

Meeting Infrastructure Needs for a Shared Prosperity: Key Challenges and Policy Implications

Guntur Sugiyarto*)

Economic Research and Regional Department, ADB

Central Asia Think Tank Development Forum

“Promoting Economic Cooperation for an Integrated Central Asia”

Graduate School of Public Policy · Nazarbayev University · Kazakhstan

June 20-21, 2016

***) All views here are personal** 1

Organization of Presentation

1. Key Characteristics and Role of infrastructure
2. ADB's Strategy and Operation
3. Infrastructure Needs and Impacts
4. Key issues and challenges
5. The Way Forward

Key Characteristics of Infrastructure

Public Good

- Externalities
- Non-excludability/free riders
- Poverty impacts

Long Horizon

- Need for long term financing
- Political risk/risk sharing

Bulky Investment

- Large investments by powerful agents
- Possible market dominance/regulatory capture

Infra-Industry Nexus

- Dynamic of comparative advantage
- Substitute/complement for factors of production
- Spatial effects

Importance of Infrastructure

One of the most important asset in any economy, providing benefits to society and the economy

Plays a central role in economic and social development.

Macroeconomy: productive capacity, output & economic growth; technical progress productivity growth; international trade; foreign direct investment (FDI)

Microeconomy: private sector costs & returns; spatial and regional development; private investment; employment & incomes; externalities

Positive Impacts of Infrastructure

Economic

- Supporting Economic Growth
- Generating Employment Opportunities

Trade & Invest.

- Reducing the Cost of Doing Business
- Supporting 'Regional Production Network'

Environ.

- Addressing Climate Change
- Mitigating Disaster Impacts

Poverty

- Reduce Poverty by Improving Access to Services
- "Energy / Transport / Water for All"

Inclusive Infrastructure defined in the ADB's Strategy 2020

- ✓ sustainable growth creating and enlarging opportunities
- ✓ broadening access to opportunities to ensure members of society can participate in and benefit from growth

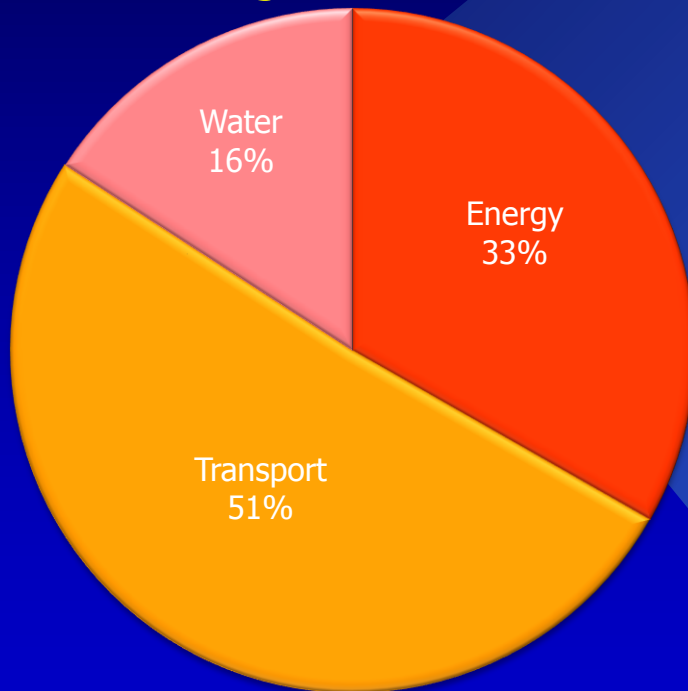
ADB's infrastructure operations emphasize public-private partnerships and private sector engagement

ADB's Long Term Strategic Framework: Strategy 2020

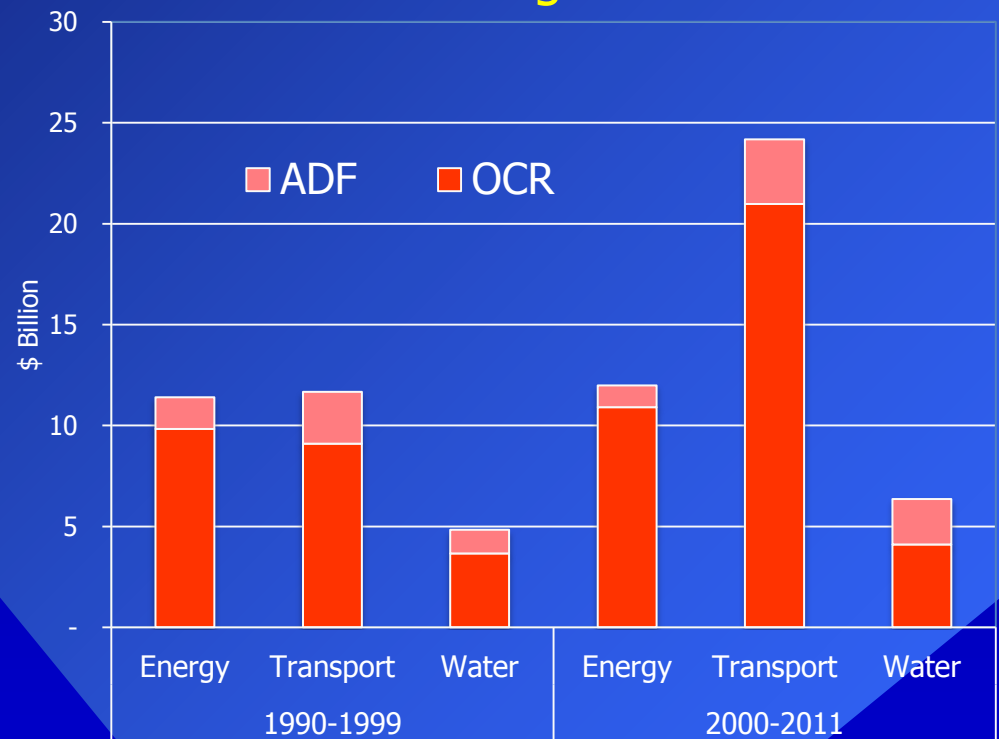
- Overarching goal: poverty reduction in Asia and the Pacific.
- Three strategic agendas: (i) inclusive economic growth; (ii) environmentally sustainable growth; and (iii) regional integration.
- Five core operational areas: (i) infrastructure; (ii) environment; (iii) regional cooperation and integration; (iv) financial sector development; and (v) education.
- Instruments: (i) lending, equity investment, and guarantees; (ii) policy dialogue, and (iii) capacity building and technical assistance.

ADB Operations on Infrastructure

ADB Lending for Infrastructure

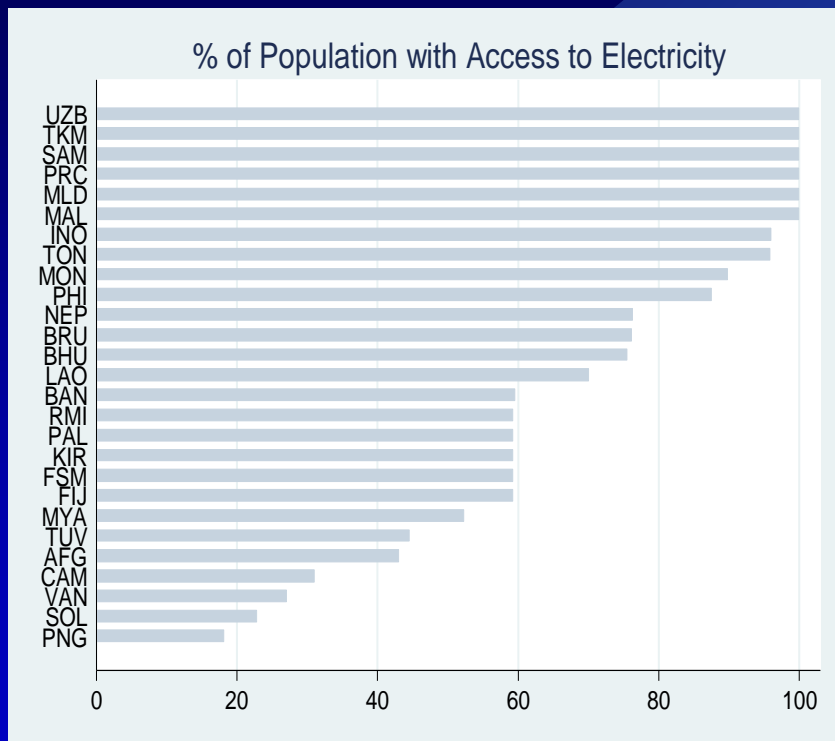


Lending for Infrastructure According to Source

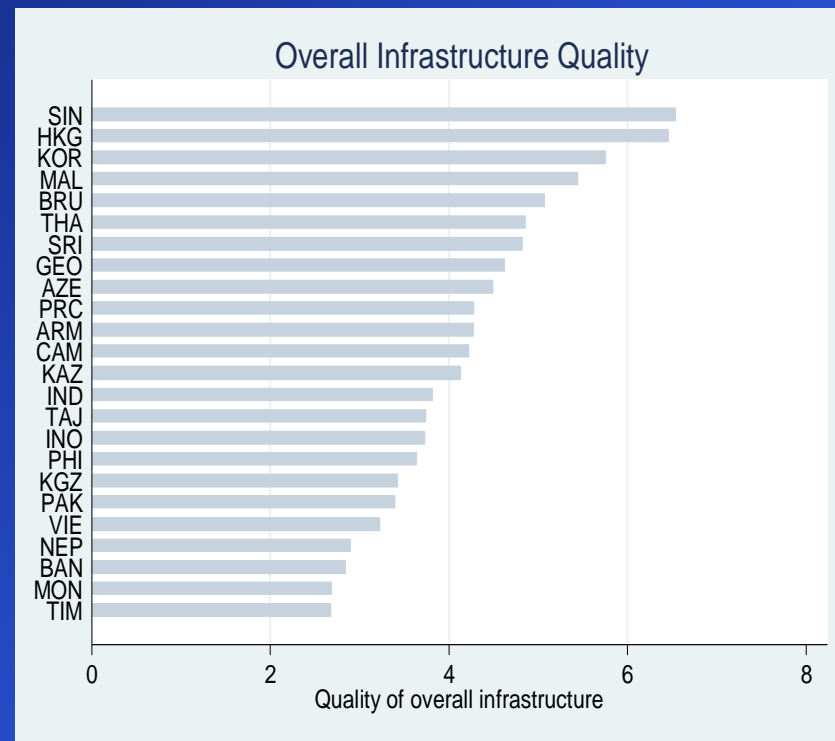


Source: ADB internal database on loan, TA, Grant, and Equity Approvals as of 23 March 2011.

Infrastructure provision across Asia: A snapshot



Source: WDI

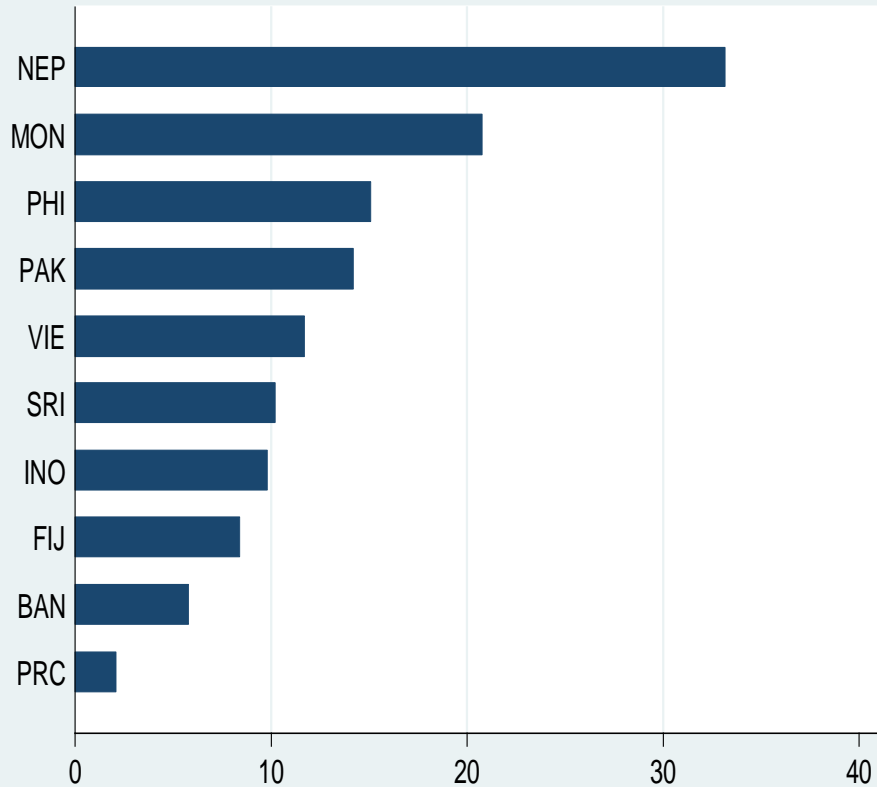


Note: Higher number represents higher quality on a scale of 1 to 7.

Source: Global Competitiveness Index 2012, World Economic Forum

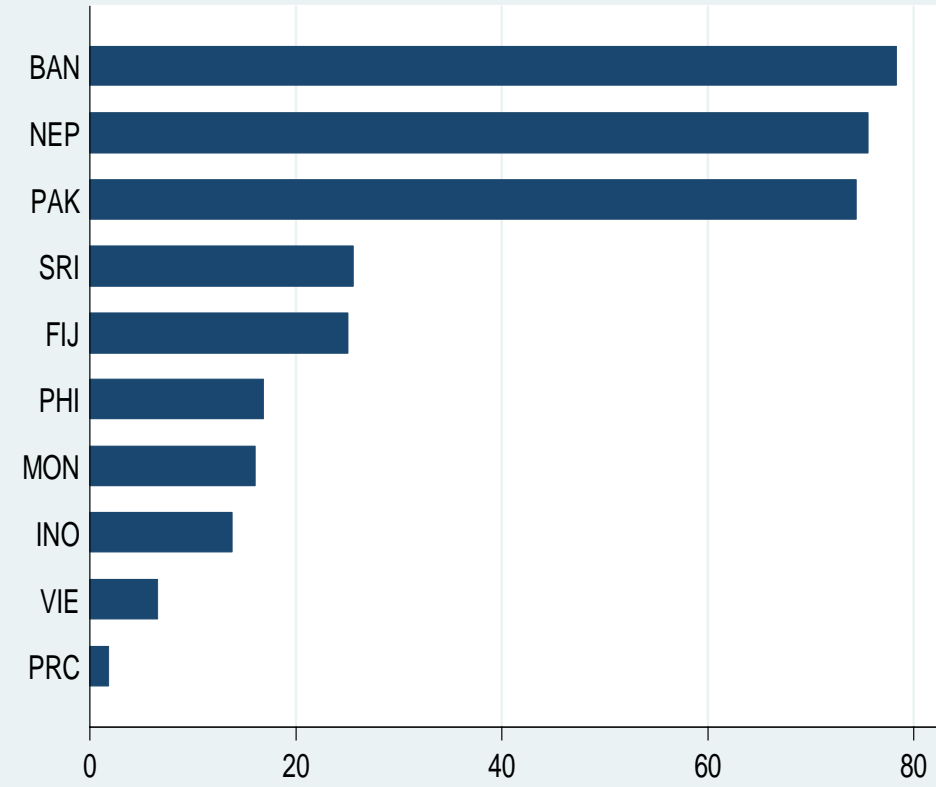
Lack of infrastructure is a constraint to operations and growth of firms

Transportation as Constraint, % of Firms



Source: WB Enterprise Survey, various years

Electricity as Constraint, % of Firms



Source: WB Enterprise Survey, various years

Note: Percentage of firms reporting constraint as "major" or "severe".

Comparison with *Seamless Asia*

Seamless Asia

Period: 2010-2020

Total: 8.22 Trillion (2008 USD)

Per annum: 747 billion

Percentage to GDP: 6.5%

Coverage: **32 DMCs**

Composition

- 68% new capacity
- 32% maintenance
- 49% energy
- 35% transport
- 13% telecoms
- 3% water and sanitation

Updated ERDI Estimate

Period: 2014-2030

Total: Based on 2010 USD

Percentage to GDP: 4.3%

Coverage: **45 DMCs** (including Korea; Singapore; Hong Kong, China; Taipei, China)

Composition

- 67% new capacity
- 33% maintenance
- 42% transport
- 36% energy
- 18% telecoms
- 4% water and sanitation

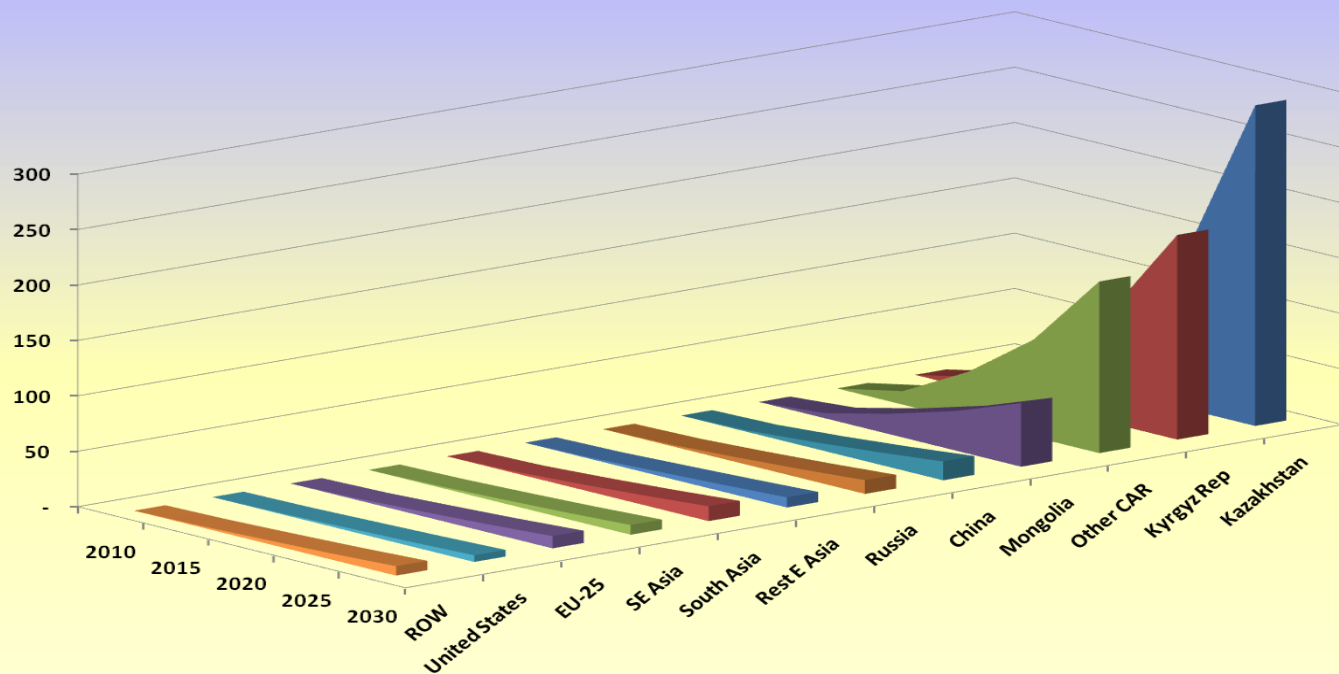
CAREC Economic Corridor Development: Assessment from a General Equilibrium Perspective



Examples of Infrastructure Impacts of KAZ Road Corridors

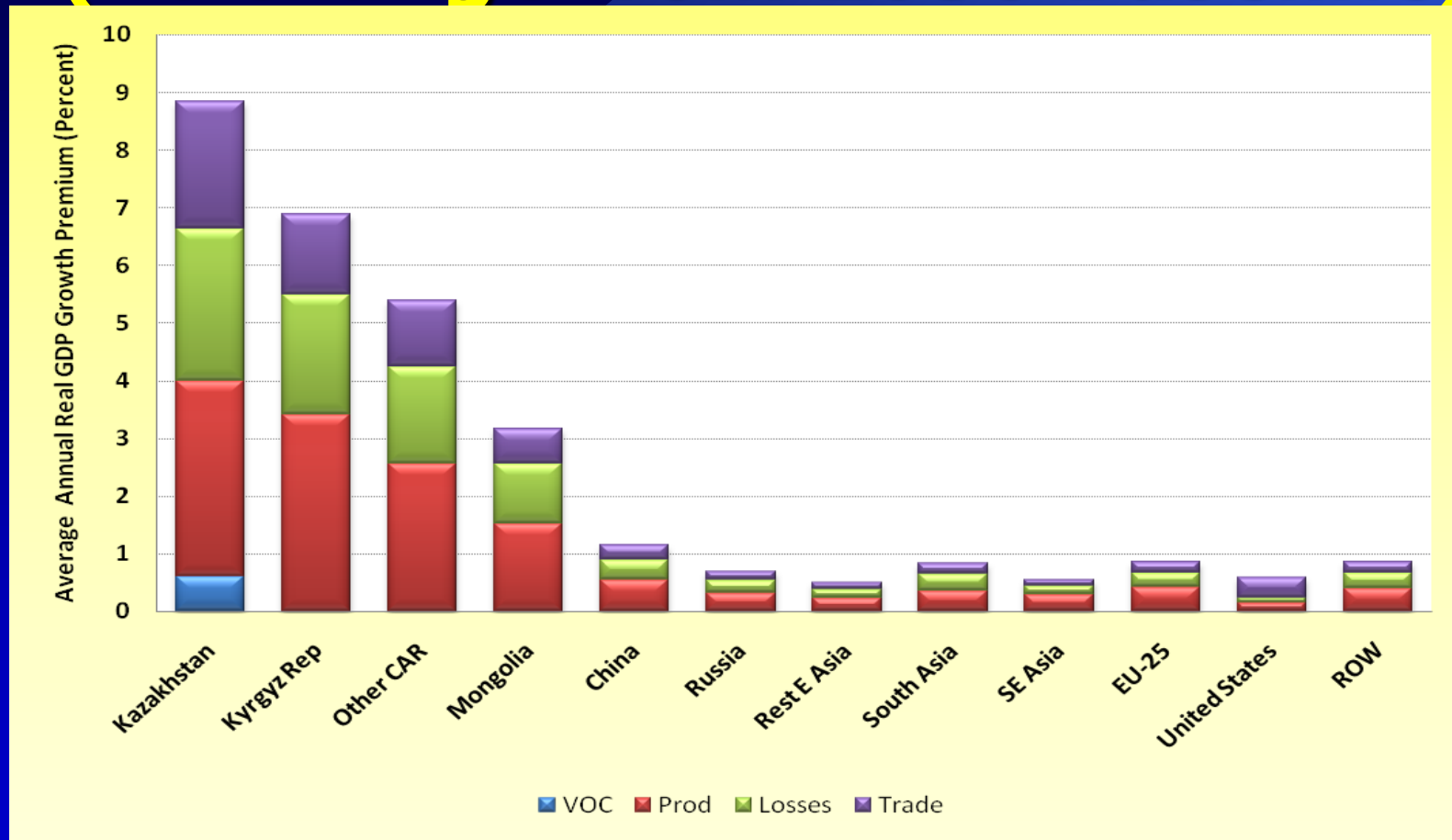
- *Vehicle Operating Costs (VOC)* – Includes complete project outlays and estimated economic benefits from improved safety, travel time, and reduced vehicle depreciation.
- *Productivity (Prod)* – Includes above and estimates of productivity gains for transport and distribution sectors.
- *Losses* – Includes above and reductions in product losses due to spoilage, damage, delays, and other adverse effects of roadway inefficiency.
- *Trade* – Includes above and estimates of reduced trade and transport cost margins.

Real GDP Growth (Annual % Change from Baseline of 2010 GDP)



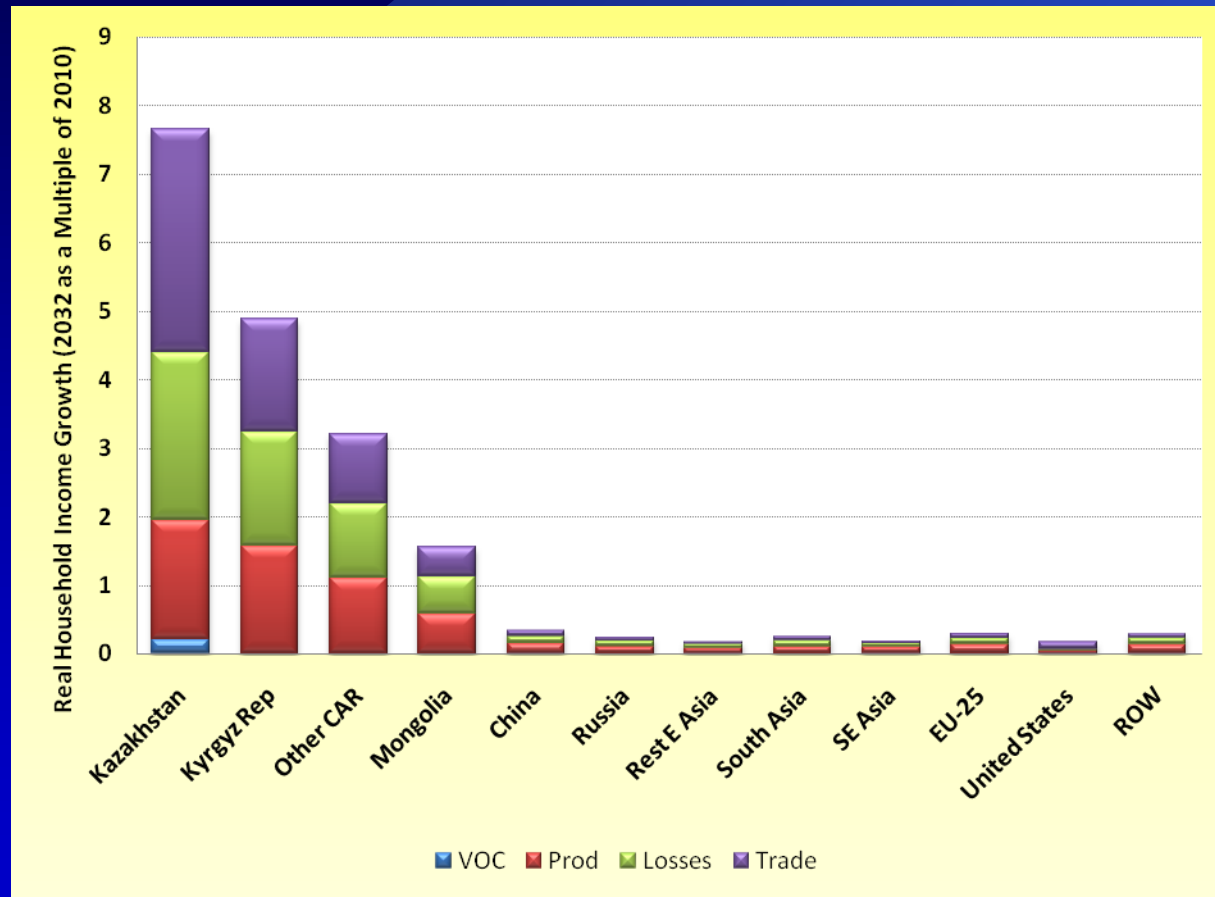
The main beneficiaries in relative growth terms are Kazakhstan and proximate economies. Regional spillovers are quite significant.

Real GDP Growth Premium (% change from 2030 Baseline)



- ❖ Significant nominal growth accrues to larger economies, however, suggesting a broader basis for financing and policy support.

Real Household Income Growth (% change from Baseline in 2030)




- ❖ Productivity effects are even more important to supply and employment responses.

Overall Impacts ...


- The benefits of KAZ road project far outweigh its costs.
- Transboundary spillovers confer significant growth leverage on other regional economies and more distant trade partners.
- Project benefits are negligible compared to productivity, efficiency, and trade stimulus effects.
- Productivity gains are the largest source of growth benefits, but reduced losses and trade stimulus are of nearly equal benefit.

Samples of outputs...



Macroeconomic Effects of Road Corridor Investment in Kazakhstan: A General Equilibrium Perspective

Guntur Sugiyarto, Olly Norojono, Asian Development Bank *
David Roland-Hoib, Department of Agricultural and Resource Economics



INTRODUCTION

ADB is engaged across the Central and West Asian region for infrastructure and other projects to facilitate economic growth and regional integration. This includes a large road network project in Kazakhstan. The costs and benefits of the project will be complex and dispersed over time and across domestic, regional and even global stakeholders. This study examines the effects of the project over the period 2008 to 2030 using a new modeling technique developed for the region.

Objective:

To examine:

- Economic benefits and criteria for supporting the corridors.
- CAREC case for criteria for optimal trade corridors and energy conveyance systems in line with the Greater Mekong Sub-region (GMS) and the South Asia Subregional Economic Cooperation (SASEC).
- Apply a forward looking economic model to estimate the impact of a significant infrastructure project in CAREC region and beyond.

RESULTS

Real GDP growth and other selected aggregates

- GDP would increase by 68% in 2020 and nearly 300% by 2030.
- Kazakhstan's transport and distribution outputs would increase by 79 and 77% by 2020 and continue to more than triple by 2030.
- Exports and imports would increase by 32 and 33% by 2020, and 63 and 64% by 2030.
- Regional spill over benefits are seen in all other CAR economies, e.g. GDP increases by 43% in 2020 and 152% by 2030.
- Components of Impacts
- Direct effects are relatively small compared with the indirect effects, especially across different economies.
- Household Income
- Household income improves consistent with the macro indicators and trade is more important to households than to firms.

CONCLUSION

Overall benefits of the project far outweigh the project's costs and the trans-boundary spill over effects confer significant growth leverage to the neighbouring and regional economies, including to more distant trading partners.

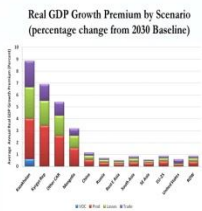
In comparison, the direct project benefits are relatively small compared to the indirect benefits coming from productivity, efficiency, and trade stimulus effects.

The different components of the project's effects are necessary for a comprehensive impact evaluation and in sustaining policy dialogue across countries in the region and beyond to foster economic growth and improve regional integration in trade and infrastructure.

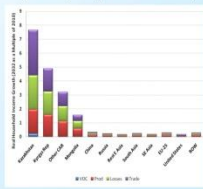
Key Project Impact Indicators (Annual Percentage Change from Baseline)

	2010	2030
Kazakhstan		
GDP	68	290
Output	79	356
Distribution	77	345
Exports	32	63
Imports	33	64
Other CAR		
Russia	4	12
EU25	4	11
PRC	6	17
Kazak Exports		
Other CAR	50	75
Russia	25	54
PRC	36	67
EU25	28	61
Kazak Imports		
Other CAR	48	75
Russia	27	56
PRC	37	69
EU25	30	63

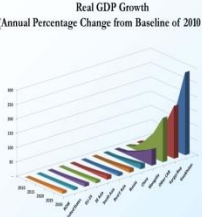
Real GDP Growth Premium by Scenario (percentage change from 2010 Baseline)



Real Household Income Growth (Percentage change from Baseline in 2030)



Real GDP Growth (Annual Percentage Change from Baseline of 2010 GDP)



Method of Analysis

CGE Modeling:

Market interactions are so pervasive and CGE model is needed to determine economic outcomes across different aspects. The model is well suited to trade analysis and can detail structural adjustments within national economies and elucidate their interactions in the international markets.

Four Policy Scenario:

Baseline: Zero investment, no action is taken on the project, which is compared with the scenarios of:

- Vehicle Operating Costs (VOC): complete project outlays and estimate the economic benefits from improved safety, travel time, and reduced vehicle depreciation.
- Productivity: collateral growth effects including VOC and productivity gains for transport and distribution sectors.
- Losses: includes above and reductions in product losses due to spoilage, damage, delays, and other adverse effects of roadway inefficiency.
- Trade: include above plus reduced trade and transport cost margins both in the domestic and across Kazak's borders.

Macroeconomic Effects of Road Corridor Investment in Kazakhstan General Equilibrium Perspective

Olly Norojono, David Roland-Holst, and Guntur Sugiyarto

Infrastructure development across Central Asia facilitates connectivity, competitiveness, productivity, and ultimately economic growth and regional integration. A sample development project is a large road corridor in Kazakhstan. This report shows the economic impact of such a project. The quantitative work follows a dynamic general equilibrium model covering both direct and indirect effects, including trade facilitation, transport cost reduction, and increased productivity. The cumulative indirect impacts benefit Kazakhstan and the many economies linked to it.

As Asian economic integration advances, infrastructure challenges arise. Asia's growth has been indirectly associated with maritime trade routes established centuries ago. More recently, this growth has been driven by other transport modes, including road, rail, and air travel. Energy trade is also an important variable. This paper presents a forward-looking economic model that is used to determine the impact of significant infrastructure projects in Central Asia and beyond.

Previous experience in this area indicates that a well-developed economic model can elucidate the many indirect benefits of large infrastructure projects and regional trade facilitation initiatives (1-3). Such a tool can capture myriad indirect effects, including ones arising from regional integration. It can also better identify the efficiency and growth dividends for diverse stakeholders. With stronger evidence of benefits for such projects, particularly with respect to regional development and poverty reduction, policy makers can better justify their appropriate fiscal commitments and promote complementary bilateral-multilateral facilitation agreements.

If Central Asian countries are to realize their full economic potential, more effective trade integration within the region and the rest of Asia is essential (4, 5). Currently, these economies have limited demand levels because of their low average incomes and because their production structures are heavily specialized in primary commodities. To take full advantage of export markets that can expand demand for the countries' products and diversify consumption, more extensive and efficient transportation networks are being planned and constructed. This paper presents multicountry estimates of the potential national and regional growth benefits of sustained commitments to such investments.

Ultimately, the gains from regional trade and transport development depend on the complex interplay of market forces, responses from households and firms to changes in the policy environment and market conditions, direct and indirect linkages among various sectors of the economy, and backward and forward linkages between the domestic economy and the rest of the world. Currently, there are no tools that would enable the policy makers in this region to make informed decisions on these issues. To overcome this limitation, a Central Asia Computable General Equilibrium (CA-CGE) model has been developed. This dynamic, multicountry CGE model links Central Asian countries directly to their key trading partners. The modeling results can inform more effective regional policy and multilateral dialogue in several ways for Central Asia, and may help policy makers to do the following:

- Assess effects of policy reforms in individual countries, including their effects on poverty and inequality (6, 7);
- Analyze the economywide and cross-border effects of major investment projects affecting the region, especially the projects that reduce trade costs for these countries (8, 9);
- Assess the effects of regional cooperation and integration initiatives;
- Make economic projections for individual countries; and
- Analyze economic and resource linkages (including energy) among countries in the region, and among them and other countries.

In its present form, the CA-CGE model includes Kazakhstan, the Kyrgyz Republic, the Xinjiang Autonomous Region of China, the rest of China, Russia, and the rest of the world. China has become an important trading partner for the Central Asian countries, with Xinjiang accounting for the bulk of China's trade with the Central Asian countries. Russia remains a leading trading partner for all Central Asian countries. It is also the main destination country for migrant workers from Central Asia. The base year for the model data is 2004. Subsequently, the model could be extended to include other neighboring countries and their trading partners.

TRANSBOUNDARY IMPACTS

Project

Infrastructure and other projects across the Central Asian region facilitate economic growth and regional integration. Included among these projects is a large road network project or corridor in Kazakhstan connecting Khorgos (a border town between Kazakhstan and China),

O. Norojono, Central and West Asia Department, and G. Sugiyarto, Economic and Research Department, Asian Development Bank, 6 ADB Avenue, Mandaluyong City, 1550 Metro Manila, Philippines. D. Roland-Holst, Department of Agricultural and Resource Economics, University of California, Berkeley, 207 Giannini Hall, Berkeley, CA 94720. Corresponding author: O. Norojono, onorojono@adb.org.

Transportation Research Record, Journal of the Transportation Research Board, No. 2162, Transportation Research Board of the National Academies, Washington, D.C., 2010, pp. 90-97. DOI: 10.3141/2162-11

*The views expressed in this paper are those of the authors and do not necessarily reflect the views and policies of the Asian Development Bank (ADB) or its Board of Governors or the governments they represent.

Major Issues and Challenges



Crowding in the private sector – PPPs, cost recovery, property rights, guarantees?



Managing networks and technical change



International cooperation; regional integration (growth spillovers)



Financing – long term, local currency bond markets, other instruments

Private Sector Financing

Key Challenges

Long
Term

**Difficulties in Providing Long-Term
Investments by Private Sector**

Risks

Inherent Risks in Infrastructure Investments

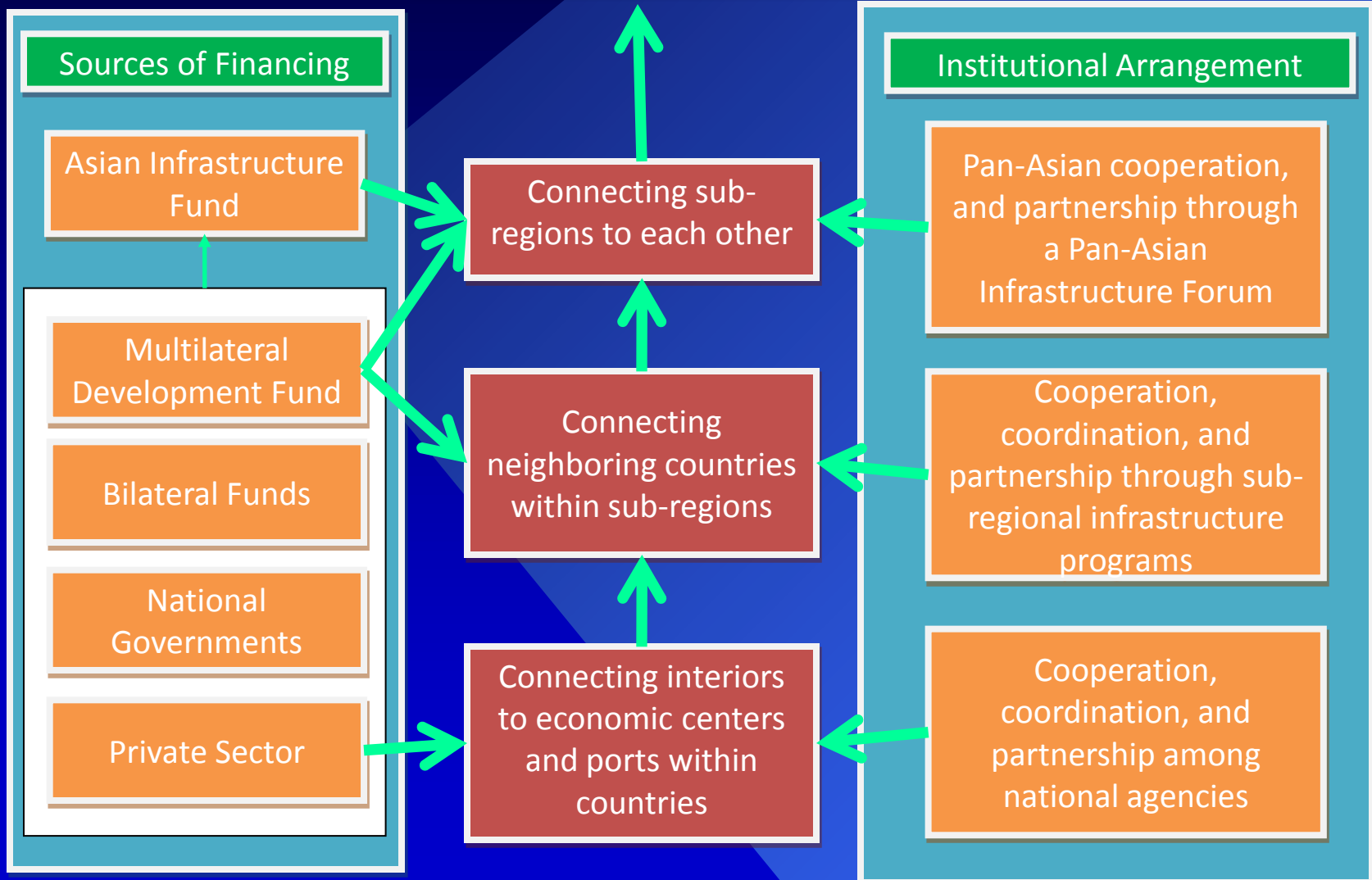
Inform.

Lack of Full Information on Projects

Role of
Govt.

Governments need to engage Private Sector

Framework and Partners



Key Challenges Ahead

Public

Limited Resources and Competing Needs of Fiscal Allocation

Private

Recent Financial Turmoil Reduces Investments (lesson from Asian and Global Crises)

PPP

Important role of PPP to Enhance Investments but need to address its risks

Donors

More Proactive Approach through Financial & Technical Supports

The Way Forward

- Meeting the infrastructure needs by accelerating infrastructure development
- Setting right policies and institutions
- Considering environmental concerns
- Supporting technological advancement
- Strengthening cross-border infrastructure through regional cooperation

Thank you!