



Economywide Impacts of Expansion of Maritime Infrastructure in Senegal

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Background

- Senegal enjoys its strategical location to form Trans-Saharan trade rout; exports about 77% of its exports to the outside Africa (Africa Development Bank (2021)).
- Petroleum, minerals and processed food products dominate maritime trade; mineral and processed food together constituting about 70% and 40% of exports and imports, respectively.
- Port of Dakar holds almost 90% of Senegal's trade
- Volume of maritime exports and imports have increased almost by 75% and 20%, respectively between 2016-2020 (Port Autonome de Dakar, 2022)
- Boasts best infrastructure in the West Africa; between 2016–2018, Senegal recorded a descent contribution of investment to real GDP (5.6% points). Thanks to the strong private investment (West Africa Economic Outlook, 2021).

Background (Contd.)

But

- With the increased pressure on capacity, the port infrastructure faces several challenges: associated cost escalations and negative impacts on the efficiency
- Efficiency index of seaport services is only 50% (Singapore tops with 91%); boarder clearance index for trade 29% compared to 44% for Côte d'Ivoire (Global Competitiveness Report, 2019)
- Compared to the global standard, the costs of importing to Senegal (per container) is still 1.6 times the costs of importing to OECD country
- The average general-cargo-handling charge (ship to gate) has been \$15 per tonne in Dakar compared to \$8-\$10 in Nigeria, Benin and Togo.

Objectives

- The country intends to tackle these challenges through investing on expanding Dakar port with greater infrastructure capacity
- The Expansion of maritime infrastructural can potentially raise the port capacity, hence increasing the efficiencies of trade transactions, and raising the preference for traded goods.
- A recursive dynamic computable general equilibrium model is used to evaluate potential outcome of increased efficiencies of exports and imports on the economic performances and wellbeing of the country.

DIMITRI Model

- Economic Structure
 - 14 regions with marginal farmers behaving in a semi-subsistence of home production and consumption (HPHC) products assuming a single production activity for each marginal farmer type in a region
 - 66 commodities: 9 subsistence food crops and 17 marketable agricultural commodities
- Production and Resource constraints
 - Flexible CES nested production function with the presence of HPHC separating marketable and subsistence production activities
 - Regional based factor market segmentation
 - The pattern of factor ownership by each household group changes by the interplay of factor mobility and household migration, together with employment changes and the labour-leisure trade-offs.
- Recursive Dynamic

National Economic Structure

Model is calibrated based on the benchmark equilibrium SAM for the year 2014 and updated to 2020 based on the baseline growth assumptions representing structure of the economy

- Mining and agro-processing industries share 15% and 27% of the total exports
- Imports of mining and agro-processing products constitute 14% and 13%, respectively
- Most of the mining activities goes to export market (98%)
- 52% of the domestic demand for the crops are met through imports

	Share of total (%)						
	GDP	Employment	Exports	Imports	Exports / output (%)	Imports / demand (%)	Household Consumption
All sectors	100	100	100	100	0.14	0.24	100
Agriculture	12.8%	12.8%	5.5%	10.6%	6.8%	26.4%	15.6%
Crops	8.9%	8.9%	3.4%	10.1%	15.3%	52.6%	8.4%
Livestock	2.3%	2.3%	0.1%	0.1%	0.3%	0.9%	2.8%
Forestry	1.1%	1.1%	0.1%	0.1%	2.3%	2.1%	1.4%
Fishing	0.5%	0.5%	2.0%	0.4%	15.3%	6.9%	3.1%
Mining	2.2%	2.2%	14.6%	13.6%	97.8%	98.8%	
Industry	11.8%	11.8%	54.1%	60.9%			31.7%
Agro-processing	4.7%	4.8%	26.7%	12.8%	34.2%	38.4%	22.5%
Other manufacturing	7.1%	6.9%	27.4%	48.1%	31.0%	65.7%	9.3%
Utility	2.7%	2.7%					
Construction	4.0%	4.0%					
Services	66.4%	66.4%	25.7%	14.9%	8.2%	10.1%	52.6%
Public Adm	14.2%	14.2%					5.1%
Other	52.3%	52.3%					47.5%

Scenarios

Non-tariff types Iceberg costs (trade facilitation) are implemented in the global CGE model as change in efficiency by shifting the import augmenting technical change in the CES Armington function for imports (Hertel et al, 2001; Fox et al., 2003; Francois et al, 2005, Fugazza and Maur, 2008)

Hummels and Schaur (2013) have discussed willingness to pay for a reduction in time to trade; Walmsley and Minor (2015) have applied this willingness to pay as rise in the marginal utility for the OECD countries

Haddad et al. (2011) have evaluated the impact of increase in port efficiency in Brazil using a spatial CGE model to transport network system to evaluate

- We consider that all the dead-weight losses in maritime exports and imports are due to the prevalence of several transaction and distributional costs, and increase in efficiencies in imports and exports would reflect reduction in existing costs due to the port infrastructural constraints

Scenarios (Contd.)

- **Baseline scenario:** The model is calibrated to the year 2014 and updated to 2020, mimicking the structure of the Senegal economy for that year. The model is then projected to the year 2025 to create baseline growth path.
- **Increase in exports and imports preferences:** Increase efficiencies in both exports and imports by simulating the efficiency parameters in CET function for exports and CES Armington function for imports by 4% between 2021 to 2025.

Results

Thank you



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