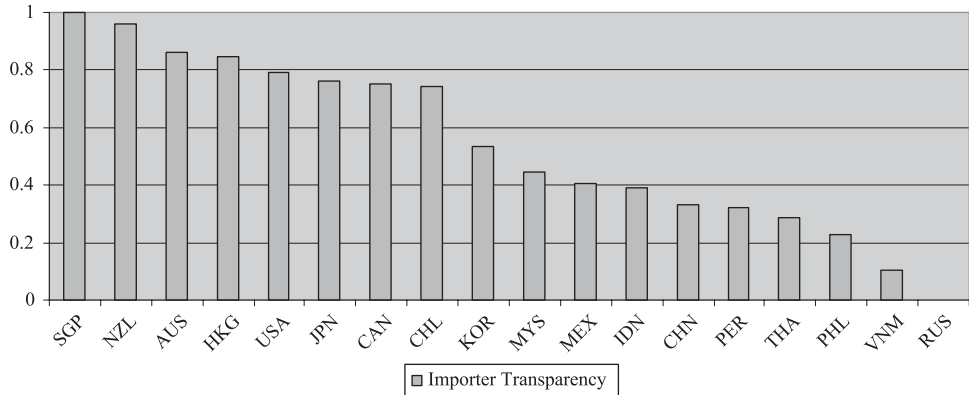
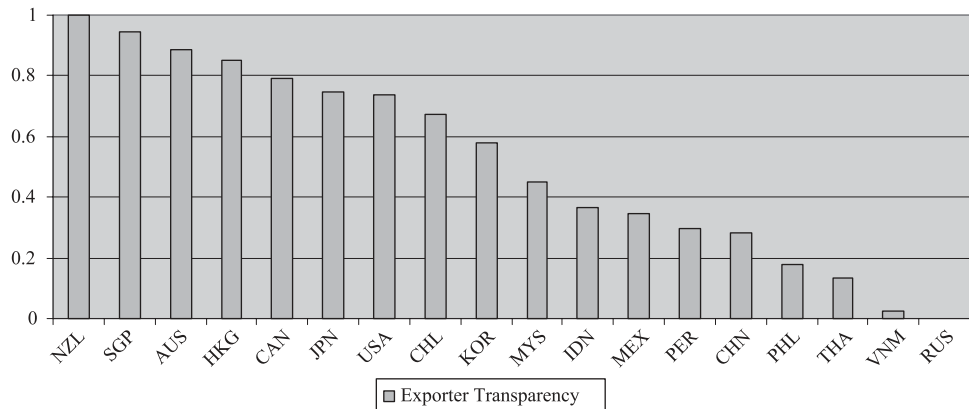


FIGURE 6
Exporter Transparency Index for APEC Economies



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.

Table 1 shows the ETI and ITI component weights obtained through factor analysis. It is import time, hidden trade barriers and irregular payments (level and dispersion) that are weighted most strongly in the final ITI. For the ETI, irregular

TABLE 1
ITI and ETI Principal Factor Weights

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

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. TRANSPARENCY AND TRADE FLOWS: ESTIMATING THE IMPACTS

In this section, we provide a first assessment of the quantitative impact of transparency on trade flows among APEC economies. To do this, we use the workhorse of empirical international trade work, namely the gravity model. Our approach takes full account of recent developments in the literature in this area, in particular as they relate to four aspects of the model and estimation procedure. First, we derive our empirical specification from the theory-consistent model of Anderson and van Wincoop (2003, 2004). Second, we use the Poisson estimator to take account of the presence of zeros in the bilateral trade matrix (Santos Silva and Tenreyro, 2006). Another important point relates to our trade policy data: we use highly detailed applied tariff data that take full account of preferences, as well as *ad valorem* equivalents of non-tariff barriers. Finally, we use an instrumental variables strategy based on colonial history to deal with the possible endogeneity of transparency with respect to bilateral trade, drawing on the growth and institutions literature (e.g. Acemoglu et al., 2001).

a. 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:

$$\begin{aligned} \log(X_{ij}^k) = & \log(E_j^k) + \log(Y_i^k) - \log(Y^k) + (1 - \sigma_k)\log(t_{ij}^k) \\ & - (1 - \sigma_k)\log(P_j^k) - (1 - \sigma_k)\log(\prod_i^k) + \varepsilon_{ij}^k, \end{aligned} \quad (1)$$

where Y_i^k = output of economy i in sector k ; E_j^k = expenditure of economy j in sector k ; Y^k = aggregate (world) output in sector k ; σ_k = elasticity of substitution in sector k ; t_{ij}^k = trade costs facing exports from economy i to economy j in sector k ; ω_i^k = economy i 's output share in sector k ; ω_j^k = economy j 's expenditure share in sector k ; and ε_{ij}^k = random error term, satisfying the usual assumptions. Inward resistance $(P_j^k)^{1-\sigma_k} = \sum_{i=1}^N \prod_i^{\sigma_k-1} \omega_i^k (t_{ij}^k)^{1-\sigma_k}$ captures the fact that j 's imports from i depend on trade costs across all suppliers. Outward resistance $(\prod_i^k)^{1-\sigma_k} = \sum_{j=1}^N P_j^{\sigma_k-1} \omega_j^k (t_{ij}^k)^{1-\sigma_k}$, 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 (α_{ij}).

$$\log(t_{ij}^k) = \delta_1 \log(1 + \tau_i^k) + \delta_2 \log(ntb_i^k) + \delta_3 \log(ITI_i) + \delta_4 \log(ETI_j) + \sum_{i \neq j} \alpha_{ij}. \quad (2)$$

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

$$\begin{aligned} \log(X_{ij}^k) = & \sum_{i \neq j} \alpha_{ij} + \beta_1 \log(Y_i) + \beta_2 \log(Y_j) + \beta_3 \log(1 + \tau_i^k) + \beta_4 \log(ntb_i^k) + \dots \\ & \dots + \beta_5 \log(ITI_i) + \beta_6 \log(ETI_j) + \sum \gamma_k + \varepsilon_{ij}^k. \end{aligned} \quad (3)$$

In fact, equation (3) involves a slight simplification. A strict derivation from equation (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 (to account for possible cross-sectoral differences in the elasticity of substitution). (See Baldwin and Taglioni, 2007, on this and similar points.) The expedient we have adopted represents a compromise between theoretical rigour and empirical tractability. In

any case, we examine the robustness of our results to alternative formulations below.

We estimate equation (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.¹¹ The intuition behind this approach is simple. The first-order conditions for Poisson estimation are mathematically equivalent to those for weighted least squares of the non-linear model given by exponentiation of equation (3). Thus, the potential problem posed by taking the logarithm of zero on the left-hand side is avoided.¹²

Our data and sources are set out in full in Appendix Table A1. For our baseline results, we use bilateral trade data disaggregated to the HS two-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 six-digit data to the HS two-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 two-digit level in the same way – while GDP data are sourced from the *World Development Indicators*. We estimate the model 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).

b. Estimation Results

Table 2 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 per cent level. However, results are noticeably clearer for the trade policy variables in the last two columns when raw materials are excluded. The reason

¹¹ With missing data coded as zero, our dataset contains 2,700 zero entries, or just under 10 per cent of the total.

¹² We prefer Poisson to the Heckman sample selection estimator proposed by Helpman et al. (2008) for two largely technical reasons. First, over-identification of the Heckman model is difficult in this context, and the literature does not yet provide a convincing solution to this problem. Second, the first-stage probit model on which the Heckman estimator is based can be biased and inconsistent in the presence of standard, unconditional fixed effects (see, generally, Greene, 2004, on this point). Poisson is one of relatively few non-linear panel data models which do not suffer from this problem, and remain consistent in fixed-effects models.

TABLE 2
Gravity Equation Estimation Results (Baseline)

	<i>All Goods</i>	<i>HS > 27</i>	<i>HS > 83</i>	<i>Diff. Goods</i>	<i>Homog. Goods</i>
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	6.886*** [2.028]	8.901*** [2.401]	9.622*** [2.817]	8.371*** [3.324]	2.379 [2.052]
Exp. Transparency	4.842*** [1.655]	6.826*** [2.069]	7.258*** [2.463]	5.170** [2.677]	2.046 [1.745]
Observations	29,376	21,114	4,284	76,500	50,694

Notes:

Robust standard errors in brackets; * significant at 15%; ** significant at 10%; *** significant at 5%. All models have fixed effects by country-pair and HS two-digit sector. Estimation is by Poisson.

is probably that the markets for agricultural goods and raw materials are often still heavily distorted through different economic policy interventions that are not adequately captured by *ad valorem* tariffs. 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 per cent cut in applied tariffs is associated with a 2.8 per cent 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.

These results suggest that the impact of transparency might be stronger for manufactured goods than for raw materials. 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), which divides all products at the SITC four-digit level into three groups: goods traded on an organised exchange, reference priced goods and differentiated products. We consider the first two as homogeneous 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 2. In column 4, where only differentiated products enter 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: the *ITI* elasticity drops by over two-thirds, while for the *ETI* the fall is over 50 per cent. Whereas both the *ITI* and *ETI* have an economically strong and statistically significant impact on trade flows for differentiated goods, their impact is much weaker and statistically insignificant in the case of homogeneous goods.

What might be the economic mechanisms underlying the apparent increased importance of transparency in differentiated goods sectors? One possibility might be the increased scope for misclassification of differentiated goods (intentional or otherwise). Javorcik and Narciso (2007) have shown that discrepancies between declared import and export values tend to be larger in sectors that are more differentiated. Secondly, it might be the case – particularly in the Asia-Pacific region – that highly differentiated goods are often inputs into technology-based final products, such as electronic goods. Production and outsourcing in these sectors increasingly take place within complex network structures, in which delivery of inputs on time and within budget are crucial to success. This dynamic would again tend to suggest that transparency as defined here might have a particularly important role to play in boosting trade.

c. Robustness Checks

It is also important to consider the potential impacts of cross-sectoral heterogeneity from a robustness standpoint. As previously noted, the pooled estimator for our gravity model involves two simplifications in this regard: the intra-sectoral elasticity of substitution is taken to be constant across sectors, whereas recent empirical work suggests that substantial variance may exist (Broda and Weinstein, 2006); and sectoral multilateral resistance terms are assumed to be well approximated by the combination of country-pair and sector fixed effects, whereas theory suggests they would vary at the finer country-pair sector level. We therefore re-estimate the gravity model separately for each of the 97 two-digit product sectors in the HS classification. Summary results are presented in Table 3, and disclose considerable cross-sectoral heterogeneity. (Full results are available on request.) Although the average estimated elasticities across all sectors are lower than in Table 2 – 1.9 for the *ITI* and 0.4 for the *ETI* – we find a statistically significant relationship at the 10 per cent level between transparency and trade flows in 34 sectors for the *ITI* and 38 for the *ETI*. Results for other parameters are similar to those in Table 2, with GDP variables statistically significant in approximately 70 regressions, tariffs in 32, and non-tariff measures in 40. It is interesting, and consistent with results discussed elsewhere in the paper, that the *ETI* and *ITI* are significant in more HS two-digit sectors than are tariffs.

TABLE 3
Gravity Equation Estimation Results (by Sector)

	<i>Average Estimate</i>	<i>Average Std. Err.</i>	<i>No. 10% Significant</i>
GDP Importer	0.624	0.196	73
GDP Exporter	0.665	0.242	68
Tariff (RG Weighted)	-2.916	4.961	32
NTB (RG Weighted)	1.319	1.845	40
Imp. Transparency	1.946	7.995	34
Exp. Transparency	0.388	7.184	38

Notes:

Results in the first two columns are simple averages based on estimates from 97 Poisson regressions, each covering one two-digit HS sector and including country-pair fixed effects. Statistical significance is assessed at the 10% level.

TABLE 4
Gravity Equation Estimation Results (Importer, Exporter and Sector Fixed Effects)

	<i>All Goods</i>
Distance	-0.497*** [0.040]
Contiguity	0.888*** [0.159]
Common Language	0.104 [0.089]
Common Coloniser	-0.050 [0.370]
Colony	-0.370*** [0.076]
Same Country	0.074 [0.149]
Tariff (RG Weighted)	-0.884 [0.541]
NTB (RG Weighted)	0.677 [0.411]
Transparency (Average)	11.938*** [4.195]
Observations	29,376

Notes:

Robust standard errors in brackets; * significant at 15%; ** significant at 10%; *** significant at 5%. All models have fixed effects by exporter, importer and HS two-digit sector. Estimation is by Poisson.

As an additional robustness check, and in order to provide a clearer comparison with other gravity models in the literature, we also re-estimate using separate importer and exporter fixed effects instead of country-pair fixed effects. In order to be able to estimate this model, we take the average of the *ETI* and *ITI* for each pair of trading countries. Results from pooled estimation are in Table 4, and they

show estimates of common gravity variables, such as bilateral distance, that are statistically significant, correctly signed, and well within the bounds established by previous work. In addition, we find a strongly positive and statistically significant effect of transparency on trade.

In interpreting results, we have been careful thus far to avoid references to causality. It would not be appropriate to conclude from Table 2, for instance, that improved transparency necessarily 'causes' an increase in bilateral trade. This is because simple gravity results like those in Table 2 do not account for possible estimation bias due to the endogeneity of transparency with respect to trade. While Table 2 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 create more transparent trading environments 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-twentieth-century colonisation generally leaves institutional marks on the colonised area, including potentially those institutions most directly affecting the trade policy environment. Indeed, our dataset reveals that in the APEC sample, a dummy variable coded so as to capture colonisation 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 colonisation took place in this region largely in the eighteenth and nineteenth 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 colonisation by Great Britain and another for importer colonisation by Great Britain, as instruments for exporter and importer transparency, respectively.

Wooldridge (2002, pp. 663–65) sets out a straightforward methodology for instrumental variables estimation of Poisson models. In the first stage, the endogenous explanatory variables (*ETI* and *ITI*) are regressed by ordinary least squares (OLS) on the exogenous explanatory variables (distance, GDP, tariffs and NTBs) and the instruments (British colonisation). 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 NTBs are treated as exogenous in this case, because the reference group aggregation scheme we have used to produce HS two-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.

TABLE 5
Gravity Equation Estimation Results (Instrumental Variables)

	<i>All Goods</i>	<i>HS > 27</i>	<i>HS > 83</i>	<i>Diff. Goods</i>	<i>Homog. Goods</i>
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	1.828*** [0.302]	1.864*** [0.373]	2.583*** [0.401]	3.889* [2.533]	1.987 [2.049]
Exp. Transparency	-0.406 [0.260]	-0.856*** [0.239]	-0.681*** [0.199]	3.071* [2.113]	1.939 [1.749]
Observations	29,376	21,114	4,284	76,500	50,694

Notes:

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 colonisation of the importer and exporter. First-stage *F*-statistics are 374.68*** and 306.88*** respectively.

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

In terms of our transparency indices, it is primarily the *ITI* that has a discernible negative impact on trade: a 1 per cent improvement in the economy's index score is associated with a nearly 2 per cent boost to trade. In the case of the *ETI*, our results are harder to interpret. 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, 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. In particular, we expect that expanding the country sample to include

a wider range of countries than just the APEC region would be beneficial in this regard. Such an approach would introduce greater variance into the transparency measures and instruments, and would therefore make it more feasible to robustly identify policy impacts in an instrumental variables setting.

Comparing Table 5 with Table 2 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 2 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.

d. 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).¹³ We consider three scenarios, each of which represents an ambitious but, we believe, feasible medium-term objective within APEC:

- (i) Scenario I: Improve importer transparency within the APEC region such that no economy is below the current regional average (0.54).
- (ii) 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.
- (iii) 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). The results, shown in Table 6, indicate that APEC member economies can indeed boost intra-regional trade significantly by cutting tariffs, reforming NTBs or promoting transparency.

¹³ These results should be interpreted with caution for a number of reasons: they exclude general equilibrium effects; they do not take account of binding non-tariff measures; they exclude extra-regional trade; and they do not consider the costs of reform. In future work, we hope to extend these results using a CGE model.

TABLE 6
 Simulated Import and Export Gains by Economy (% of Baseline)

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

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 per cent, as compared with only 0.9 per cent for Scenario II and 1.8 per cent for scenario III. In monetary terms, these effects equate to approximately US\$148bn, US\$18bn and US\$35bn, respectively. Moreover, aggregate results obscure the fact that some countries – those that reform the most – stand to benefit to a level well in excess of the regional average.

5. CONCLUSIONS

This paper has drawn on a wide range of objective and perception-based indicators to develop new, quantitative measures of transparency in the trading environment. Our approach is grounded in the view that it is the full range of factors in a country's trading environment that can influence exporters' and importers' incentives – which means that efforts to promote regional and global integration need to address policy reform across a number of areas, not limited

to traditional trade policy measures such as tariffs. There is thus an important complementary role to be played by trade facilitation in the broad sense (Wilson et al., 2005).

Taking APEC as a case study, we have used these measures to provide some of the first quantitative evidence suggesting that increasing the transparency of the trading environment through greater predictability and simplification can be an important way of reducing trade costs. We have found that the impact from transparency reforms comes in addition to the effects stemming from a more liberal stance in respect of 'traditional' trade policy measures such as tariffs and quotas. It appears particularly strong for differentiated products. Moreover, our instrumental variables results suggest that our findings are robust to the possible endogeneity of transparency to bilateral trade.

In policy terms, these results are generally supportive of the important place given to transparency both in the multilateral system, and in some regional groupings like APEC. As one means of reducing trade transaction costs, transparency reforms can legitimately be part of the trade facilitation agenda. Our results suggest that a reform agenda on transparency in APEC could proceed whether APEC continues in its current framework, or decides to begin formal talks on a Free Trade Area of the Asia Pacific (FTAAP). The type of reform measures examined here can be advanced in a number of ways and benefits shared across the APEC membership. However, translation of this policy programme into concrete reforms would benefit from more detailed research on a number of points.

First, it will be important to identify in greater detail the economic mechanisms at work in particular cases of transparency reform. Here, we have focused on two dimensions – predictability and simplification – that we measure using multiple indicators. By aggregating these indicators through factor analysis, we can produce a summary measure of the overall impact of transparency on bilateral trade. But to inform the details of policy reform, it will be necessary to 'unbundle' transparency even further and to examine particular aspects – such as corruption or policy uncertainty – that might be of particular importance in some national contexts. Since transparency reforms are not always politically easy (more on this below), it will be important for this body of research to identify whenever possible the relative economic payoffs from different measures, in order to help policy-makers invest their political capital where the economic return is highest.

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 (see Hoekman, 2006,

for a review). 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 among traders and officials, taking place against the background of national trade policy choices.¹⁴ Moving forward on corruption therefore requires detailed analysis of its determinants, as well as on the design of incentive-compatible policy reforms.

¹⁴ On this point, see Fisman and Wei (2004), Gatti (1999, 2004), Javorcik and Narciso (2007) and Fisman and Gatti (2006).

APPENDIX

TABLE A1
Data and Sources

<i>Variable</i>	<i>Description</i>	<i>Year</i>	<i>Source</i>
<i>Bound Lines_i</i>	Measures the percentage of bound lines in the tariff schedule of economy <i>i</i> .	2002–04	MAcMap (2007)
<i>Clearance Time_i</i>	Measures the number of days needed for import or export clearance in economy <i>i</i> .	2006	<i>Doing Business</i> (2007)
<i>Colony_{ij}</i>	Dummy variable equal to one only if one country was ever a colony of the other.	NA	Mayer and Zignago (2006)
<i>Common Coloniser_{ij}</i>	Dummy variable equal to one only if the importing and exporting countries were colonised by the same power.	NA	Mayer and Zignago (2006)
<i>Common Language_{ij}</i>	Dummy variable equal to one only if the importing and exporting countries have a common language (ethnographic not official basis).	NA	Mayer and Zignago (2006)
<i>Contiguity_{ij}</i>	Dummy variable equal to one only if the importing and exporting countries share a land border.	NA	Mayer and Zignago (2006)
<i>Distance_{ij}</i>	Measures the great-circle distance between the main city in the importing country and the main city in the exporting country.	NA	Mayer and Zignago (2006)
<i>E-Readiness_i</i>	Measures the state of e-government readiness of UN Member States in economy <i>i</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)
<i>Favouritism_i</i>	Measures the extent of favouritism in economy <i>i</i> . Based on responses to the question: ‘When deciding upon policies and contracts, government officials (1 = usually favour well-connected firms and individuals, 7 = are neutral among firms and individuals)’.	2004	<i>Global Competitiveness Report</i> (2005)
<i>GDP Exporter_i</i>	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 US dollars. Dollar figures for GDP are converted from domestic currencies using single-year official exchange rates.	2004	World Bank, <i>World Development Indicators</i> (2007)
<i>GDP Importer_j</i>	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 US dollars. Dollar figures for GDP are converted from domestic currencies using single-year official exchange rates.	2004	World Bank, <i>World Development Indicators</i> (2007)
<i>Hidden Barriers_i</i>	Measures the extent of favouritism in economy <i>i</i> . Based on responses to the question: ‘In your country, hidden import barriers (that is, barriers other than published tariffs and quotas) are (1 = an important problem, 7 = not an important problem)’.	2004	<i>Global Competitiveness Report</i> (2005)

TABLE A1 *Continued*

<i>Variable</i>	<i>Description</i>	<i>Year</i>	<i>Source</i>
<i>Imports_{ijk}</i>	Imports of economy <i>i</i> from economy <i>j</i> in sector <i>k</i> . Aggregated at the HS two-digit level and SITC four-digit level. MAcMap balances declared export and import values to obtain final estimated import figures.	2002–04	MAcMap (2007)
<i>Irreg. Paym._i</i>	Measures the extent of irregular payments in economy <i>i</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	<i>Global Competitiveness Report</i> (2005)
<i>No. Documents_i</i>	Counts the average number of documents needed for imports or exports in economy <i>i</i> .	2006	<i>Doing Business</i> (2007)
<i>No. of Agencies_i</i>	Counts the average number of border agencies involved in imports or exports in economy <i>i</i> .	2006	Logistics Perception Index (2007)
<i>NTB_i (RG Weighted)</i>	Non-tariff barriers in economy <i>i</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 + <i>NTB</i>).	2001/04	Kee et al. (2006)
<i>Same Country_{ij}</i>	Dummy variable equal to one only if the exporting and importing countries were once part of the same country.	NA	Mayer and Zignago (2006)
<i>Std. Dev. Irreg. Paym._i</i>	Standard deviation for the answer to the question on irregular payments in economy <i>i</i> .	2004	<i>Global Competitiveness Report</i> (2005)
<i>Tariff Dispersion_i</i>	Standard deviation of effective applied MFN tariffs in HS four-digit product groups in economy <i>i</i> .	2002–04	MAcMap (2007)
<i>Tariff_i (RG Weighted)</i>	The tariff rate of economy <i>i</i> is measured as the effective applied MFN rate, which is defined as (specific applied MFN tariff/Unit value) + <i>ad valorem</i> applied MFN tariff. It is weighted by reference group weights and converted to logarithm of (1 + tariff).	2002–04	MAcMap (2007)
<i>Time Spread_i</i>	Difference between the maximum and minimum number of days for clearance needed for imports or exports in economy <i>i</i> .	2006	Logistics Perception Index (2007)

TABLE A2
Economies Included in the Dataset

Group	Members
Importers	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*
Exporters	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.

REFERENCES

- Acemoglu, D., S. Johnson and J. A. Robinson (2001), 'The Colonial Origins of Comparative Development: An Empirical Investigation', *American Economic Review*, **91**, 5, 1369–401.
- Anderson, J. E. and D. Marcouiller (2002), 'Insecurity and the Pattern of Trade: An Empirical Investigation', *Review of Economics and Statistics*, **84**, 2, 342–52.
- Anderson, J. E. and E. van Wincoop (2003), 'Gravity with Gravitas: A Solution to the Border Puzzle', *American Economic Review*, **93**, 1, 170–92.
- Anderson, J. E. and E. van Wincoop (2004), 'Trade Costs', *Journal of Economic Literature*, **42**, 3, 691–751.
- Arvis, J. F. and M. A. Mustra (2007), *Measuring Global Connections: A New Set of Logistics Indicators* (Washington, DC: The World Bank).
- Arvis, J. F., G. Raballand and J. F. Marteau (2007), 'The Cost of Being Landlocked: Logistics Costs and Supply Chain Reliability', Policy Research Working Paper No. 4258 (Washington, DC: The World Bank).
- Baldwin, R. E. and D. Taglioni (2007), 'Trade Effects of the Euro: A Comparison of Estimators', *Journal of Economic Integration*, **22**, 4, 780–818.
- Broda, C. and D. E. Weinstein (2006), 'Globalization and the Gains from Variety', *Quarterly Journal of Economics*, **121**, 2, 541–85.
- Ching, S. T.-F., C. Y.-P. Wong and A. Zhang (2004), 'Non-tariff Barriers to Trade in the Pacific Rim', *Pacific Economic Review*, **9**, 1, 65–73.
- De Groot, H. L. F., G. J. Linders, P. Rietveld and U. Subramanian (2004), 'The Institutional Determinants of Bilateral Trade Flows', *Kyklos*, **57**, 1, 103–23.
- Djankov, S., C. Freund and C. S. Pham (2006), 'Trading on Time', Policy Research Working Paper No. 3909 (Washington, DC: The World Bank).
- Evans, C. L. and J. Harrigan (2005), 'Distance, Time, and Specialization: Lean Retailing in General Equilibrium', *American Economic Review*, **95**, 1, 292–313.
- Fisman, R. and R. Gatti (2006), 'Bargaining for Bribes: The Role of Institutions', Discussion Paper No. 5712 (London: Centre for Economic Policy Research).
- Fisman, R. and S. J. Wei (2004), 'Tax Rates and Tax Evasion: Evidence from "Missing Imports" in China', *Journal of Political Economy*, **112**, 2, 471–500.
- Francois, J. F. (2001), 'Trade Policy Transparency and Investor Confidence', *Review of International Economics*, **9**, 2, 303–16.
- Francois, J. F. and M. Manchin (2007), 'Institutions, Infrastructure, and Trade', Policy Research Working Paper No. 4152 (Washington, DC: The World Bank).
- Francois, J. F. and W. J. Martin (2004), 'Commercial Policy Variability, Bindings, and Market Access', *European Economic Review*, **48**, 3, 665–79.

- Freund, C. L. and D. Weinhold (2004), 'The Effect of the Internet on International Trade', *Journal of International Economics*, **62**, 1, 171–89.
- Gatti, R. (1999), 'Corruption and Trade Tariffs, or a Case for Uniform Tariffs', Policy Research Working Paper No. 2216 (Washington, DC: The World Bank).
- Gatti, R. (2004), 'Explaining Corruption: Are Open Countries Less Corrupt?', *Journal of International Development*, **16**, 6, 851–61.
- Greene, W. (2004), 'The Behaviour of the Maximum Likelihood Estimator of Limited Dependent Variable Models in the Presence of Fixed Effects', *Journal of Econometrics*, **7**, 98–119.
- Helpman, E., M. Melitz and Y. Rubinstein (2008), 'Estimating Trade Flows: Trading Partners and Trading Volumes', *Quarterly Journal of Economics*, **123**, 2, 441–87.
- Hoekman, B. M. (2006), 'Liberalizing Trade in Services: A Survey', Policy Research Working Paper No. 4030 (Washington, DC: The World Bank).
- Hummels, D. (2001), 'Time as a Trade Barrier', Mimeo.
- Javorcik, B. S. and G. Narciso (2007), 'Differentiated Products and Evasion of Import Tariffs', Policy Research Working Paper No. 4123 (Washington, DC: The World Bank).
- Kee, H. L., A. Nicita and M. Olarreaga (2006), 'Estimating Trade Restrictiveness Indices', Policy Research Working Paper No. 3840 (Washington, DC: The World Bank).
- Laborde, D., H. Boumelassa and M. C. Mitaritonna, Forthcoming, 'A Consistent Picture of the Protection across the World in 2004: MacMapHS6 v2' (Paris: Centre d'Etudes Prospectives et d'Informations Internationales).
- Levchenko, A. (2007), 'Institutional Quality and International Trade', *Review of Economic Studies*, **74**, 3, 791–819.
- Mayer, T. and S. Zignago (2006), 'Notes on CEPII's Distance Measures' (Paris: Centre d'Etudes Prospectives et d'Informations Internationales).
- Ranjan, P. and J. Y. Lee (2007), 'Contract Enforcement and International Trade', *Economics and Politics*, **19**, 2, 191–218.
- Rauch, J. (1999), 'Networks versus Markets in International Trade', *Journal of International Economics*, **48**, 7–35.
- Santos Silva, J. M. C. and S. Tenreyro (2006), 'The Log of Gravity', *Review of Economics and Statistics*, **88**, 4, 641–58.
- Wilson, J. S., C. L. Mann and T. Otsuki (2005), 'Assessing the Benefits of Trade Facilitation: A Global Perspective', *The World Economy*, **28**, 6, 841–71.
- Wolfe, R. (2003), 'Regulatory Transparency, Developing Countries, and the WTO', *World Trade Review*, **2**, 2, 157–82.
- Wooldridge, J. (2001), *Econometric Analysis of Cross Section and Panel Data* (Boston, MA: MIT Press).
- World Bank (2005), *World Development Report 2005: A Better Investment Climate for Everyone* (Washington, DC: The World Bank).
- World Bank Independent Evaluation Group (2006), *Assessing World Bank Support for Trade, 1987–2004* (Washington, DC: The World Bank).