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Infrastructure for Regional Co-operation

Haider A. Khan, University of Denver and
John Weiss – University of Bradford

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Infrastructure for Regional Co-operation

Haider A. Khan (University of Denver, USA)\(^1\)
and John Weiss (University of Bradford, UK)

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Introduction

Regional co-operation has received very considerable attention as means of stimulating ‘inclusive-growth’ in DMCs. Conceptually such discussions can be seen as a part of the analysis of the ‘New Regionalism’. The focus here is on co-operation through preferential trade and investment agreements that aim to strengthen structural economic reform, aid economic transformation, attract foreign investment and generally raise the international competitiveness of participating countries (IDB 2002).

Discussions within ADB have identified four broad mechanisms and levels for regional co-operation. These distinguish between

1) co-operation in various aspects of infrastructure in both ‘hard’ (e.g. ports, roads, telecoms) and ‘soft’ (e.g. social networks, legal frameworks) variants;
2) formal agreements on trade and investment (free trade agreements, investment agreements);
3) monetary co-operation (currency swaps, exchange rate pegs, currency unions);
4) regional public goods (health and environmental protection).

Here we focus on the first of these mechanisms since the latter three have been examined extensively elsewhere (for example see Bhattacharya 2006, Kawai 2005). The issue we discuss in this paper is how and why infrastructure can assist in this process. Whilst it may seem intuitively obvious that co-operation and economic activity more generally require infrastructure we seek to clarify more sharply why this might be so and thus provide a framework for subsequent empirical analysis of where policy interventions might be most effective.

Infrastructure and growth

A simple way of thinking about the role of infrastructure in growth more generally is to draw on the distinction made many years ago by Hirschman (1957) between ‘social overhead capital’ and ‘directly productive activity’. The former provides inputs, markets and a working environment for the latter and can be used as a shorthand term for infrastructure in its broadest sense, covering not just hard activities such as roads, ports and power plants but also the ‘soft’ institutional side relating to governance mechanisms, social networks and the ‘rules of the game’ more generally. The notion of social overhead capital supporting market-based productive activity is clearly a simplification since much infrastructure provides services that are also market-based. However if infrastructure is interpreted broadly to include institutions the distinction between social overhead capital and productive activity provides a link with the current focus on institutions as a key prerequisite for economic growth.

There continues to be very considerable debate on the exact role of institutions in economic growth (see for example Rodrik 2004), with much of the problem a technical one of attributing causation; even if it is agreed that almost tautologically that ‘good’
institutions go with high growth how far institutional quality is a response to rather than a cause of growth still remains to be resolved in many cases.

There is also a substantial literature linking physical infrastructure with growth. It is possible to use indices of ‘hard’ infrastructure as explanatory variables in growth regressions, although again problems of reverse causality (what causes what) remain. Jalilian and Weiss (2006) looked at this issue by constructing weighted indices of infrastructure quantity and quality and then using these separately in growth regressions. The use of best-practice econometrics allows the isolation of the impact of infrastructure, which in this analysis is found to have an independent causal influence on growth, although the actual elasticity of growth to the infrastructure measures is relatively low.

The common sense of this is that infrastructure impacts on growth through a number of mechanisms: for example amongst others by widening access to markets (for example through better road, rail, and port links), by increasing or improving access to inputs (for example by increased power supplies) and by raising the incentive to invest (for example by improved communications). These national growth mechanisms will also be relevant when we consider regional co-operation in the form of heightened trade and investment between nations.

‘Trade cost’ and regional co-operation

Trade costs are often defined as the range of costs involved in moving a product from a point of production to a market. As such they can refer to both national and cross-border transactions. For example in their authoritative survey Anderson and Wincoop (2004: 691) define trade costs as ‘all costs in getting a good to final user other than the marginal cost of producing the good itself’. Declines in such costs obviously make goods more cost competitive and raise the return on investment. However for an analysis of regional co-operation the focus must be on the cross-border aspects of such costs (or ‘international trade costs’), since it will be these that raise barriers to trade and restrict the return on investments in exportables (although they raise it for import substitutes).

International trade costs can be sub-divided in various ways and different components and aspects of infrastructure can be linked with the different types of trade costs. Box 1 sets out some of links to bring out the wide range of infrastructure features that will impact on these costs.

<table>
<thead>
<tr>
<th>Type of trade cost</th>
<th>Infrastructure intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport cost</td>
<td>Ports, Road, Rail, Air links</td>
</tr>
<tr>
<td>Freight insurance</td>
<td>Insurance regulation</td>
</tr>
</tbody>
</table>
The significance of this for regional co-operation is that international trade costs form a potentially important barrier to trade and that improvements in infrastructure, for example through the various mechanisms noted in box 1, can lower these barriers. The theoretical framework that is relevant here is an extension of the effective rate of protection (Balassa 1971, Corden 1972). The conventional formulation quantifies how far value-added in a line of production is impacted by policy-induced barriers to trade in the form of tariff or quota protection on outputs and inputs. This approach has been extended to incorporate transport costs on outputs and inputs (Amjadi and Yeats 1995). In principle however there is no reason why non-transport international trade costs cannot also be added as they also provide a form of protection that allows domestic producers to capture a higher level of value added, whilst still remaining price competitive with foreign suppliers.

Formally we can extend the effective protection rate (ERP) concept so that

\[
ERPi = \frac{(ti - \sum a_{ij}tj)(1-\Sigma a_{ij})}{1-\Sigma a_{ij}} + \frac{(ri - \sum a_{ij}rj)(1-\Sigma a_{ij})}{1-\Sigma a_{ij}} + \frac{(ni - \sum a_{ij}nj)(1-\Sigma a_{ij})}{1-\Sigma a_{ij}} \quad (1)
\]

where \(i\) is the final product, \(j\) is an internationally traded production input and \(a_{ij}\) is the (unobservable) coefficient for units of \(j\) per unit of \(i\) with no policy barriers to trade and no international trade cost; \(ti\) and \(tj\) are the rate of tariff or tariff equivalent of policy-induced trade barriers on \(i\) and \(j\) respectively, \(ri\) and \(rj\) are the transport costs per unit of \(i\) and \(j\) respectively and \(ni\) and \(nj\) are the non-transport trade costs per unit of \(i\) and \(j\).2

Coefficient \(a_{ij}\) is not directly observable and in practice is proxied by actual inputs per unit of output.

2 Here for simplicity we treat non-traded inputs as traded inputs with a zero tariff and assume away the impact of tariffs, quotas and trade costs on their price. Similarly this expression assumes no interaction between tariffs and trade costs, whereas in practice tariffs are typically imposed on cif values which will include trade costs. With an interaction effect on price the expression becomes

\[
ERPi = \frac{(ti - \sum a_{ij}tj)(1-\Sigma a_{ij})}{1-\Sigma a_{ij}} + \frac{(ri - \sum a_{ij}rj)(1-\Sigma a_{ij})}{1-\Sigma a_{ij}} + \frac{(ni - \sum a_{ij}nj)(1-\Sigma a_{ij})}{1-\Sigma a_{ij}} + \frac{(ti + (ri + ni) - \Sigma a_{ij}(rj + nj))(1-\Sigma a_{ij})}{1-\Sigma a_{ij}} \quad (2)
\]
The first term gives the potential proportionate increase in value-added due to policy-induced protection, the second term gives the proportionate increase due transport costs and the third the proportionate increase due to other international trade costs. In other words the sum of these gives the increase in potential income to domestic factors in comparison with a situation where there were zero tariffs, no quotas and no trade costs. Trade cost thus potentially increase ‘natural’ protection and since they can vary significantly between products impacting on (or distorting) relative prices with efficiency implications.

**How significant are trade costs?**

Whilst such arguments are widely recognized there is a lack of empirical evidence, particularly in the Asian context. However it is now widely asserted that trade costs are more important than policy barriers to trade; for example Anderson and Wincoop (2004:693) argue that ‘inferred border costs appear on average to dwarf the effect of tariff and non-tariff barriers’. Their ‘representative’ international trade costs for industrialized countries, a combination of transport and non-transport costs, are as high as 74%, compared with average tariffs of less than 5%. Of these international trade costs roughly one third are transport related and the rest cover the various types of trade cost listed in box 1. This rough figure of 74%, which is no more than illustrative, can be interpreted as the sum of \( ri \) and \( ni \) in (1) above. If international trade costs for inputs are below those for outputs the representative effective protection rate created by trade cost (terms two and three in 1) will be higher still.

More specific estimates of this type for developing countries are required to gain a sense of the magnitude of the barriers to regional co-operation through trade. Work on Sub-Saharan Africa some years ago was novel in deriving effective protection estimates due to transport costs (the second term in 1) and highlighted the barriers to African exports posed by poor transport infrastructure (Amjadi and Yeats 1995). For example whilst import tariffs facing African goods in the US were relatively low the tariff equivalent of higher transport costs from Africa was on average 8 percentage points above the tariff rate. These are nominal protection figures however and with low value-added content effective protection afforded US producers from transport costs will be much higher. In an analysis for the early 1990’s the authors find an average effective protection due to transport of 25% compared with a nominal one of 15% (Amjadi and Yeats 1995, table 5).

An important part of the argument over the significance of trade costs (not just transport costs) is their variation across products. There has been considerable theoretical discussion on deadweight losses incurred through significant variations in tariffs and similar arguments apply to trade costs more generally. It is intuitively clear that transport costs per unit of value will vary across products with different weight to value ratios, but other aspects of trade cost also appear to differ substantially between products. We have some approximate evidence on this from trade data that allow a comparison between fob and cif values for the same product with the cif –fob margin interpreted as a measure of non-policy induced trade cost. De (2006 tables 4 to 6) for example reports the cif- fob
margin at the 4 digit level for the top ten product categories in trade with very
considerable variation between them. For PRC’s imports from Japan, for example, in
2004 the margin as a percentage of the cif price ranges from a low of 2% to a high of
123% (De 2006 table 4b). Import tariffs on the other hand range from zero to 35%. There
are doubts about the accuracy and comparability of this fob and cif price data, but
nonetheless the range of trade costs implied by this data seems very wide.

Having noted the scale and variability of trade costs the key question is whether they are
a significant barrier to regional co-operation and closer trading ties. It is well known that
despite their existence East Asia has seen a very rapid growth of intra-regional trade ties
in recent years, although the same is much less true for South and Central Asia. However
this does not necessarily imply that intra-regional trade cannot expand still further. There
are alternative pieces of evidence to support this.

First, we can point to the vast literature in the 1990’s that addressed the impact of trade
liberalization, in terms of tariff and quota reductions, on trade flows. In general whilst
there has been dispute as to the impact of trade reform on income growth, in terms of
trade flows there is little doubt that trade did expand significantly in response to
reductions in policy-induced trade barriers. If trade cost barriers are as high as often
claimed their reduction should also see a significant rise in trade.

Second, we can draw on trade intensity indices (TII) from the very detailed work of Ng
and Yeats (2003) on East Asia. The TII is defined simply as

$$TII_{ij} = \frac{(x_{ij} / X_{it})}{(x_{wj} / X_{wt})}$$

Where we have trade between countries i and j and xij is the exports of i to j and Xit is
the total exports of i; w is the world and xwj is world exports to j and Xwt is total world
exports. This TII is simply the ratio of j’s share in i’s exports to j’s share in world
exports. If it exceeds 1.0 we can say there is an ‘intense’ trade relation. In this analysis j
can be a partner country or a regional group of countries. As expected for all bilateral
trade flows in East Asia TII exceeds 1.0 often by a very wide margin. However if one
corrects for distance between trading partners and compares a predicted TII derived from
a regression model with the actual TII, in 2001 for about 40% (by number not value) of
the possible bilateral trade flows in the East Asian region the actual index was below the
predicted figure (Ng and Yeats 2003: 23). In other words given the distances involved
one would have expected the partners to trade even more with each other than they
actually did. The analysis is simple as it does not allow adjust for other factors apart from
distance but it does highlight that the apparently high level of trade intensity in the region
may not be as strong as it first appears.

Third, a growing number of gravity-type models relate trade between partners to distance,
a set of country characteristics and proxies for trade costs. Invariably the latter prove to

3 Weiss (1992) for example showed the link between tariff reform in Mexico in the 1980’s and the growth
of exports.
be a significant explanatory variable, negatively related to trade levels (see for example Limao and Venables 2001, De 2006). More using this framework for the GMS region Fujimura Edwards (2006) find an average elasticity of trade in major exports to cross-border road infrastructure of 0.4, while formal trade barriers as measured by tariffs do not have a significant influence on trade. Much more work remains to be done in quantifying accurately the trade cost to be used in these models, but provided the proxies applied there are broadly reasonable the results indicate a fairly strong elasticity of trade to declines in trade cost. Insofar as higher trade can stimulate income growth there are further potential benefits from infrastructure investment or intervention in these areas to lower trade cost barriers to trade.

The incentive to invest

As with any other form of cost, an increase in trade costs of all types will be expected to impact on the incentive to invest. This is reflected in the responses typically found in ‘investment climate’ surveys which indicate that poor quality hard infrastructure that provides poor road and air communications, unreliable power supplies and congested ports is a major disincentive to investment (World Bank 2005). However not all trade costs need be borne by the domestic purchaser or importer for internationally traded goods. From simple micro economics we know that the incidence of trade costs will be determined by demand and supply elasticities. In the extreme case in which supply of a good is perfectly inelastic any increase in trade costs will be borne wholly by the supplier. Any attempt to pass on higher trade cost will raise the domestic price above the market clearing level and the resulting excess supply will bring down the price. At the other extreme where demand is perfectly inelastic any increase in trade cost will be borne solely by the purchaser or importer. Most real world situations will involve less than perfectly inelastic demand and supply schedules and who bears the largest share of increases in trade costs (or who benefits most by their reduction) will be determined by the size of demand and supply elasticities and when elasticities are equal the burden is shared equally. However, assuming a less than perfectly elastic supply schedule, the more the elasticity of demand falls the higher will be the proportion of trade cost borne by the purchaser or importer and hence the greater will be the negative impact on their investment plans.3

The role of institutions and soft infrastructure

The discussion thus far has focussed narrowly on hard infrastructure drawing on the framework of trade costs and their impact on protection and prices. Infrastructure can be defined much more broadly and below we discuss the wider implications of soft infrastructure for regional co-operation.

We do not attempt an exhaustive survey of issues or the large literature that exists. Estache (2006) is a good survey of both hard infrastructure and corruption. Soft

3 Amjadi and Yeats (1995) demonstrate these points graphically in the case of freight costs.
infrastructure is defined here as all the institutional facilities used to deliver both hard infrastructure such as energy, water and sanitation, telecommunication and transport services, and generally to provide means to enhance economic well-being through both market and non-market economic, social and political interactions. In this sense, soft infrastructure is the institutional means to enable citizens as producers and consumers to get the most out of their economic activities including but not limited to the economic activities in the hard infrastructure sectors. In Sen’s terms, soft infrastructure along with the hard infrastructure can work to enhance the capabilities of citizens. We discuss soft infrastructure mainly under three distinct but related categories - governance in general, corporate governance and corruption.

Soft Infrastructure: Governance, Trade Costs and Regional Cooperation

“Governance” refers to institutions and processes by which we make collective decisions and solve collective problems. It has become the dominant term in discussing issues such as the role of the state as various pressures converged in the 1980s to force researchers and leaders of governments and multilateral organizations to shift attention from government to governance. These pressures included demands to reduce the size of government, frustration with inefficient and corrupt government bureaucracies, and recognition that the formulation and implementation of public policy appropriately included non-government actors. Public officials must now coordinate and cooperate with partners in vertical, authority-based and horizontal, negotiation-based systems responsible for provision of public goods. Clearly, these developments have significant implications for the supply and management of infrastructure.

In the last ten years, the World Bank has taken the lead in operationalizing the concept of governance. In a recent summary of the governance literature Kaufmann et al (2006) report on the latest version of the worldwide governance indicators, covering 213 countries and territories and measuring six dimensions of governance since 1996 until end-2005: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. The indicators are based on several hundred individual variables measuring perceptions of governance, drawn from separate data sources constructed by 25 different organizations. Using these extensive data sources, the authors construct indicators of the following six dimensions of governance:
1. **Voice and accountability (VA)**, the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media;
2. **Political stability and absence of violence (PV)**, perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including political violence and terrorism;

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*See also Kaufmann et al (2005, 2003)*

3. **Government effectiveness (GE)**, the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies;

4. **Regulatory quality (RQ)**, the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development;

5. **Rule of law (RL)**, the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence;

6. **Control of corruption (CC)**, the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests.

We discuss corruption under a separate heading later. In this section we focus on the possible relations between trade costs and the other dimensions of governance in the context of regional cooperation. If we look at Box 1 *Illustrations of trade cost and infrastructure interventions* we find that already several areas of governance reform leading to trade cost reductions are indicated. In fact, it could be argued that almost all areas except perhaps direct transport costs can be affected by desirable governance reforms. In particular, unofficial payments could cease or be reduced drastically as **Government effectiveness (GE)**—that is the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies—increases with appropriate reforms. Furthermore, if the reforms are carried out on a coordinated basis within the region, the benefits will be reaped by all the parties regardless of their country of origin.

Another area where coordinated governance reforms can reduce trade costs is customs delays. The informal anecdotal evidence indicates that there are substantial losses from such delays. Clearly, even unilateral reform by one country can improve the situation for that country and its trading partners; but a coordinated reform package will provide incentives for cross-border cooperation among exporters, importers and other allied interest groups including consumers which can lead to significant cuts in trade costs. For example, the harmonization of customs procedures, a regional cooperation issue *par excellence*, can save each party involved considerable sums. It can also lead to the creation of goodwill and operational procedures that can ease the way for future gainful cooperation in other areas.

A third area where governance reforms can (at least indirectly) affect trade costs is insurance regulation. **Regulatory quality (RQ)** refers to the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. If governance reforms lead to an improvement in RQ, then freight insurance and related regulations can lead to significant lowering of costs.

These are probably the most obvious areas in which cross-border coordination along with governance reforms will have a significant impact on trade costs. In addition an
increasingly general tendency to follow the rule of law will undoubtedly make regional cooperation and lowering of trade costs more feasible. As is noted in Box 1, the lowering of information costs through such cooperation and an improvement of the quality of information can also improve the investment climate as well.

Much of the recent research on governance has focused on defining and measuring various indicators of governance. Operational work has relied largely on survey-based statistical techniques. It is still too early to say how useful the current set of measurement techniques will be in the area of measuring the impact of soft infrastructure reforms on trade costs and other factors related to regional cooperation. But the value added from doing such work can potentially be great (see also the section on corruption). We now turn to a brief discussion of corporate governance, particularly as it may relate to the Public-Private Partnership idea in the area of infrastructure provision and regional cooperation, and its possible impact on trade costs.

**Corporate Governance and Infrastructure Management**

Corporate governance in a narrow sense addresses the fundamental microeconomic issue of how the managers of the firm are induced by banks, equity markets, or other mechanisms to act in the best interests of its shareholders and hence to maximize the discounted present value of the firm. In a wider sense, corporate governance can or should address a whole host of issues for multiple stakeholders—ranging from efficiency and equity to the promotion of economic and political freedom.

Khan (1999; 2004) develop the idea of a family based corporate governance system (FBS) and contrasts this with the bank-led system (BLS) and equity market based system (EMS). Both BLS and EMS are closely associated with the dominant mode of corporate finance by banks and equity markets respectively. In the case of FBS, the financing can come from three different sources. Initially, family business is financed largely by internal funds. As the enterprise grows over time, the role of banks and outside equity becomes more prominent. However, the key difference between FBS as a governance system and BLS and EMS lies in the fact that neither the banks nor the equity markets ultimately control the family business groups. The control resides with the family groups in the final analysis. This may not be without economic rationale, but ultimately FBS can run into trouble as well. Since many developing economies are characterized by FBS, it is important to analyze the role of FBS in infrastructure delivery and management. In addition the role of BLS and EMS in infrastructure delivery and management needs also to be considered.

According to the theory developed in Khan (1999; 2004) it is possible to analyze the FBS type of governance by considering five essential aspects: 1) the extent of family controlled corporations in the specific regions, e.g., in East Asia or Latin America; 2) the dominant modes of financing; 3) the key information asymmetries and agency conflicts; 4) problems of monitoring family businesses; 5) investment and capital accumulation.
For infrastructure delivery and management all five aspects are important, but information asymmetry, monitoring and investment issues are of particular salience.

It is fair to say that work on the role of corporate governance in ensuring efficiency and equity in the infrastructure delivery and management is yet to begin. But this is likely to be a research area with particularly high pay-off. Infrastructure projects are typically large, involve external financing including foreign financing, and have many informational asymmetries arising from many sources, particularly the specialized nature of many projects. In view of the popularity and potential of the public-private partnership (PPP) in infrastructure delivery and management, it is imperative that we try to understand the issues related to corporate governance in this area. PPP can lead to desired outcomes only when many of these informational and agency issues have been sorted out and proper corporate governance with an efficiently functioning Board of Directors is in place.

With respect to trade costs in particular, to the extent a well-governed corporation is able to deliver infrastructure at or close to the minimum average cost, the direct transport cost itself can be lower. In addition, a well-governed insurance industry will deliver insurance products at lower costs as well. Cross-border coordination of corporate governance reforms by instituting best practices in several countries can lead to substantial lowering of trade costs among these countries and between the region and the rest of the world. Some particular hypotheses to test in this context can flow from the relationship between factors that concern the relations between outside members of the Board, independent Auditing Committees and remuneration committees on the one hand and trade costs on the other. For example, one could test the hypothesis that an independent auditing committee can lower trade costs (via an improvement of the delivery of services by decreasing the incentive to overcharge, follow dilatory practices etc).

**Corruption: how significant a problem?**

Our last broad research theme emerging from this quick survey of soft infrastructure, trade costs and regional cooperation may be the most complex one. In the final analysis, corruption is really about accountability for governance failures as the subsection on governance already indicated. Our major concern here, as in the last two sections, is with how corruption increases trade costs. We suggest research strategies for determining these links and also policies for improving regional cooperation through fighting cross-border corruption such as smuggling.

Although ‘unofficial payments’ may be the most obvious and perhaps the most widespread type of corruption with regards to trade costs (see Box 1), there are clearly many aspects of regulatory environment that are affected by corruption.\(^5\) The impact of

\(^5\) One could go further and claim that perhaps all aspects of regulatory environment are affected by corruption
corruption in the financial sector is particularly important to understand. It would appear that almost all the costs listed in Box 1 are likely to increase because of corruption.

The usual explanation of the existence of corruption in public sector infrastructure delivery and management relies on the phenomenon of low wages in the public sector. There are at least two other important features of infrastructure that can account for the higher than average risks of corruption in these activities. First, on the average, projects tend to be much bigger than in other sectors. Second, firms delivering services in infrastructure are often allowed a monopoly on delivery.

The existence of widespread corruption among public monopolies in the infrastructure sectors was often one of the arguments used to advocate privatization. This was supported by the theoretical modeling of corruption. Assuming that it is easier for corrupt politicians to control public firms than private firms, these researchers argued that privatization could reduce the control government has over the rent offered by the full control of the sector by making political interference more costly or more visible.

However, as Estache (2006) correctly observers:

Most of the evidence offered by these surveys is however anecdotal and indirect. There is no real systematic measurement of the level of corruption in the sector. With the exception of a database compiled by Clarke and Xu (2004) for Eastern Europe and some sense of the ranking of utilities among corrupt institutions from the Global Corruption Report (2004), the annual Global Competitiveness Report provides the only comparable, quantitative, multi-country (59 developing countries) overview of corruption in infrastructure sectors, ranking countries according to the perceived degree of corruption (based on interviews with private firms) among many other criteria.

What can be done to reduce corruption in infrastructure? Four main directions in has been suggested. These are: (i) privatization, (ii) regulation and related processes, (iii) increased decentralization, and, (iv) adoption of participatory process in the selection, implementation, and supervision of projects. In each of these areas cross-border cooperation can significantly improve efficiency and reduce costs, including trade costs.

If we wish to attain more precision in future research on corruption in infrastructure and its impact, some preliminary work needs to be done. In this effort, there are at least two areas in which basic work is likely to pay off significantly. The first one is data collection, refinement and organization according to some given theoretical framework. There is a significant body of theoretical work in microeconomic theory, corporate governance and related areas that can be used as a starting point for this. Secondly, and

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6 See, for example, Shapiro and Willig (1990), Shleifer and Vishny (1993), Boycko et al (1996) and Aidt (2003) among others
7 Estache (2006:19) points out “Favoritism, fraud, cronyism, patronage, embezzlement, bribes, and state capture are all concepts that have long been associated with the delivery of infrastructure services in many countries.”
at least equally important is data analysis that will also be necessary. Empirically, the measurement of corruption levels in the infrastructure sector is still generally approximated by the level of corruption in the country. More direct sector data and analysis are needed.

The assessment of the effectiveness of the policy instruments for the infrastructure sector depends crucially on refining data in ways described above. Once such data are available, accurate estimates of the impact of corruption on trade (and other) costs can be computed by using state of the arts econometric methods.

We concur with Estache (2006) with regards to the assessment of theoretical work in this area and the need for empirical evidence:

The main message of this discussion of the effectiveness of theoretical solutions may be that there is not enough evidence to get a sense of how much and under what circumstances each one of them really matters. When evidence is available, it is too narrow or not robust enough. This defines an important research agenda for the sector. Finding out more about the actual effectiveness of the theoretical recommendations on how to deal with corruption in the sector should be a higher priority.

Therefore, estimating the impact of corruption on trade costs empirically looms as an important research task. At our present state of knowledge, one could begin with some existing (unrefined) index of corruption as a right hand side variable and run regressions on a cross-sectional basis to see what the impact of corruption (ceteris paribus) on trading costs may be. Even at this level a rather extensive cross-section data set on a number of variables including governance, corporate governance and industry-specific indicators will be necessary. But the pay off is likely to be large since the existing state is one of theoretical deductions of limited applicability at best, or following one’s prejudices with a few anecdotes for support at worst. As mentioned earlier, more refined data on corruption in infrastructure in particular will lead to more accurate empirical estimates of its impact, and hence, one hopes, to better--- or at least better informed--- policies.

**Soft Infrastructure, Trading Costs and Regional Cooperation: a final observation**

All three related areas of soft infrastructure discussed so far can lead to a significant reduction in trade costs. Once the relevant data are available this plausible hypothesis can be specified econometrically. With further testing we will be in a position to assess existing policies in the area of soft infrastructure reforms. Turning to trade costs in particular, we saw that that trade costs were thought to be more important than policy barriers to trade. We could test whether this was true particularly for soft infrastructural factors related to trade costs, thus providing a deeper explanation for Anderson and Wincoop’s (2004:693) claim that ‘inferred border costs appear on average to dwarf the effect of tariff and non-tariff barriers’. Hence attempting to quantify the impact of soft infrastructure on trade cost barriers and the implied protection rates can be an important empirical contribution to understanding barriers to closer regional cooperation. Furthermore, there are also economy- wide modelling approaches that can be used for
these and other purposes including assessing the impact of regional cooperation in infrastructure on poverty reduction as well.

**Infrastructure Reforms, Trade Costs and Poverty Reduction: CGE Modeling**

We also wish to emphasize that soft and hard infrastructure reforms and the consequent reduction of trade costs do not happen in a vacuum, but that they also have an impact on the poor through their impact on other markets (such as the labor market and investment savings market) that matter to the poor. These feedback effects are potentially significant for poverty reduction. Models that can carry out counterfactual policy experiments and estimate their impact on poverty making possible an economy-wide analysis, are needed. Computable general equilibrium (CGE) models are increasingly becoming a useful analytical response to these needs. At the ADBI, we have carried out such modeling exercises with respect to trade liberalization and its impact on poverty (Cororaton 2005, 2006; Khan, 2004, 2005, 2006).

In general, through a simultaneous and recursive equations system structure, the CGE models can simulate economic and social impacts of reforms and are based on the socioeconomic structure of a social accounting matrix (SAM), with its multisectoral disaggregation. As illustrated in Khan(2004), for example, the basic idea behind a SAM is to identify the linkages in an economic system. The basic elements when constructing a SAM are input-output tables combined with government accounts, labor force and household surveys. The household surveys are crucial for performing impact analysis on welfare and poverty. How deep the analysis can go depends on data availability. The CGE literature on the effects of public infrastructure service reform is rather modest: Adam and Bevan (2004) for Uganda, Boccanfusso et al. (2006) for Senegal, Chisari and his colleagues (1999, 2003) and Navajas (2000) for Argentina, Andersen and Faris (2002) for natural gas in Bolivia, and Logren et al (1997) for rural Morocco. Their main contribution is to show the importance of infrastructure for achieving the MDGs and also to show that good regulation can be redistributive and progressive. Multi-country CGE models for particular regions can also capture the impacts of regional cooperation in hard and soft infrastructure areas.

**Conclusions**

This paper has attempted to provide a framework for considering how infrastructure – both in hard and soft variants – can contribute to the process of regional cooperation in various parts of Asia. It has drawn on the familiar formulation of the effective rate of protection – developed decades ago when tariffs and quotas were serious barriers to trade – and argued that this concept can modified to quantify the empirical significance of

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8 See also the references cited there.
broader trade cost barriers. The effective rate of protection concept is flexible enough to allow the effect of a range of potential trade costs to be addressed. Infrastructure interventions can be interpreted as instruments to lower trade costs and hence are a means of stimulating closer trading links.

In this paper we have focused on co-operation in various aspects of infrastructure in both ‘hard’ (eg ports, roads, telecoms) and ‘soft’ (eg governance) variants. We have emphasized specifically the relationship between both hard and soft infrastructure and trade costs. Clearly, much work remains to be done to quantify the impact of trade costs on both on domestic value-added and through protection on trade flows. The basic policy point is that if we have a clear indication of the height of the barriers posed by different types of trade cost this will give us a rough ranking of priorities in terms of infrastructure interventions to lower these. Whilst a vast amount of empirical work in the 1960’s and 1970’s quantified the barriers to trade caused by tariffs and quotas, as yet relatively little has been done to quantify protection from these largely ‘non-policy’ barriers.

We have identified several crucial areas of future research with potentially large value added. Our general hypothesis with significant policy implications which can be elaborated and tested is that trade costs are negatively related to the existence of and improvements in both hard and soft infrastructure. A related hypothesis is that cross-border cooperation in building and maintaining both hard and soft infrastructure will lead to a reduction in trade costs. More specifically it will be useful to know the how high are the barriers to trade created by factors like high freight costs, slow port handling, customs delays, lack of competition in the insurance sector, poor corporate governance, unofficial payments and so forth. Some of these factors may be intrinsically difficult to quantify but there is a potentially rich field here.
References


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