

Trade digitalization vs & customs modernization

Prof. Batnasan Namsrai

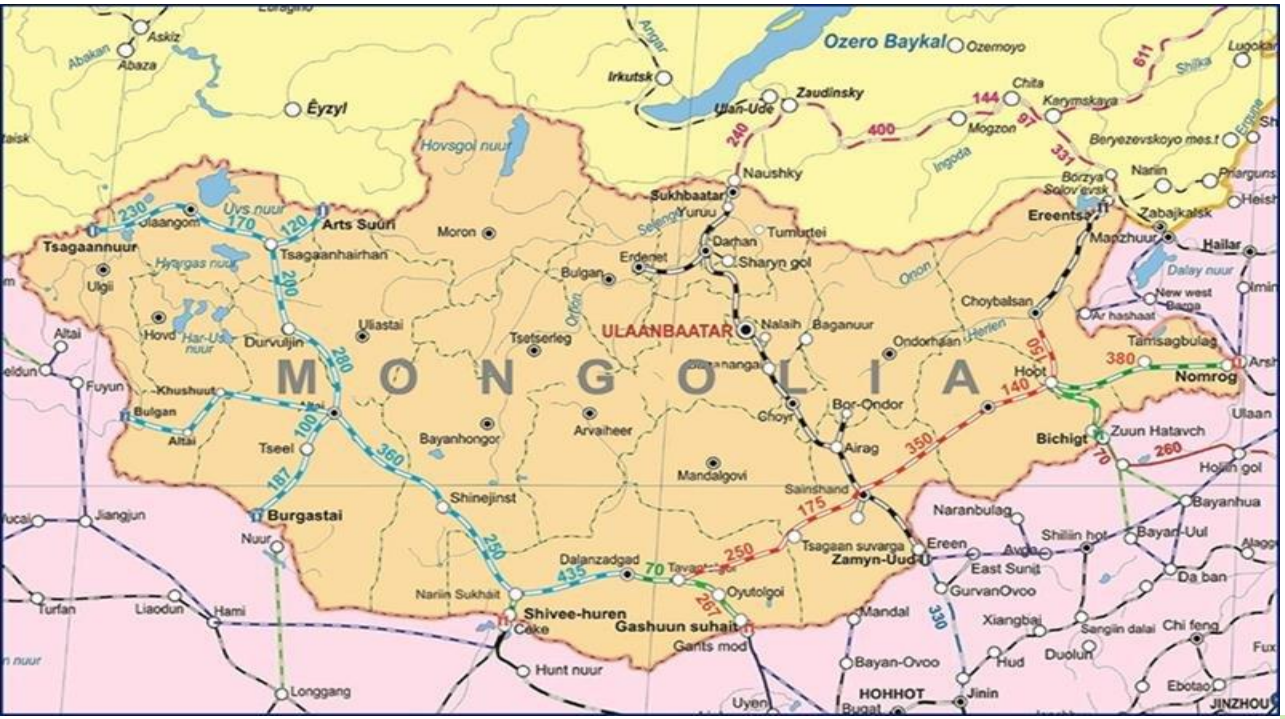
National University of Mongolia

Content

- Changes in trade environment
- New technologies in cross border trade
- Economic growth and transport demand
- The customs modernization solutions
- Summary

Changes in trade environment

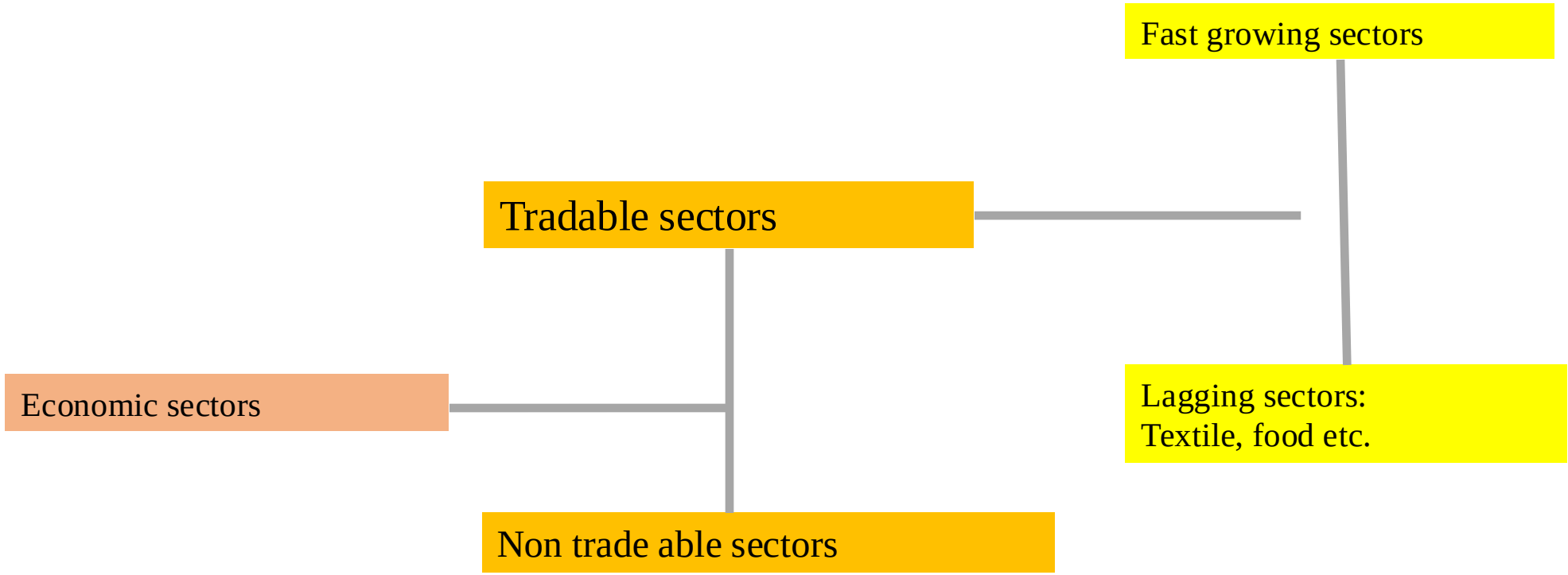
Trade situation vs technological development



- Rapid economic growth in recent years,
- Exploitation of large mining deposits,
- Development of giant industrial projects,
- Rapid changes in the technical and technological environment

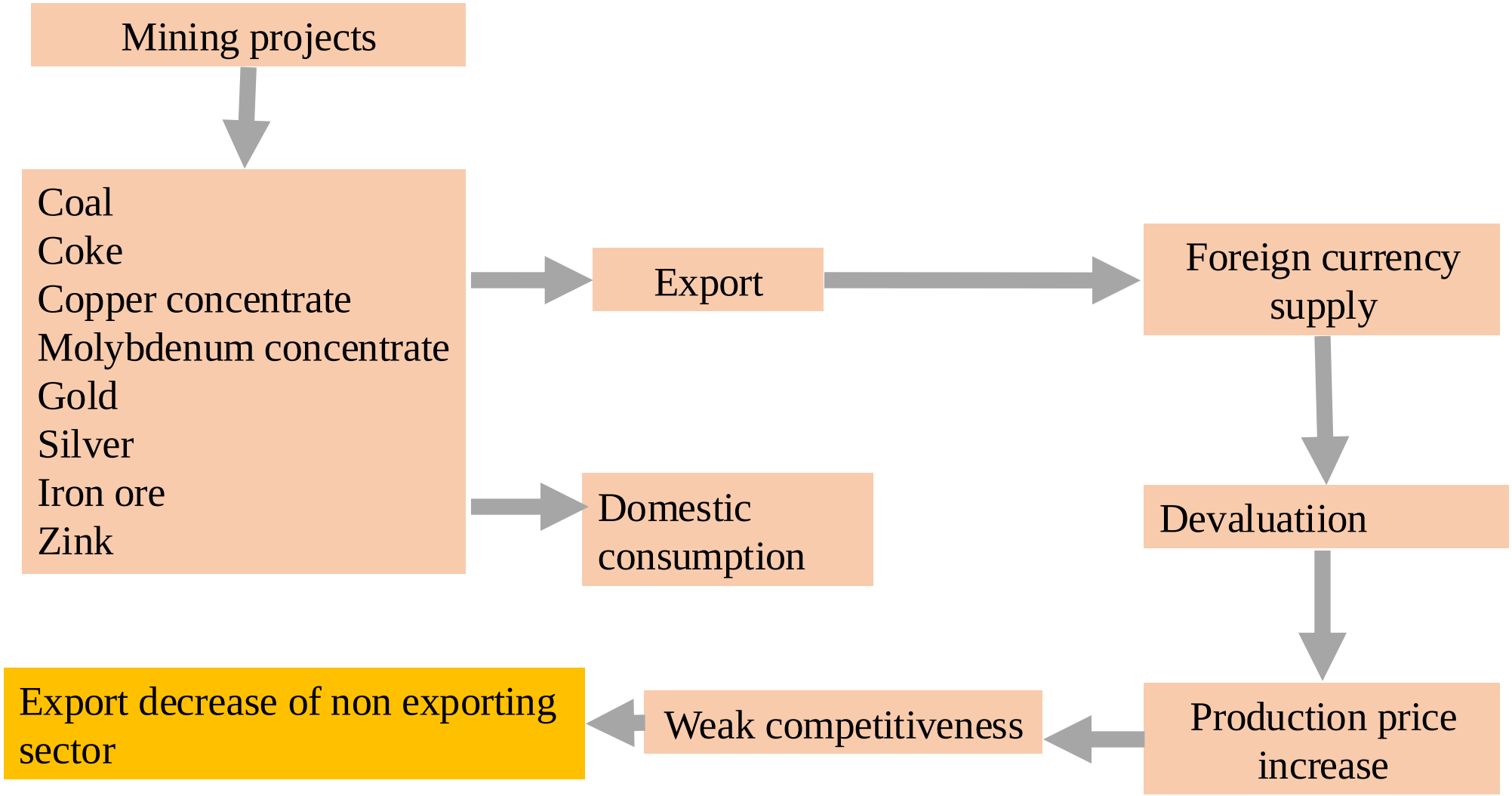


Three speed economy

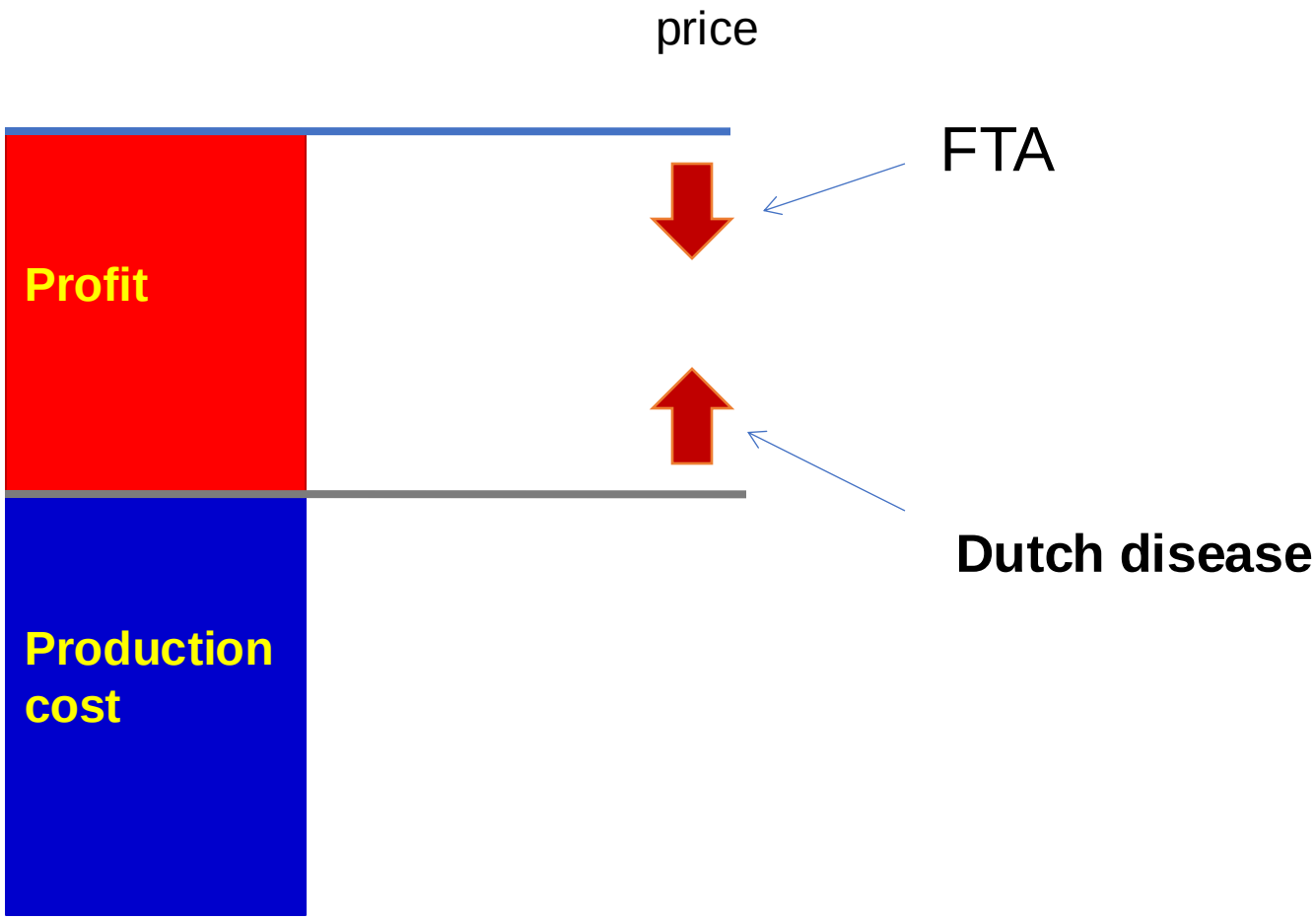


W. Max Corden “The Dutch Disease in Australia: Policy Options for a Three-Speed Economy” 2012

“Dutch disease” effect on business and economy



Countries ultimate need for digital trade



Main problems of digital trade and services development

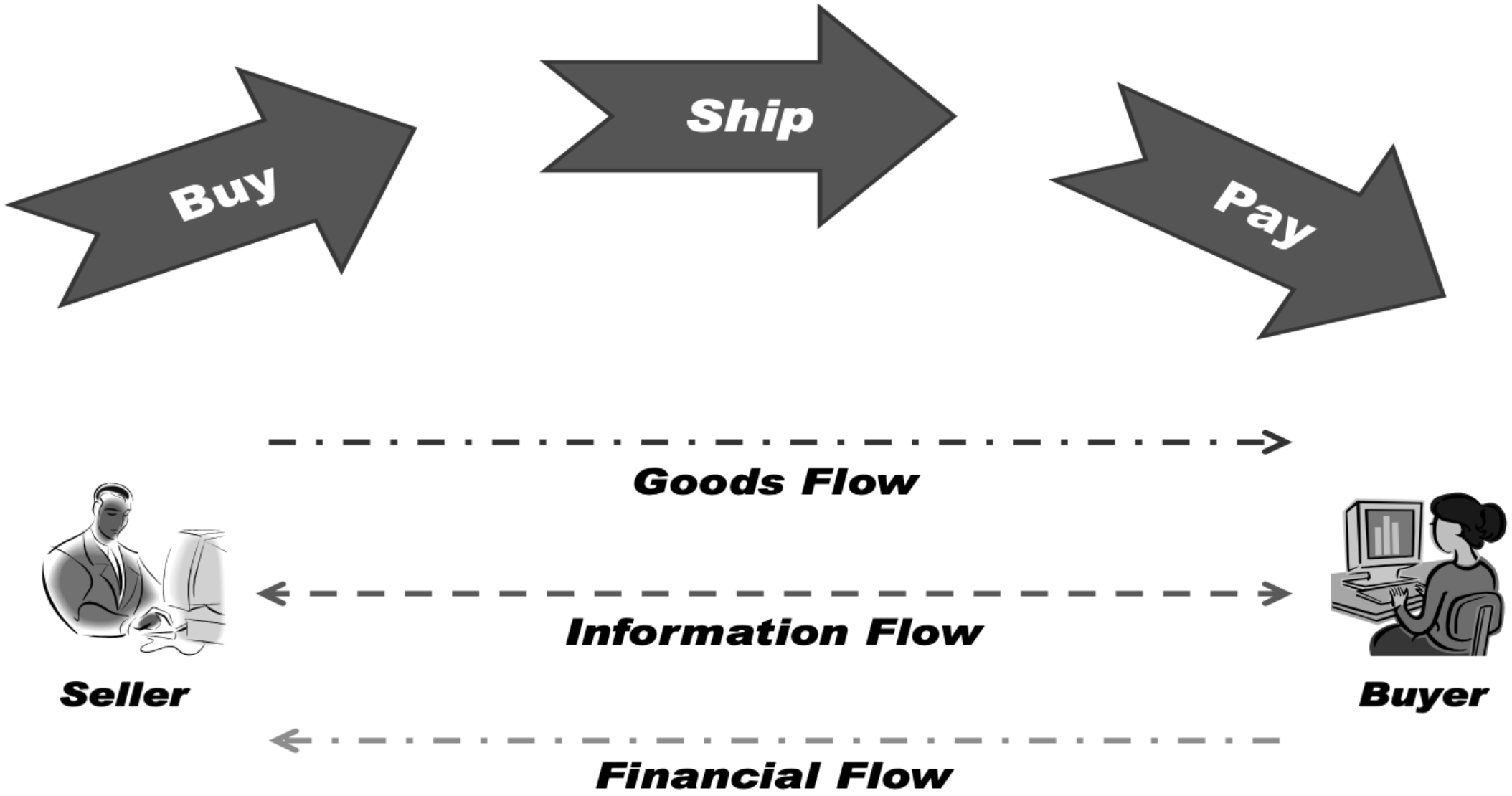
- Supply chain development
  - High cost of infrastructure development needs optimal solutions
    - Efficiency issues
    - Port infrastructure development
    - Public - private partnership
  - Optimal strategies and regulations to develop a supply chain network
    - Collapse of old supply chain network
    - Week inter-industry tie in the economy
    - Regulatory framework and international cooperation
- International trade
  - High transport cost for importing and exporting
    - High transit cost
    - Poor road and railroad external and internal connection
  - Time spent for exporting and importing
    - Time spending for export & import documentation at the border
    - Time spent on transshipment and transit transportation

Solutions

- Investment in the supply chain
  - Infrastructure investment at critical points
  - Investment in internal logistics: warehousing, transport
  - Public - private partnership
- Risk - based customs management
  - Electronic transmission of trade documents
  - Database and data management of customs administration
  - Probability model-based customs control mode selection
- International cooperation
  - Transit transportation
  - Paperless trade

New technologies in cross border trade

Figure 2: Three Types of Flows in an International Supply Chain



Use of big data, data analytics, AI and machine learning

Big data and data analytics

- Data mining for intellegence purposes and risk management
- Using financial and tax data to improve compliance and performanve of public reenue collection and the fight against smuggling
- Anaysing massive volumes of internet information to identify crime trends in intellectual property rights
- Data mining of imports
- Trade circumvention graph analytics
- Export and import data analytics
- Price recommendation data analytics
- Developing a data lake for consolidation and single truth of all customs data

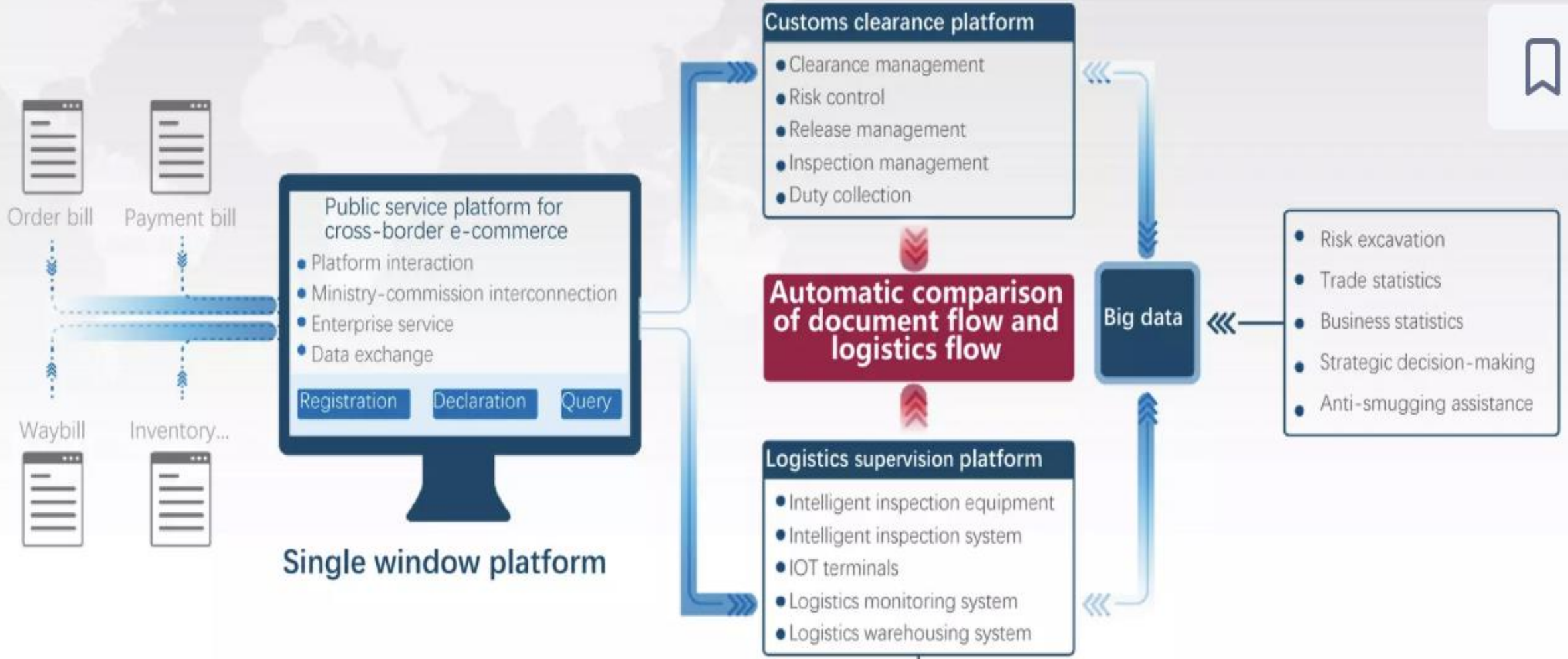
Arificial intellegence and machine learning:

- AI based model for interpreting X-ray images
- AI and machine learning for enhanced risk management processes (e.g inspection results feedback loop, client segmentation, automatic assessment, upgrade risk profile)
- Chatbots for answering online public enquiries and for physical robors to answer enquiries from travellers at control points
- Cross-platform cyber patrols
- CT scanners with AI to enhance enforcement capablities and customs clearence efficiency
- Automating repetitive manual procedures involving revenue protection (e.g online research of market prices and deploying AI to assist in conducting intellegent filtering of research results)
- Using AI with Harmonised System Classification

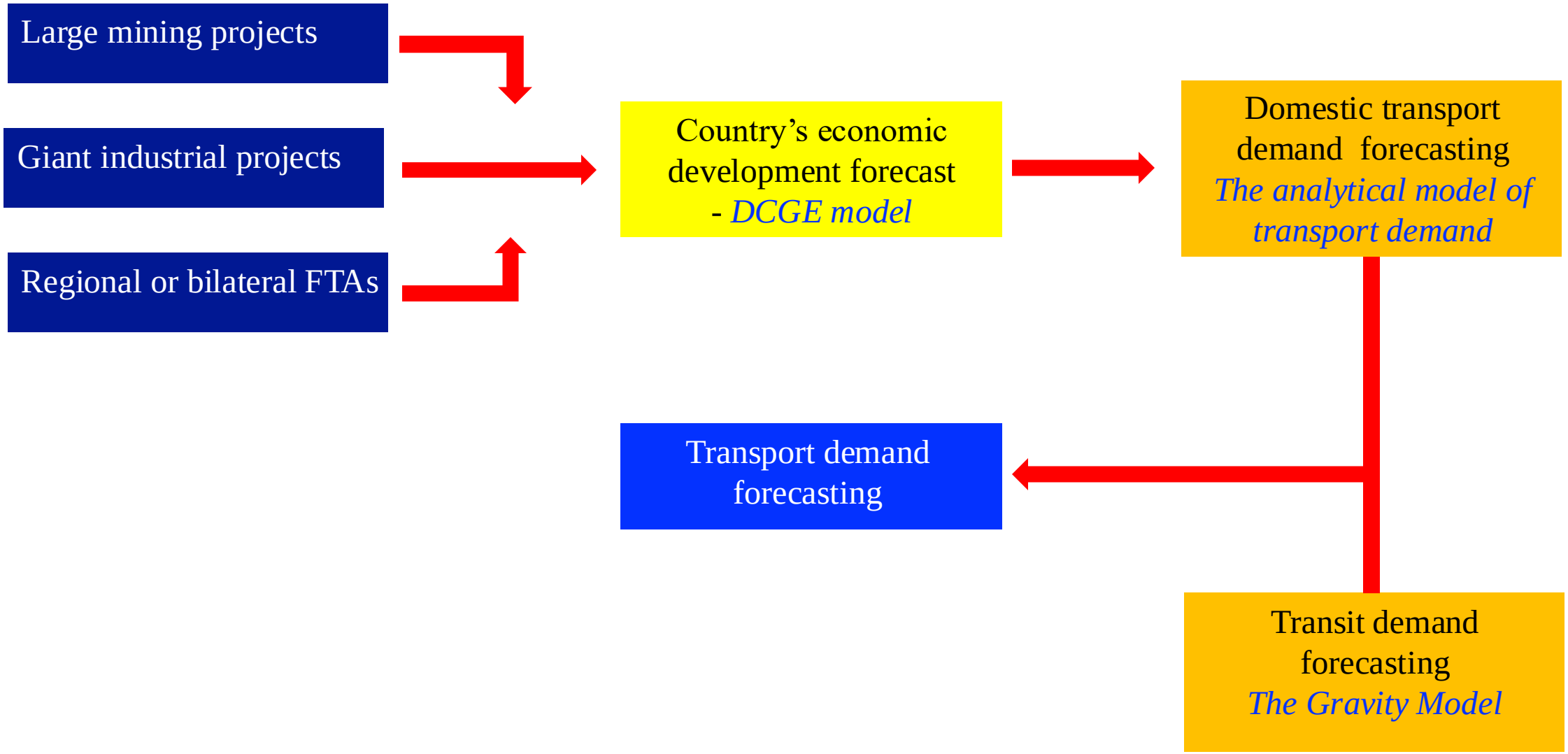
Use of big data, data analytics, artificial intellegence and machine learning

- Post clearance audits and controls
- Automated targeting systems
- Tariff classification and non-compliance with tariff advice
- Misuse of concessions (including tariff concessions order, by law, free trade agreements and origin masking)
- Detection of anomalies in high revenue areas (including exise equivalient goods i.e alcohol, tabacco, petrolium)
- Detection of dumping and countervailing anomalies
- Detection of undervaluation and overvaluation anomalies
- Refund and drawbacks non-compliance
- Detection of prohibited goods
- Monitoring service delivery performance in real time
- Providing historical insights into customs statistical information for future planning and forecasting
- Compliance risk scoring in commercial and trade activities
- Identifying low risk individual at borders
- Developing advanced analystics of AEOs

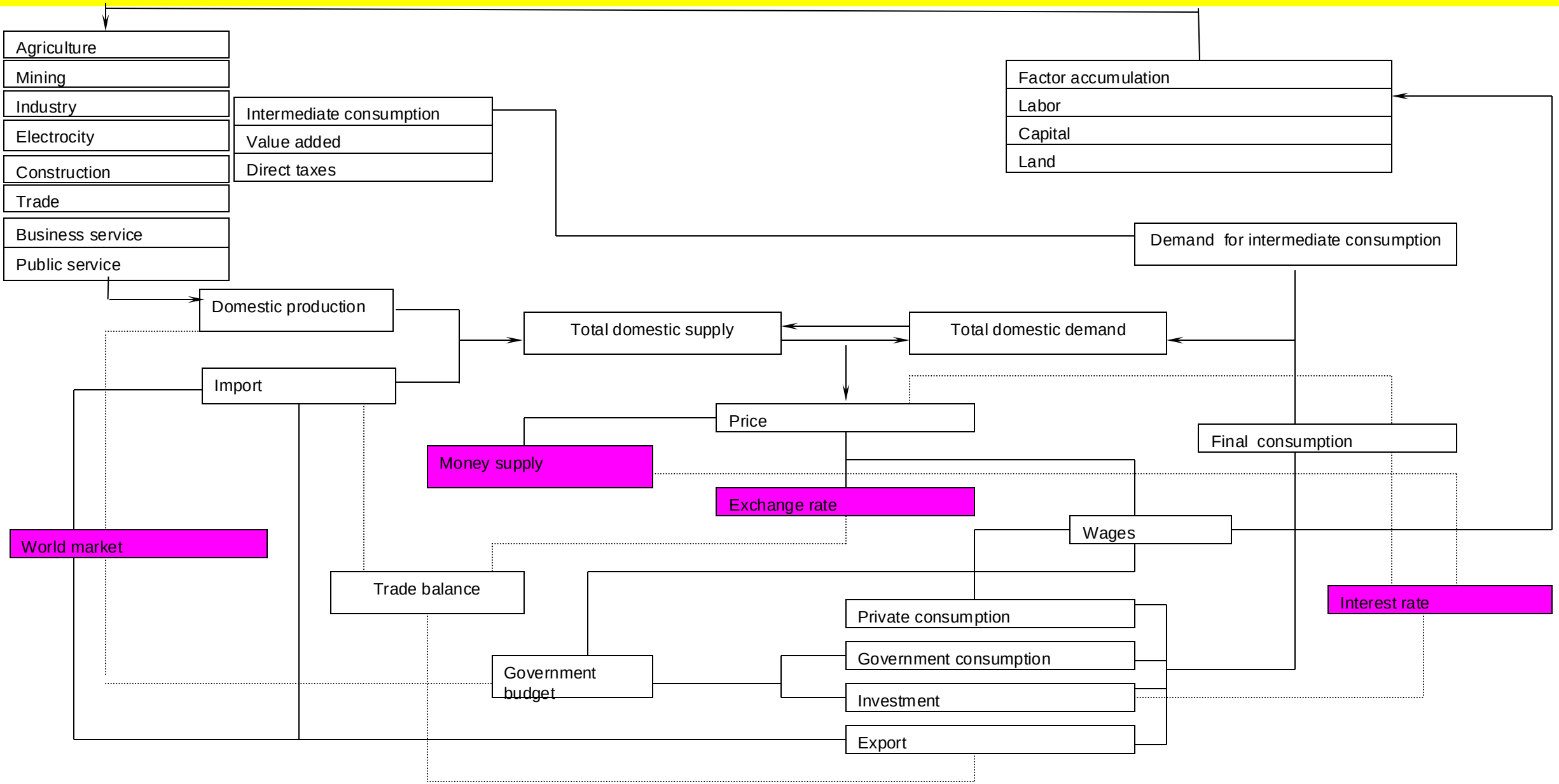
Integrated Solutions for Cross-Border E-Commerce



Economic growth and transport demand


Large mining projects
Giant industrial projects
Regional or bilateral FTAs
Country's economic development forecast - DCGE model
Domestic transport demand forecasting The analytical model of transport demand
Transport demand forecasting
Transit demand forecasting The Gravity Model

The CGE model: Mongolian CGE model flowchart



Endogenous variables

Exogenous variables

N.Batnasan 2009

Functions and equations in the model

Commodity flow		Price equation:
$QX=AT[\eta*QE^{\tau}+(1-\eta)*QD^{\tau}]^{1/\tau}$		$PX=1/AT[\eta^{-\sigma e}(PE)^{1+\sigma e}+(1-\eta)^{-\sigma e}(PD)^{1+\sigma ei}]^{1/1+\sigma e}$
		$PE = (1 + te)*ER*PW_E$
$QC=AC*[\beta*QM^{v}+(1-\beta)*QD^{v}]^{-1/v}$		$PC= 1/AC*[\beta^{\sigma m}(PW)^{1-\sigma}+(1-\beta)(PD)^{1-\sigma m}]^{1/1-\sigma m}$
		$PM = (1 + tm)*ER*PW_M$
		$PT = (1 + ts)*PC$
$QX_i=AP_i[\omega_i*QVA_i^{\rho}+(1-\omega)_i*QINT^{\rho}]^{1/\rho}$		$PX_i=1/AP_i[\eta^{-\sigma e}(PVA_i)^{1+\sigma e}+(1-\eta)^{-\sigma e}(PINT_i)^{1+\sigma ei}]^{1/1+\sigma e}$
$QVA_i=(\omega/1-\omega)^{1/1+\rho}*(PINT_i/PVA_i)^{1/1+\rho}$		
Equilibrium conditions in SAM		
QS	=	QD
PD*QD+PE*QE	=PX*QX=	$INT+W_L*L+ W_K*K+tx*PX*QX$
PC*(QH+QG+QI+QINT)	=PC*QC=	PD*QS+tm*PM*QM+PM*QM
$W_L*L+W_K*K+FSAV+YG$	=Y=	PC*(QH+QG)+SAV
SAV	=	PT*QI
td*PX*QX + tm*ER*PWm*QM - te*ER*PWe*QE + tc*PC*QC + $tw*YH_L+ tk*YH_K$ + FTRSFER	=	YG
SAV	=	PT*QI
PWm*QM	=	PWe*QE + FSAV + FTRSFER
YH	=	QH*PT+SAV
Production factors		
$K_{t+1}=I_{t+1}+K_t(1-\delta)$		$L_t=L_0(1+g)^t$

The analytical model of railtransport demand forecasting

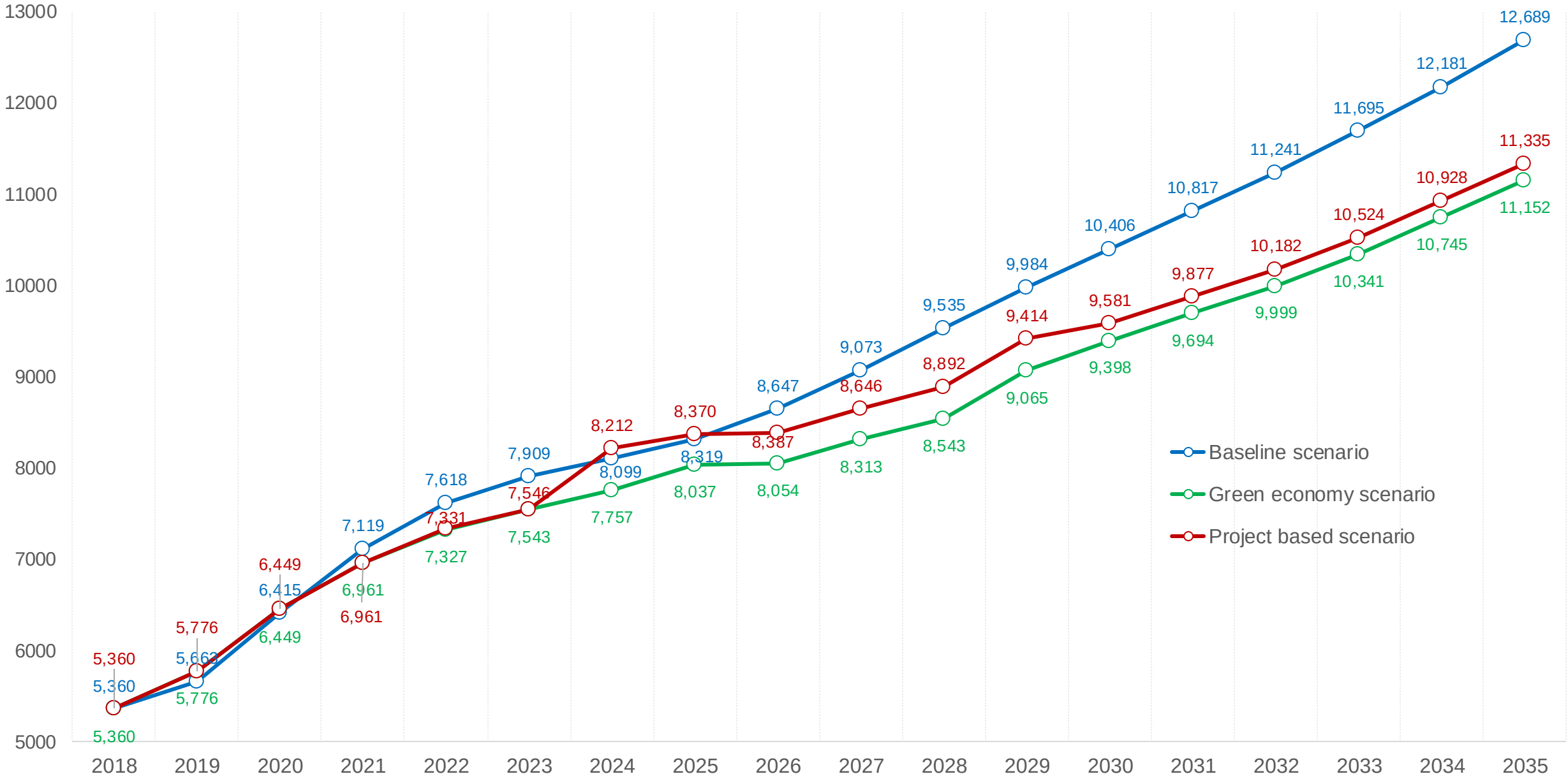
- $X_t = (I - A)^{-1} Y_t$
- $X_{t+\gamma} = (I - A)^{-1} Y_{t+\gamma}$
- $(x_{jt+\gamma} - x_{jt})/x_{jt} = k_j$
- $(1 + k_t) w_{jt} = r_{t+\gamma}$

The analytical model of railtransport demand

- Jeffrey L. Jordan, Stanley R. Thompson 1984

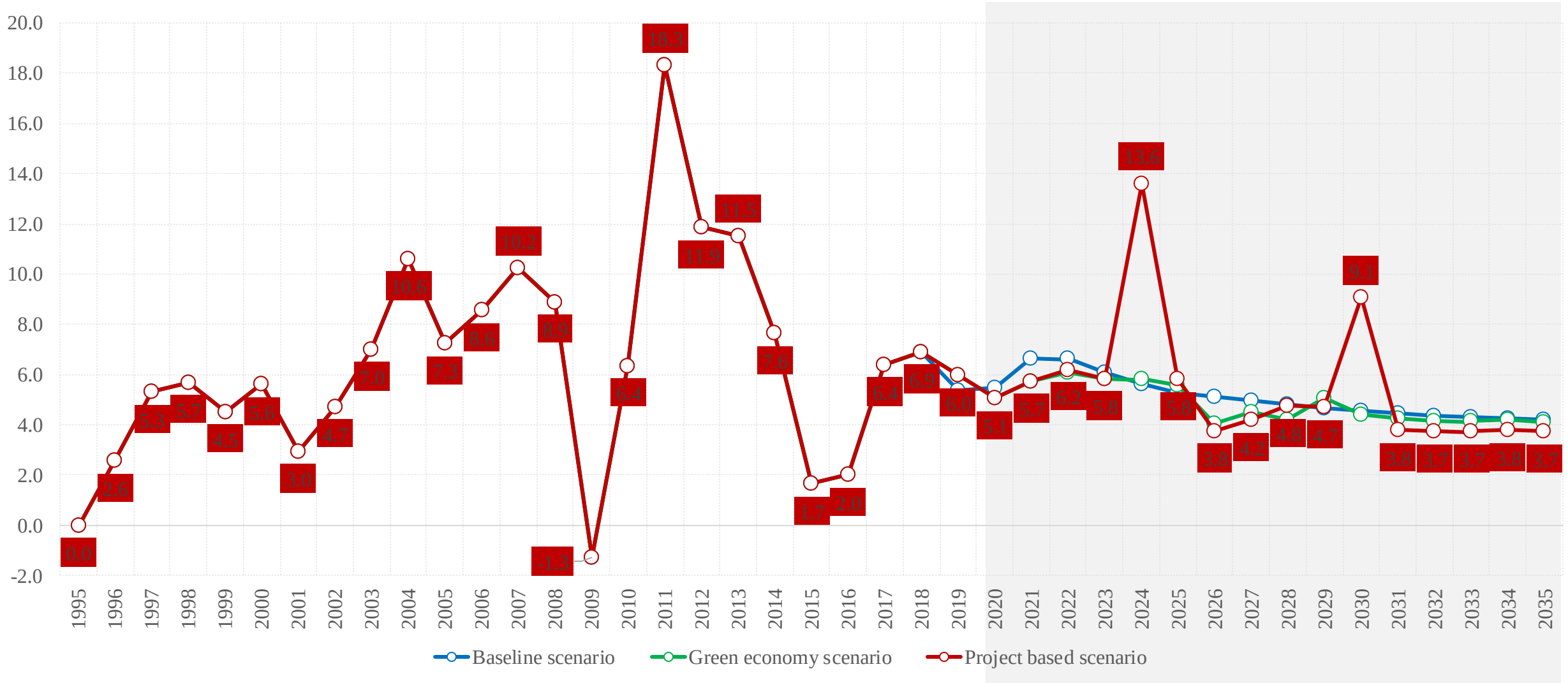
- X_t – total output vector of economy in year t;
- Y_t – final demand vector facing economy in year t;
- $(I - A)^{-1}$ – matrix of interdependency coefficients, the Leontief inverse matrix;
- γ – unspecified future time period;
- k_j – proportionate change in total out- put of industry j between year t and selected years in the future;
- w_{jt} – estimated total waybill based on a one percent sample of industry j, year t;
- $r_{t+\gamma}$ – predicted freight traffic flows of industry j for time $t+\gamma$
- A – matrix of technical coefficients a_{ij}'s where $a_{ij} = x_{ij}/x_j$; .
- x_{ij} – value of sales from industry i to industry j;
- x_j – total output of industry j; and
- I – identity matrix.

Investment

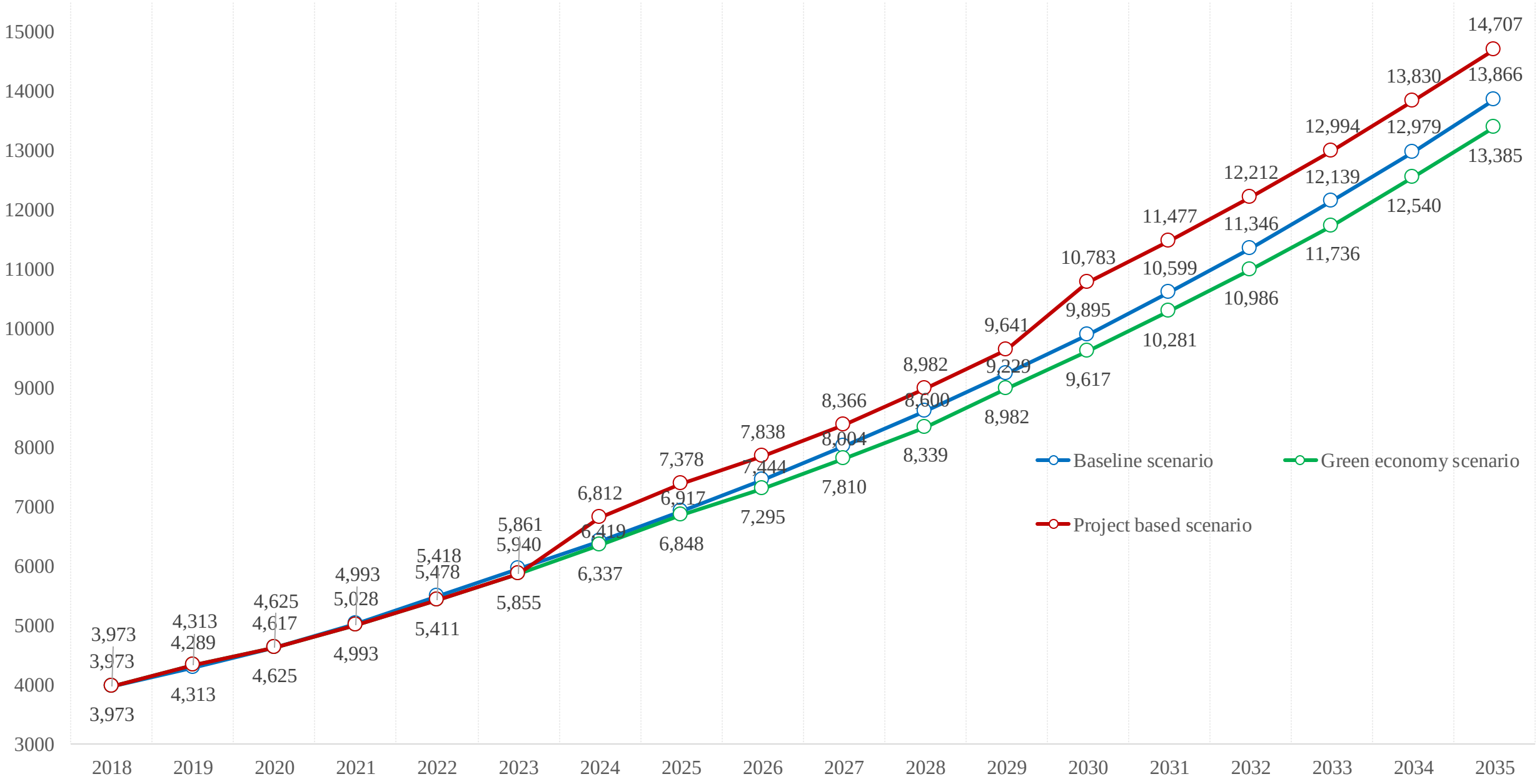

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7,618
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8,212
8,099
7,757
8,370
8,319
8,037
8,387
8,647
8,054
8,646
9,073
8,313
8,892
9,535
8,543
9,414
9,984
9,065
9,581
10,406
9,398
9,877
10,817
9,694
10,182
11,241
9,999
10,524
11,695
10,341
10,928
12,181
10,745
11,335
12,689
11,152
Baseline scenario
Green economy scenario
Project based scenario

GDP growth forecast of Mongolia, between 2019 and 2035

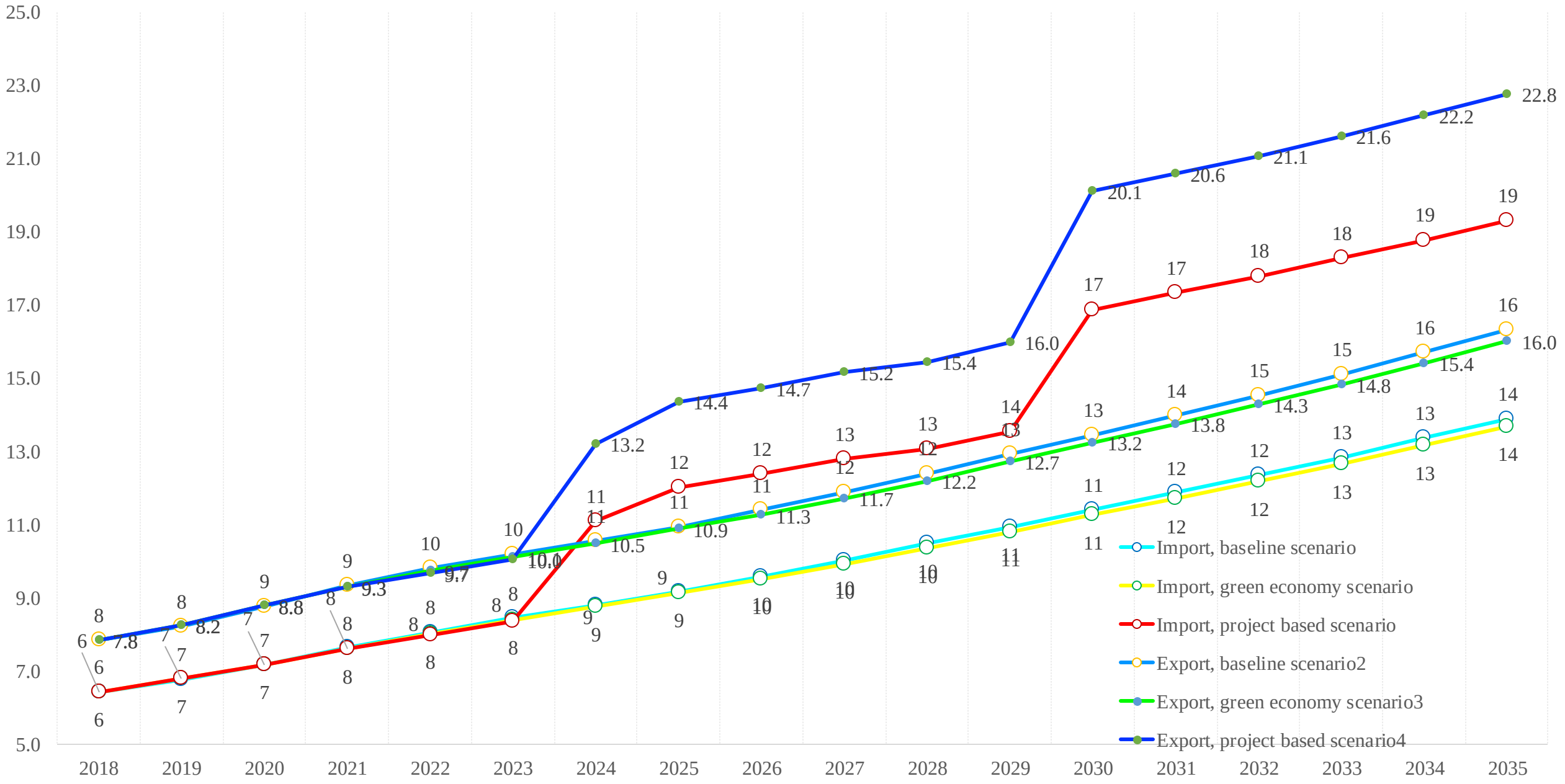
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Baseline scenario	5.5	6.6	6.6	6.1	5.6	5.3	5.1	5.0	4.8	4.7	4.6	4.5	4.4	4.3	4.3	4.2
Green economy scenario	5.1	5.7	6.1	5.8	5.8	5.6	4.0	4.5	4.2	5.1	4.4	4.2	4.2	4.2	4.2	4.1
Project based scenario	5.1	5.7	6.2	5.8	13.6	5.8	3.8	4.2	4.8	4.7	9.1	3.8	3.7	3.7	3.8	3.7

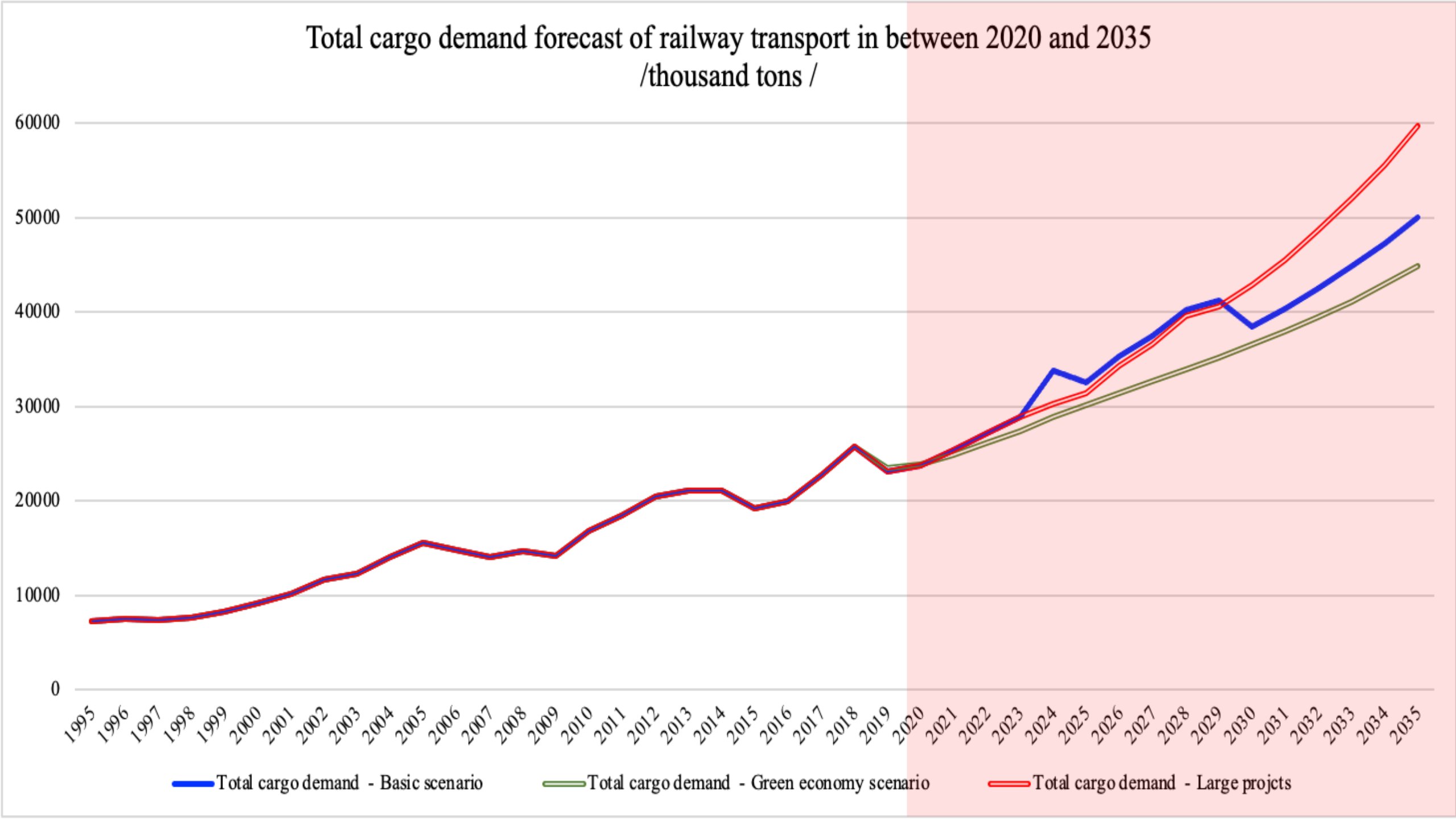


GDP per capita / in USD

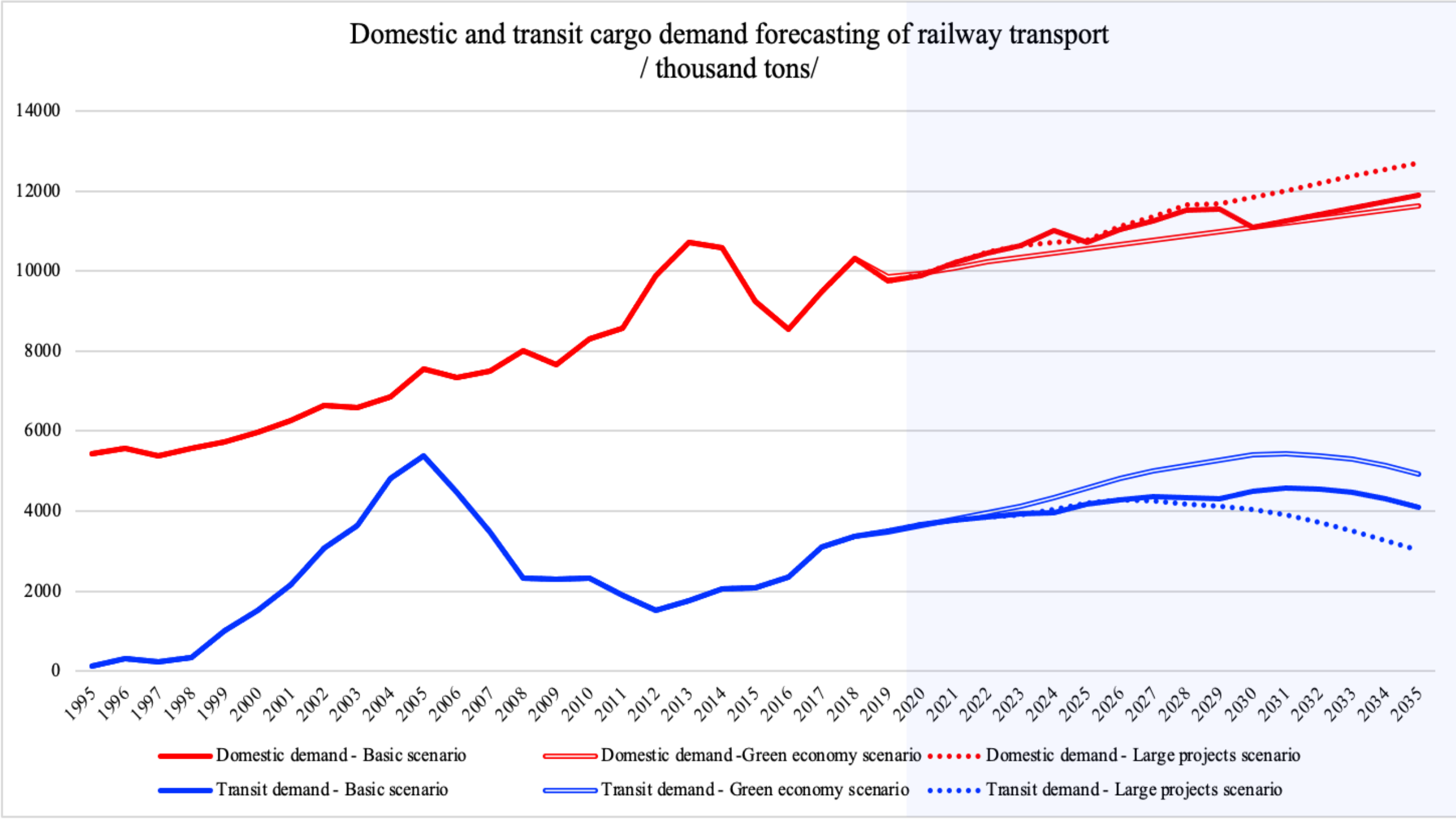


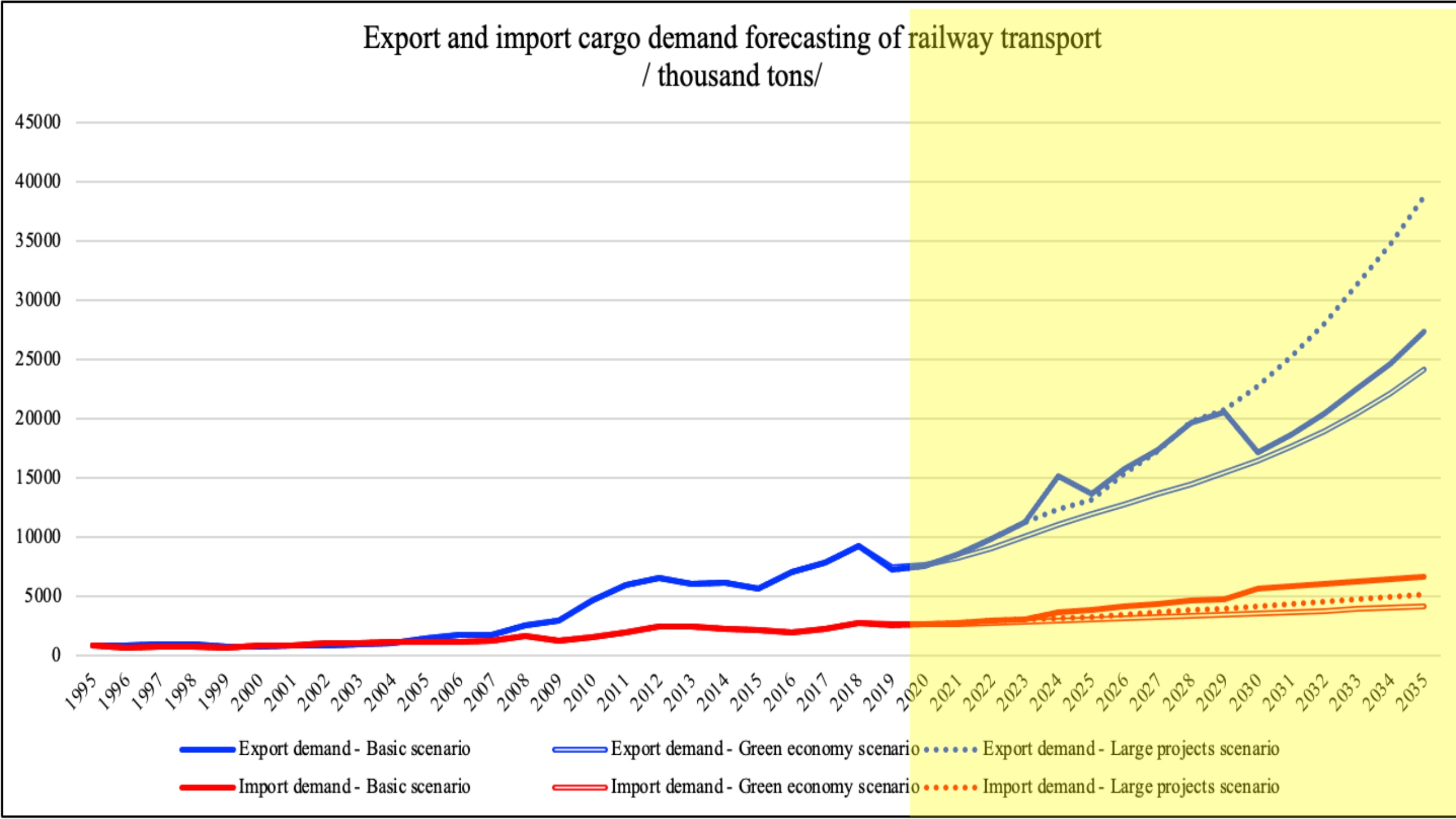
Export and import forecast




Total cargo demand forecast of railway transport in between 2020 and 2035
/thousand tons /
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40000
30000
20000
10000
0
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2035
Total cargo demand - Basic scenario
Total cargo demand - Green economy scenario
Total cargo demand - Large projcts

Domestic and transit cargo demand forecasting of railway transport
/ thousand tons/

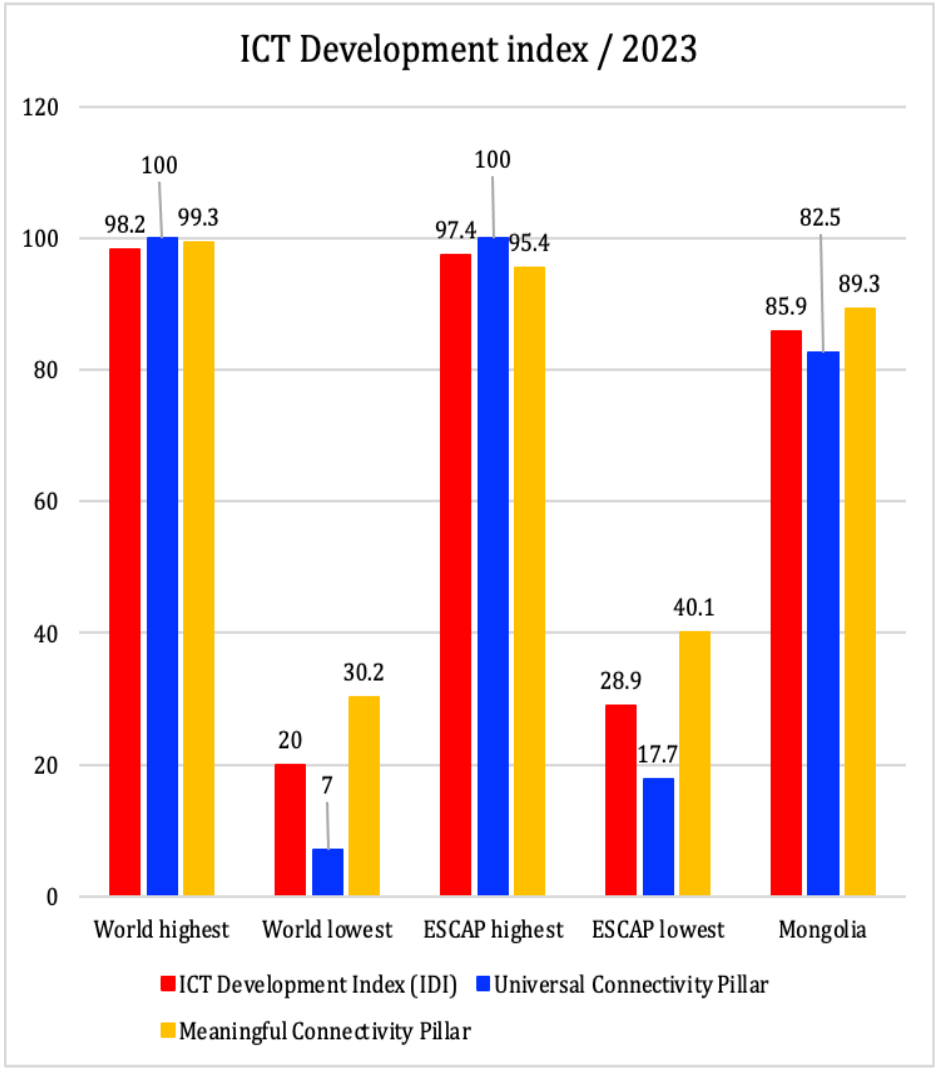



Export and import cargo demand forecasting of railway transport
/ thousand tons/
45000
40000
35000
30000
25000
20000
15000
10000
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Export demand - Basic scenario
Export demand - Green economy scenario
Export demand - Large projects scenario
Import demand - Basic scenario
Import demand - Green economy scenario
Import demand - Large projects scenario

The customs modernization solutions

Current situation of digital trade and services development in Mongolia

- Digital trade
  - E-commerce: developing fast, however physical infrastructure is poor
  - Agriculture: intra-country commodity exchange
  - Mining: inter-country commodity exchange
- Digital services
  - Financial and banking services
  - Public services
  - Educational services
  - Information technology and communications
  - Tourism
  - Insurance, social security & social welfare
  - R&D
  - Professional and technical services
  - Business management

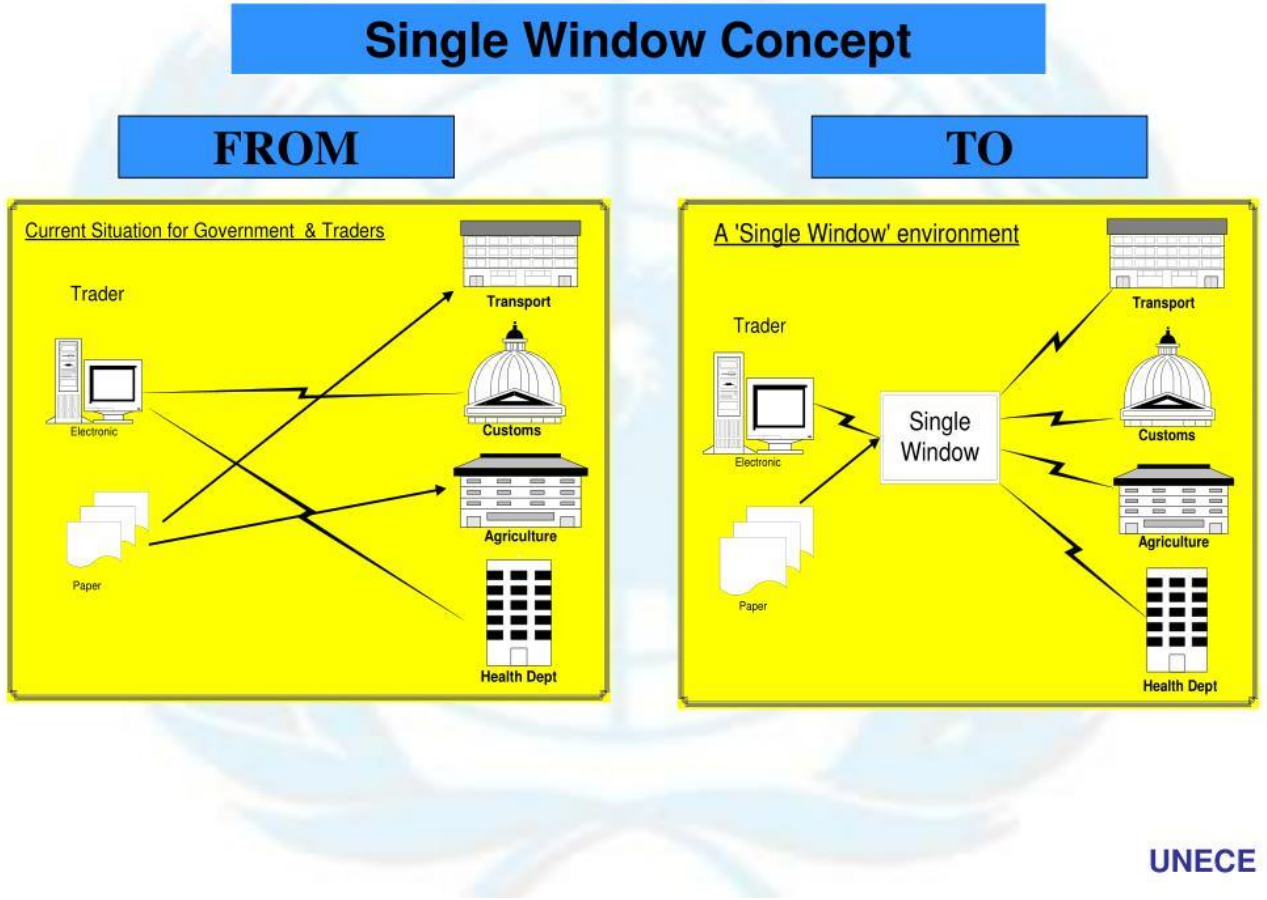


Main steps

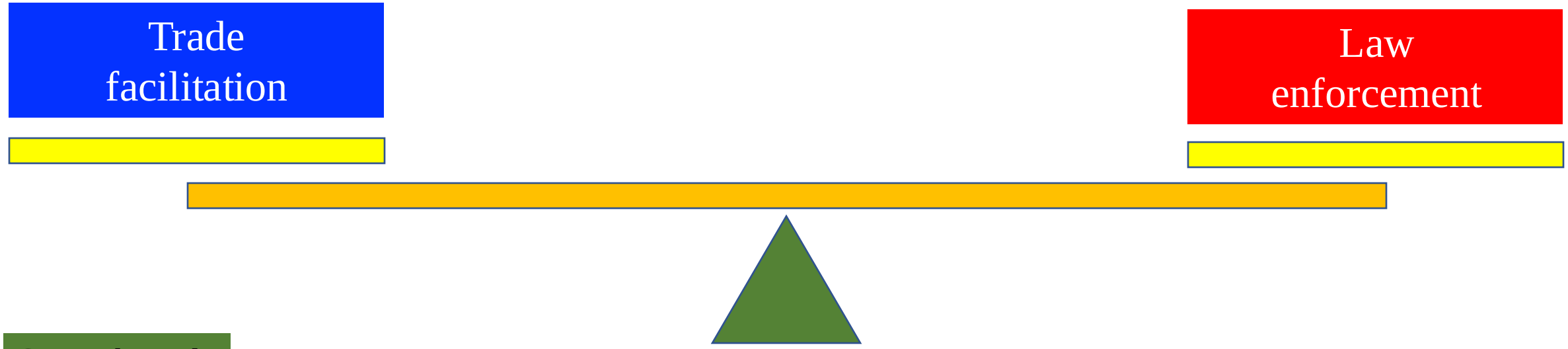
- Electronic exchange of trade documents
- Risk based customs management
- Single window
- New method of import clearence

Single window

- A single authority for border crossing related coordination
- A single system of electronic collection
- An automated system for all participants of international trade related activities



Risk based customs management



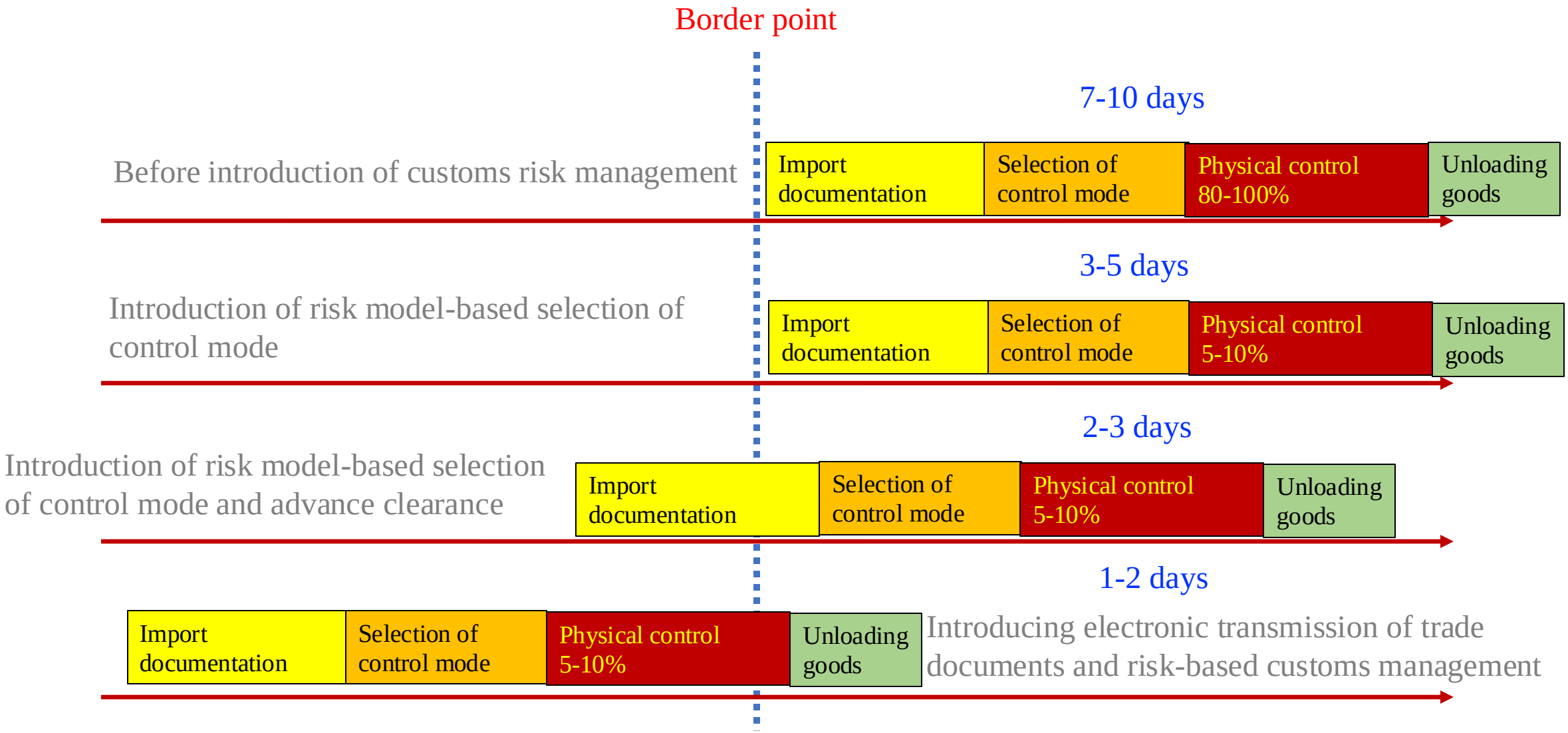
Green channel

Orange channel

Red channel

$$P_r = \alpha + \beta_1 f q_criteria\ 1_{ij} + \beta_2 f q_criteria\ 2_{ij} + \cdots ij + \beta_N f q_criteria\ N_{ij} + \varepsilon_{ij} \quad (1.\ 1)$$

New method of import clearance



Time & expenditure for export/import control and documentation

№	Indicators	Time / hours				Expenditure/ USD			
		Mongolia	PR.Ch	Asia Pacific	High income OECD countries	Mongolia	PR.Ch	Asia Pacific	High income OECD countries
1	Export border control	134	21	57.5	12.7	225	256	381.1	136.8
2	Export documentation	168	9	55.6	2.3	64	74	109.4	33.4
3	Import border control	48	36	68.4	8.5	210	241	422.8	98.1
4	Import documentation	115	13	53.7	3.4	83	77	108.4	23.5

Across border trade indicators - 2014

№	Indicators	Export		Import	
		Time /days	Cost /USD	Time /days	Cost /USD
1	Documents preparation	28	145	28	110
2	Customs clearance and technical control	2	160	4	150
3	Ports and terminal handling	5	190	5	190
4	Inland transportation and handling	14	2250	13	2500
	Totals	49	2745	50	2950

Source: Doing business 2014

Across border trade indicators -2020

No	Indicators	Time / hours				Cost / USD			
		Mongolia	P.R.Ch	Asia Pacific	High income OECD countries	Mongolia	P.R.Ch	Asia Pacific	High income OECD countries
1	Export border compliance	134	21	57.5	12.7	225	256	381.1	136.8
2	Export documentary compliance	168	9	55.6	2.3	64	74	109.4	33.4
3	Import border compliance	48	36	68.4	8.5	210	241	422.8	98.1
4	Import documentary compliance	115	13	53.7	3.4	83	77	108.4	23.5

Source: Doing business - 2020

Across trade indicators before and after customs modernization

No	Indicators	Time / hours		Cost / USD	
		Before modernization	After modernization	Before modernization	After modernization
1	**Export border control**	**134.0**	**69.2**	**225.0**	**171.1**
	Clearance and inspections required by customs authorities	32.0	3.2	41.0	4.1
	Clearance and inspections required by agencies other than customs	72.0	36.0	34.0	17.0
	Port or border handling	30.0	30.0	150.0	150.0
2	**Export documentation**	**168.0**	**84.0**	**64.0**	**6.4**
3	**Import border control**	**48.0**	**26.4**	**210.0**	**156.0**
	Clearance and inspections required by customs authorities	24.0	2.4	60.0	6.0
	Clearance and inspections required by agencies other than customs	0.0	0.0	0.0	0.0
	Port or border handling	24.0	24.0	150.0	150.0
4	**Import documentation**	**115.0**	**57.5**	**83.0**	**41.5**

Source: Authors calculation

The impact of customs modernization

Indicators	Before				After				Percentage change
	Border compliance	Documentary compliance	Inand transportation	Totals	Border compliance	Documentary compliance	Inand transportation	Totals	
Time to export	134	168	754	1056	69.2	64	754	887.2	0.840
Time to import	48	115	917	1080	26.4	57.5	917	1000.9	0.927
Cost to export	225	64	2456	2745	171.1	6.4	2456	2633.5	0.959
Cost to import	210	83	2456	2749	156	41.5	2456	2653.5	0.965

Results expected

- 16% decrease of export lead time or 387.9 million dollar increase of non mining products' export /except 25, 26, 27th groups of HS
- 7.2% decrease of export lead time or 562.1 million dollas increase of non mining products' import /except 25, 26, 27th groups of HS

Conclusion

- Investment in hard infrastructure
- Pre-determination of the control channel
  - Generation of risk management data base
  - AI based risk assessment model
  - Electronic transmission of trade documents
- Risk based customs control
  - Trade facilitation
  - Law enforcement

Thanks for attention

batnasan@num.edu.mn