Regional Economic Integration in Asia and the Pacific

Fahad Khan
Economist, Asian Development Bank

3rd CAREC Think Tanks Development Forum (CTTDF)
17 July, Bishkek, Kyrgyzstan

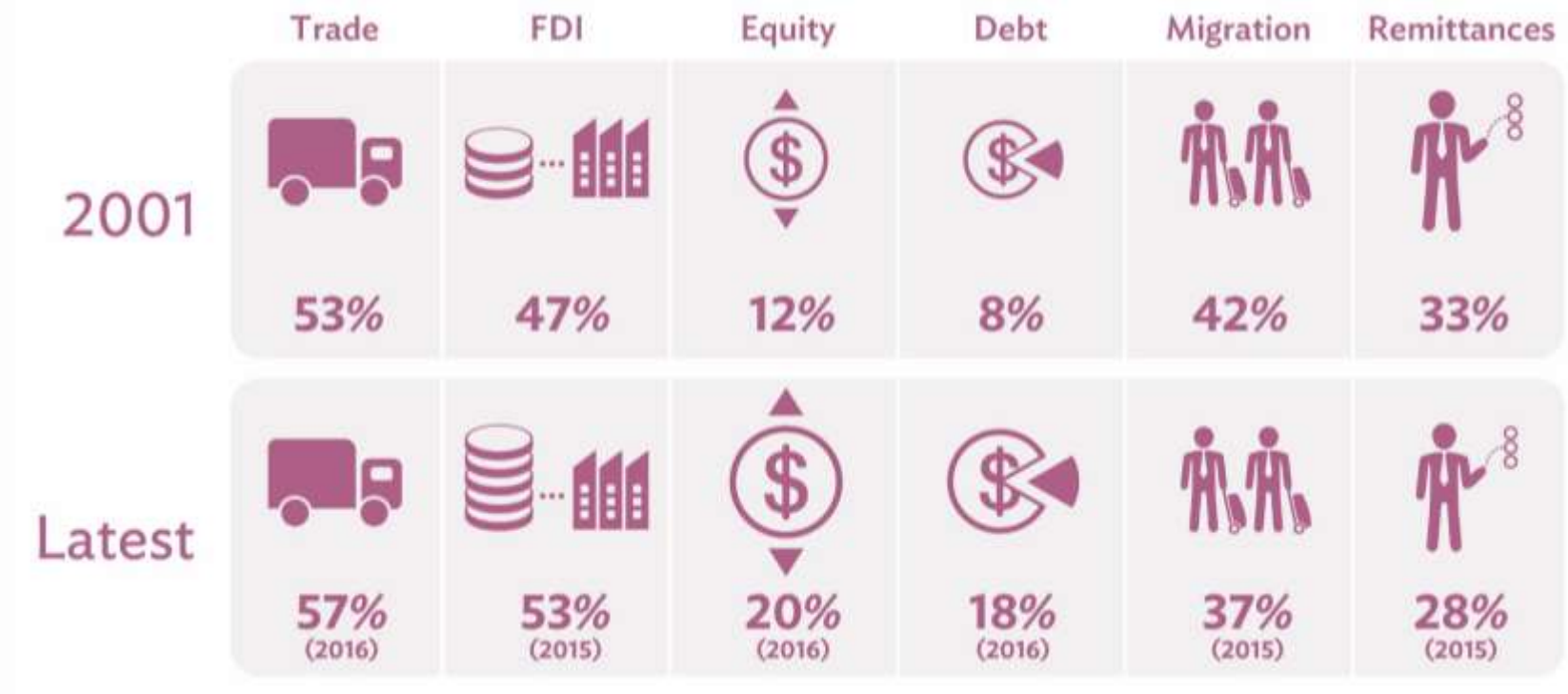
ADB

Outline

- Regional Economic Integration: Progress and Challenges
- Asia-Pacific Regional Integration Index
  - Construction and Interpretation
  - Comparison with other regions
  - Key findings
- CAREC Regional Integration: State of Play

Regional integration continue to deepen

Intraregional shares as % of total



FDI = based on inward foreign direct investment (flows data); Equity = based on equity asset holdings (stock data); Debt = based on debt asset holdings (stock data).
Notes:
1. Trade, equity and debt data as of January to June 2016 (H1 2016).
2. Migration data in 2001 and 2015; available every 5 years.
3. Remittance data only available starting in 2010.
Source: ADB calculations using data from Association of Southeast Asian Nations (ASEAN) Secretariat, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, World Bank, and national sources.

Regional Integration

- Deeper regional integration offers economic and non-economic benefits
  - Economic gains by expanding markets, boosting industrialization, enhancing market structure, fostering productivity and investment opportunities
  - Non-negligible non-economic gains by improving political/security stability and socio-cultural harmonization
- Asia-Pacific made significant progress in regional economic integration—but the degree of regional integration remains illusive
- Policy needs for a tool to monitor and evaluate progress against set goals

ADB

Why a Composite Index?

- Regional integration is a multidimensional phenomenon and may not be captured by a single variable alone
- A composite index is constructed from compiling various indicators into a single index and allows for summarizing complex and multidimensional issues
- The index can assist in decision-making; improve accountability; and facilitate communication with general public

Introducing Asia-Pacific Regional Integration Index (APRII)

- Aims to assess the degree of integration in Asia-Pacific and its subregions; identify strengths and weaknesses of regional integration across different regions and different dimensions; and monitor progress over time and against the set goals
- Most comprehensive dataset: constructed from 26 indicators based on bilateral data, expressed as a ratio of intra-regional sum (or average) to total sum (or average)
- Design of composite index: (OECD, 2008)
  - Creation of six dimensional indexes and their overall index
  - All indexes constructed by weight-averaging their respective components, with weights determined by principal component analysis (PCA)

ADB

Benefits of PCA

- Reduction of data dimensionality
  (e.g., TV 2-dimensional, the subjects 3-dimensional)
- PCA summarizes a dataset into a smaller number of dimensions while preserving the variation in the data to the maximum extent possible
- Suppose a vector of two variables, X_1, and X_2

$$Z_1 = a_{11}X_1 + a_{21}X_2 \qquad Z_2 = a_{12}X_1 + a_{22}X_2$$

- PCA chooses the weights that maximize the variance of Z
- Amount to solving eigenvalues/eigenvectors of $E(X'X)$
- $Var(Z_1) \geq Var(Z_2)$, and Z_2 is orthogonal to Z_1

ADB

Structure of APRII

R1. Trade and Investment Integration	R11	Proportion of intra-regional goods exports to total goods exports
	R12	Proportion of intra-regional goods imports to total goods imports
	R13	Intra-regional trade intensity index
	R14	Proportion of intra-regional FDI inflows to total FDI inflows
	R15	Proportion of intra-regional FDI inflows plus outflows to total FDI inflows plus outflows
R2. Money and Finance Integration	R21	Proportion of intra-regional cross-border equity liabilities to total cross-border equity liabilities
	R22	Proportion of intra-regional cross-border bond liabilities to total cross-border bond liabilities
	R23	Pair-wise dispersion of deposit rates averaged regionally relative to that averaged globally
	R24	Pair-wise correlation of equity returns averaged regionally minus that averaged globally
R3. Regional Value Chain	R31	Ratio between the averaged trade complementarity index over regional trading partners and the averaged trade complementarity index over all trading partners
	R32	Ratio between the averaged trade concentration index over regional trading partners and the averaged trade concentration index over all trading partners
	R33	Proportion of intra-regional intermediate goods exports to total intra-regional goods exports
	R34	Proportion of intra-regional intermediate goods imports to total intra-regional goods imports
R4. Infrastructure and Connectivity	R41	Ratio between the averaged trade cost over regional trading partners and the averaged trade cost over all trading partners
	R42	Ratio between the averaged liner shipping connectivity index over regional trading partners and the averaged liner shipping connectivity index over all trading partners
	R43	Logistics performance index (overall)
	R44	Doing Business Index (overall)
R5. Free Movement of People	R51	Proportion of intra-regional outbound migration to total outbound migration
	R52	Proportion of intra-regional tourists to total tourists (inbound plus outbound)
	R53	Proportion of intra-regional remittances to total remittances
	R54	Proportion of other Asian countries that do not require an entry visa
R6. Institutional and Social Integration	R61	Proportion of other Asian countries that have signed FTAs with
	R62	Proportion of other Asian countries that have an embassy
	R63	Proportion of other Asian countries that have signed business investment treaties with
	R64	Proportion of other Asian countries that have signed double taxation treaties with
	R65	Cultural proximity with other Asian countries relative to that with all other countries

Normalization

- Normalization to avoid adding up apples and oranges prior to data aggregation
  - Adjust for different units of measurement
  - Adjust for different range of variation
- Cast indicators into a same standard
- Min-Max rescaling normalizes the indicators such that they all range between 0 and 1
  - $\frac{X_j - X_{j,min}}{X_{j,max} - X_{j,min}}$, if higher values of the indicator denote greater regional integration
  - $1 - \frac{X_j - X_{j,min}}{X_{j,max} - X_{j,min}}$, if higher values of the indicator denote lesser regional integration
- All normalized indicators have the same range of variation (0, 1)

ADB

Weighting

- Importance of a weighting scheme to combine indicators into a single index
- Weighted average via PCA
- EC recommends PCA as a useful tool, especially when each dimension has few indicators (3-10)
- Other indexes using PCA weighting scheme

  KOF Index of Globalization, Economic Freedom of the World Index, Chicago Fed National Activity Index, Logistic Performance Index, General Indicator of Science and Technology, Environmental Performance Index, Internal Market Index, Business Climate Indicator, to name a few

Index Construction

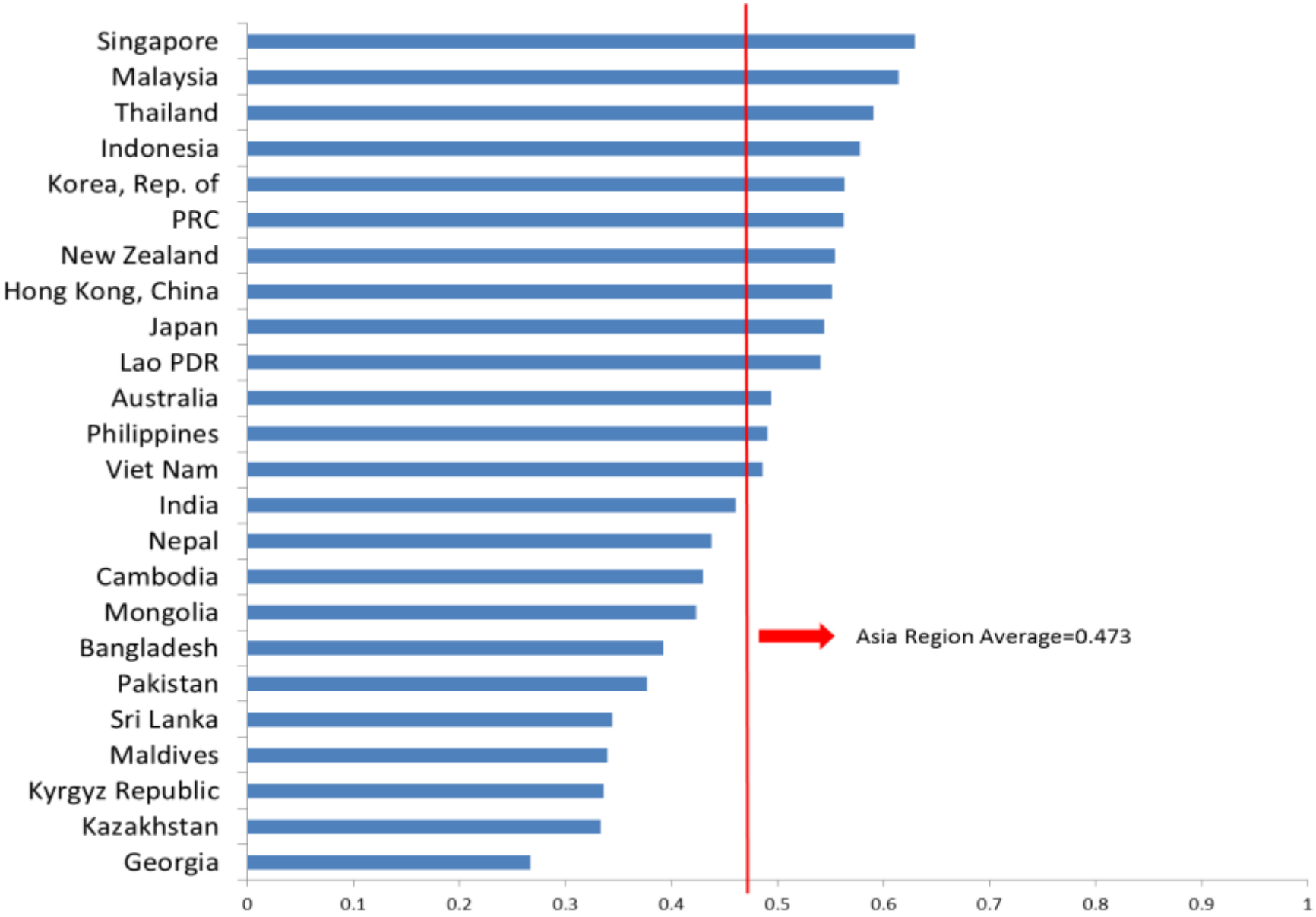
- Normalization to avoid adding up apples and oranges prior to data aggregation
  - Adjust for different units of measurement
  - Adjust for different range of variation
- Importance of a weighting scheme to combine indicators into a single index
- Weighted average via PCA
- EC recommends PCA as a useful tool, especially when each dimension has few indicators (3-10)
- Other indexes using PCA weighting scheme

  KOF Index of Globalization, Economic Freedom of the World Index, Chicago Fed National Activity Index, Logistic Performance Index, General Indicator of Science and Technology, Environmental Performance Index, Internal Market Index, Business Climate Indicator, to name a few

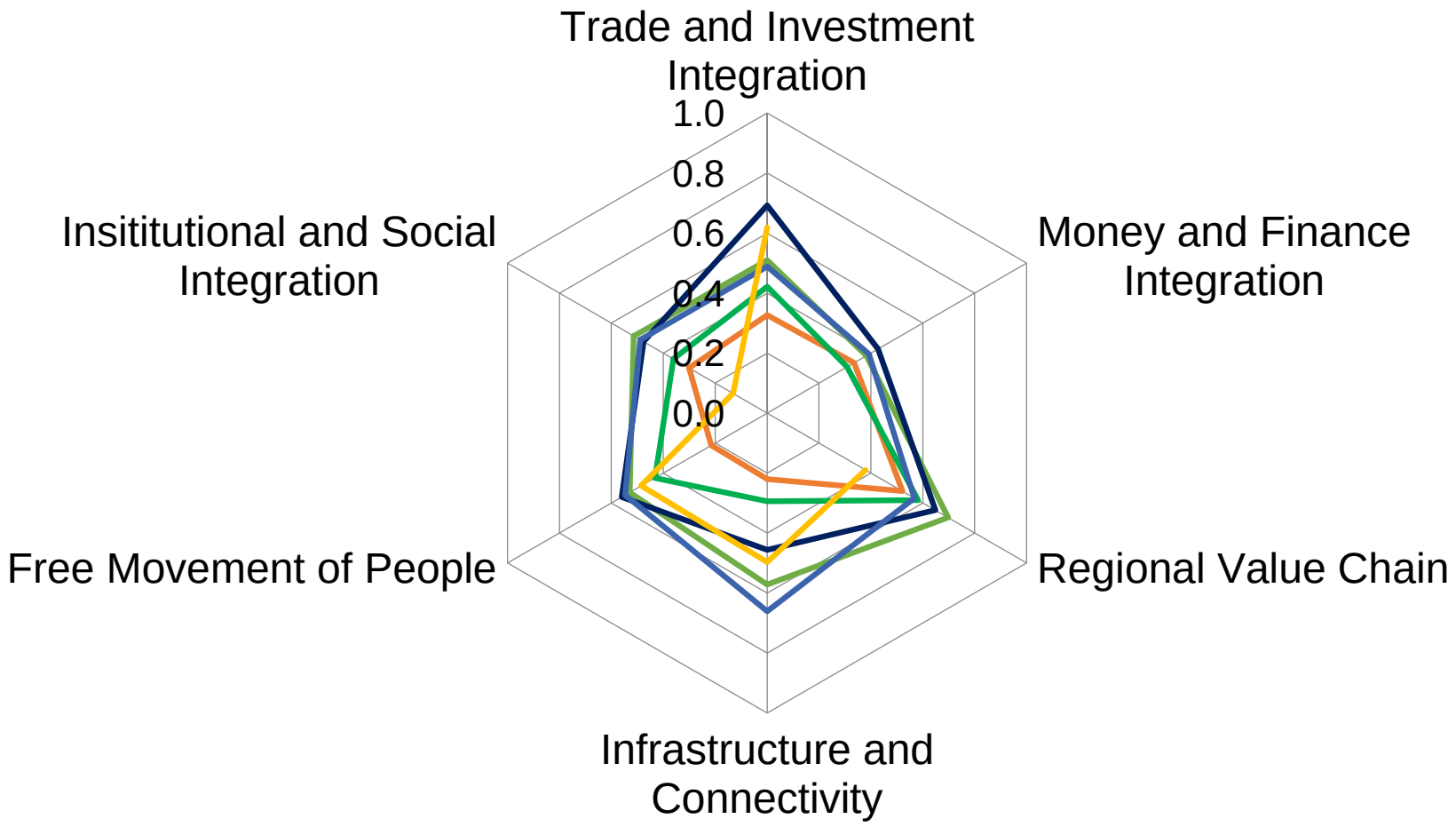
Comparison with Other Regional Integration Indexes

- **African Regional Integration Index:** African Union Commission, African Development Bank, UN Economic Commission for Africa
  - First edition in 2016
  - Min-Max rescaling
  - Five dimensions and a total of 16 indicators
  - No account for possible roles of the financial market in promoting regional integration
  - Weighting by arithmetic average (i.e., equal weighting)
    - Justifiable when many indicators (50-100) with a lack of consensus on weighting
    - A problem of double counting if indicators are highly correlated
    - May assign a higher weight to the dimension that contains more indicators
  - PCA
    - Correct for overlapping information between correlated indictors (No double counting)
    - No problem with different number of indicators in dimensions

Asia Regional Integration Index: Overall



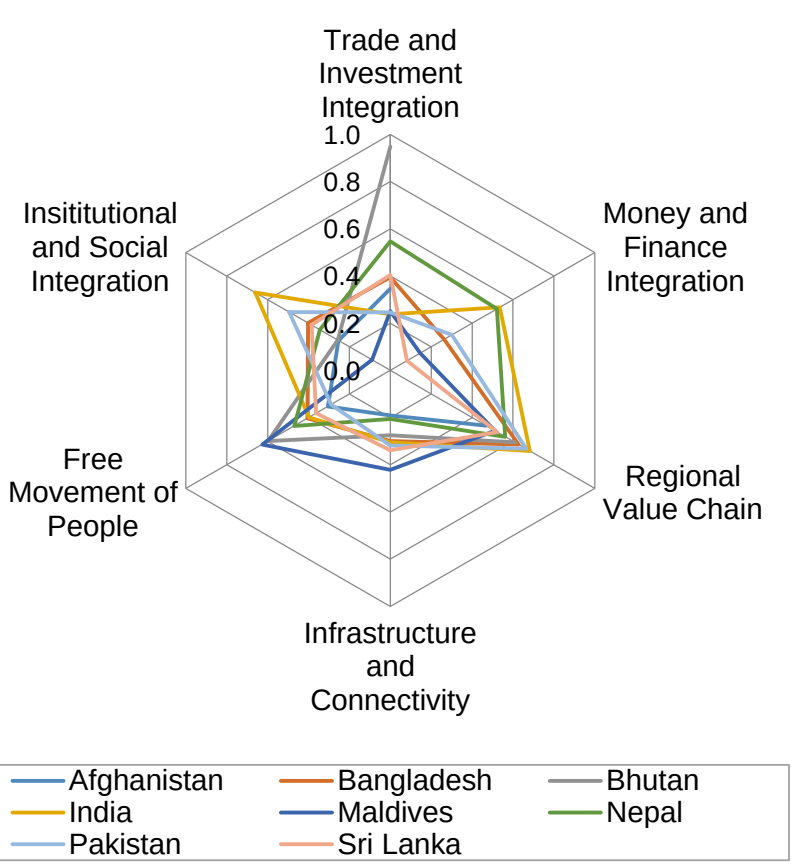
Asia-Pacific Regional Integration Index



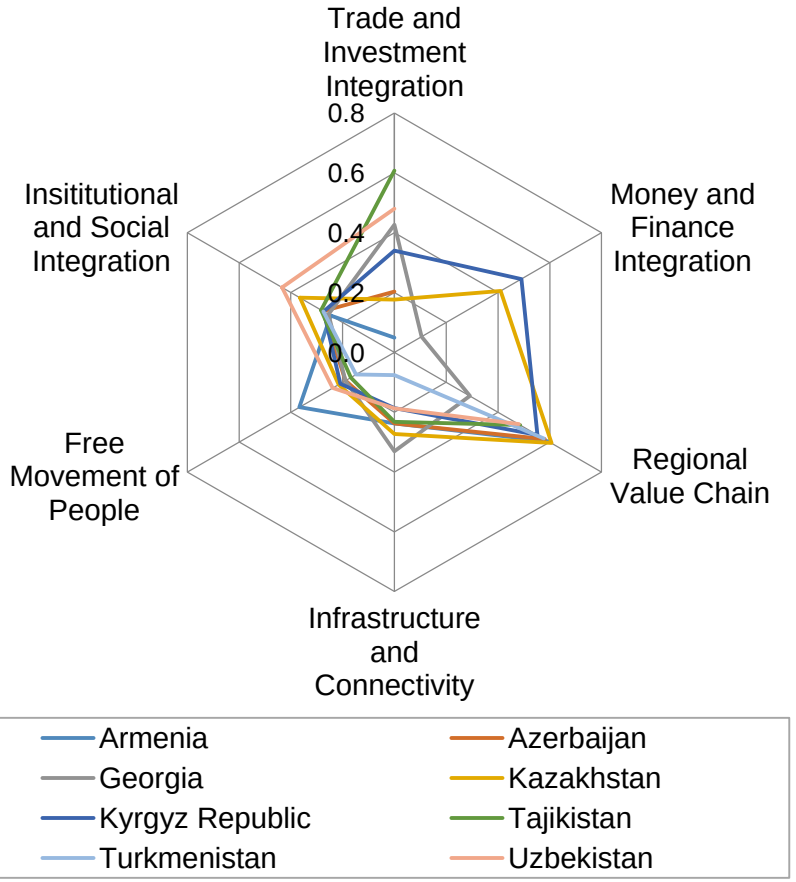
Source: ADB estimates.

Asia regional integration index: Subregions (2)

South Asia

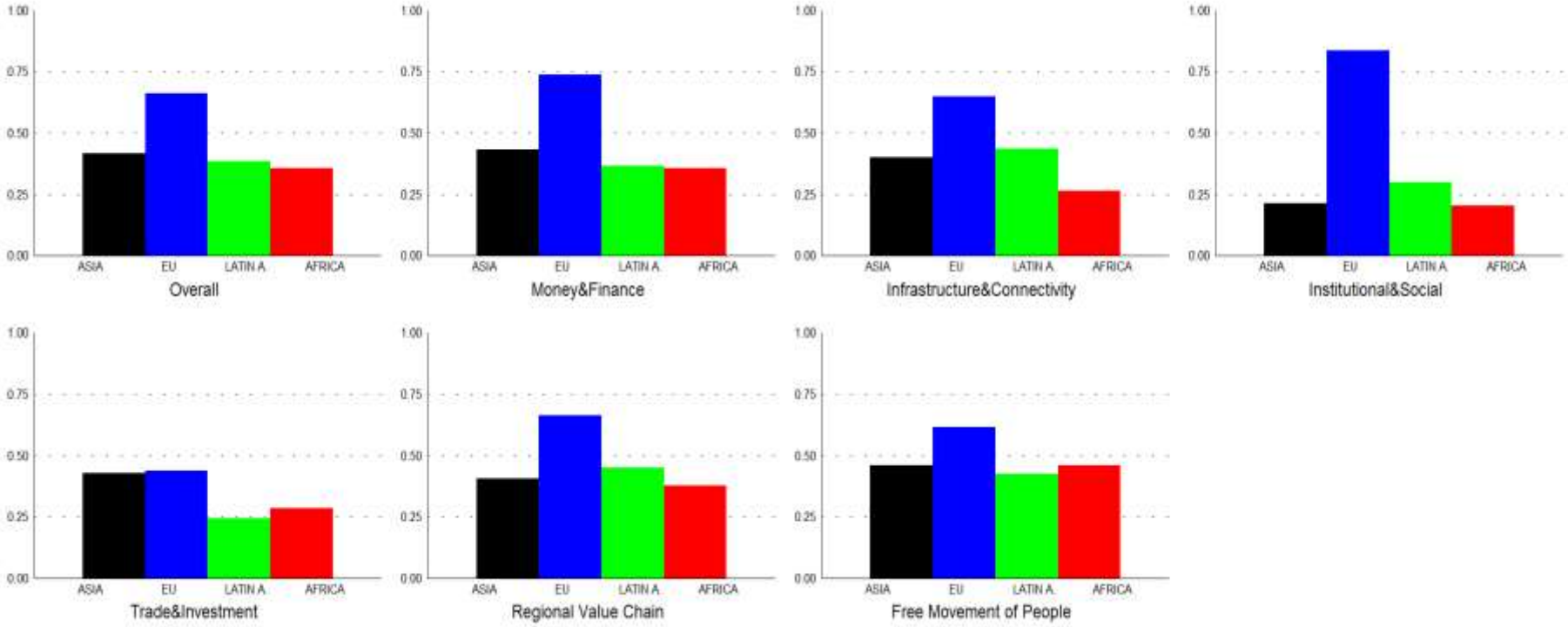


Central Asia



Comparison with Other Regions: World-wise normalization

- Normalize data based on world maximum and minimum values for all regions
- The indexes can be compared at the same base



Key Findings

- Large variations in regional integration across subregions and six dimensions
  - Regional integration in Southeast Asia is most advanced
  - Trade and investment/regional value chains drive regional integration in Asia-Pacific
- Regional integration is multidimensional process; lagging areas (especially, money and finance/institutional and social framework) require greater attention to promote regional integration
- Asia's current level of overall regional integration fares better than those of Latin America and Africa; but lags behind EU
  - Trade and investment integration in Asia-Pacific is as advanced as that in EU
  - Institutional and social dimension of regional integration lags in developing regions

ADB

Summary

- **Regional integration in Asia-Pacific:** Significant progress has been made, but the degree of regional integration varies across different subregions and socioeconomic dimensions
- **Advanced trade and investment integration:** Asian regional integration has been largely driven by trade and investment integration which is as advanced as that in EU; but progress has been slow in institutional and social dimension
- **Regional integration is multidimensional process:** Some dimensions (especially, money and finance/institutional and social framework) require greater attention to promote regional integration

ADB

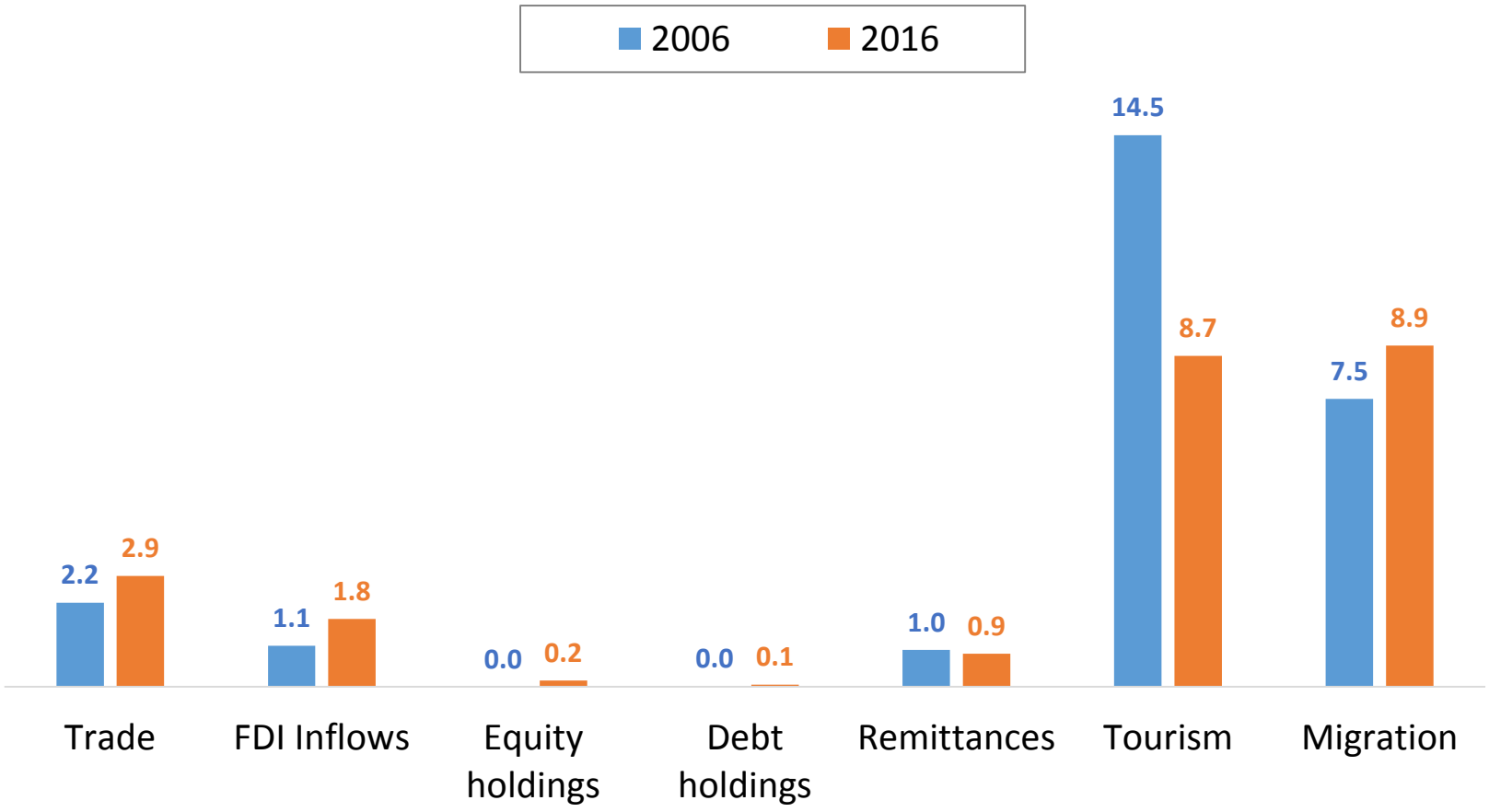
Asian Regional Integration: Open Questions

- Economic benefits of regional integration include expansion of markets, better allocation of resources and risk sharing.
- Costs: Potential contagion, income inequality ?
- Are all dimensions of integration equally desirable ?
- Intraregional integration versus across regions. Does intraregional integration imply inward orientation ?
- APRII can assess not only the state of regional integration, but the economic analysis of costs and benefits and optimal extent of regional integration.

State of Play: CAREC Regional Integration

Regional Integration Indicators: Within CAREC

(% share)

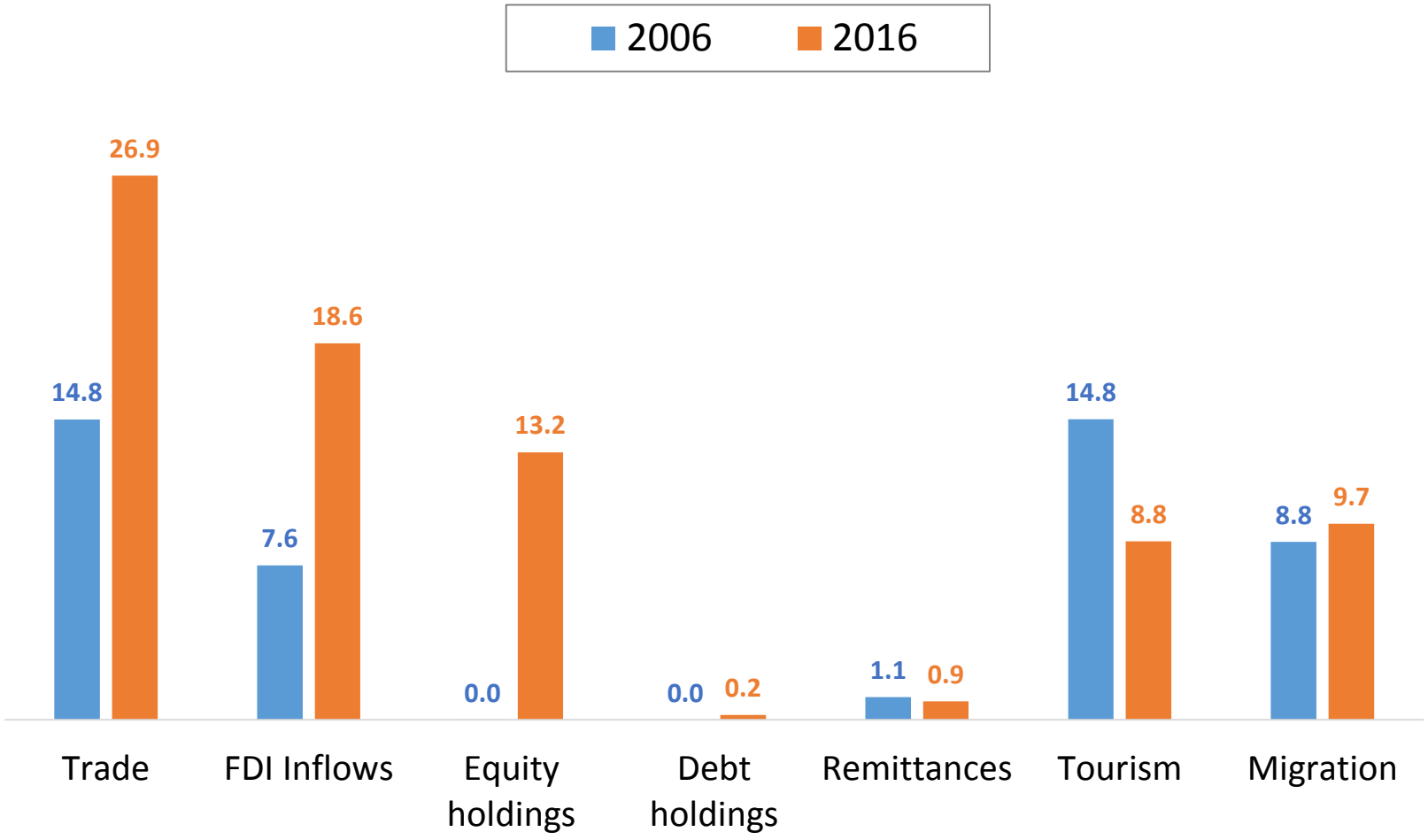


Note: Equity and Debt – as of June 2016. Remittances -- data starts 2010. Tourism -- latest available data is up to 2015 only. Migration --- data is available on 5 year interval (2005 and 2015 figures are used).

Source: ADB calculations using preliminary data from ADB. *Asian Economic Integration Report 2017*. Forthcoming.

Intrasubregional Integration Indicators: Within CAREC ex-PRC

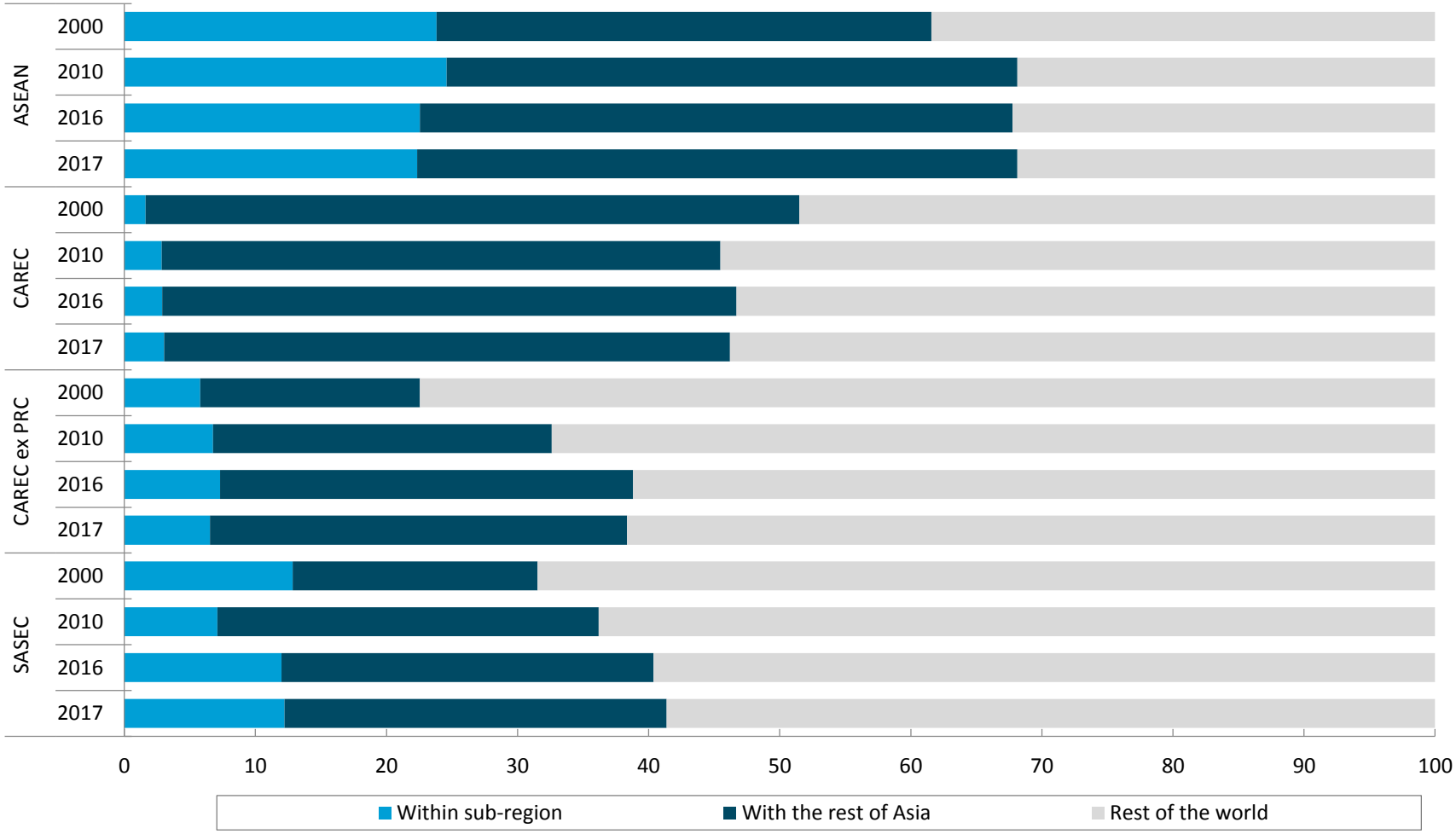
(% share)



Note: Equity and Debt – as of June 2016. Remittances -- data starts 2010. Tourism -- latest available data is up to 2015 only. Migration --- data is available on 5 year interval (2005 and 2015 figures are used).

Source: ADB calculations using preliminary data from ADB. *Asian Economic Integration Report 2017*. Forthcoming.

Intra- and Inter-subregional Trade Shares (%)



Note: Intra-subregional trade shares are calculated as $100 \cdot ((X\_ii + M\_ii)/(X\_iw + M\_iw))$, where $X\_ii + M\_ii$ refers to region i's total intra-subregional trade and $X\_iw + M\_iw$ refers to subregion i's total trade with world. On the other hand, inter-subregional trade shares are computed as $100 \cdot ((X\_ij + M\_ij)/(X\_iw + M\_iw))$, where $X\_ij + M\_ij$ refers to subregion i's total trade with rest of Asia.
Source: ADB calculations using data from *Direction of Trade Statistics,* International Monetary Fund.

Data Availability: CAREC's Intrasubregional RII

	Country	R1: Trade and Investment	R2: Money and Finance	R3: Regional Value Chain	R4: Infrastructure and Connectivity	R5: Free Movement of People	Overall Integration Index
1	Azerbaijan						
2	Georgia						
3	Kazakhstan						
4	Kyrgyz Republic						
5	Tajikistan						
6	Turkmenistan						
7	Uzbekistan						
8	PRC						
9	Mongolia						
10	Afghanistan						
11	Pakistan						

Way Forward on CRII

- Addressing the data gaps (i.e. mostly for Turkmenistan and financial indicators for many CAREC economies).
- Due to data limitations, the infra and connectivity dimension includes non-bilateral data (LPI and Doing Business).
  - The quality of data used for this dimension could still be improved by utilizing the bilateral data from the CPMM.
- Constructing a historical series:
  - Refer to ‘Constructing the Asia-Pacific Regional Cooperation and Integration Index: A Panel Approach’ (Park 2018)

ADB

Thank you!

Trade facilitation indicators in CAREC

CARECCPMM
CORRIDOR PERFORMANCE MEASUREMENT & MONITORING

TFI1	**Time taken to clear a border crossing point (hours)** Average length of time (hours) it takes to move cargo (20 tons) across a border from the exit point of one country to the entry point of another; to capture both the complexity and the inefficiencies inherent in the border crossing process.
TFI2	**Cost incurred at border crossing clearance ($)** Average total cost ($) of moving cargo (20 tons) across a border from the exit point of one country to the entry point of another; Both official and unofficial payments are included.
TFI3	**Cost incurred to travel a corridor section (per 500 kilometer per 20-ton cargo)** Average total cost ($) incurred for a unit of cargo (a cargo truck or train with 20 tons of goods) traveling along a corridor section within a country or across borders. Both official and unofficial payments are included.
TFI4	**Speed to travel with delay on CAREC corridors (kilometers per hour), (speed with delay)** Average speed (kilometers per hour) at which a unit of cargo travels along a corridor section (a stretch of road 500 kilometer long) within a country or across borders. The total time taken for the entire journey. Distance and time measurements include border crossings. An indicator of the efficiency of border crossing points along the corridors.
TFI5	**Speed to travel without delay on CAREC corridors (kilometers per hour)–(speed without delay)** Traveling speed only. A measure of the condition of physical infrastructure (such as road and railways).

ADB