

Session 2

Factors affecting supply of forest products

Dr. B. Sundar

Flow

1. Introduction
2. Drivers of Demand for Forest Products
3. Factors Affecting Supply of Forest Products
4. Water – an important forest product
5. Elasticity of supply
6. Problem 1

1. Introduction

- Several studies of global wood and wood products supply and demand contain projections supply and demand of roughly the same order of magnitude.
- However, many of the studies have arrived at different conclusions about the adequacy of forest resources to meet the wood raw material requirements
- Studies broadly agree that, at the global level, raw material supplies will expand to meet production requirements.
- However, few of the studies foresee plentiful wood supplies and several have suggested that it may be difficult to meet future requirements
- The World Bank justifies involvement in forestry on the basis of the sector's linkages to its key objectives of
 - poverty alleviation,
 - environmentally sustainable development and
 - private sector development
- We stress the supply side since issues of supply fall within the purview of forest policymakers while demand issues are influenced by national economic policies

1. Introduction

- Factors affecting the demand for forest products (ex. Wood)
 - Price of the products
 - Price of substitute products (metals, plastic, cement, chemical)
 - Population
 - Income levels
 - Consumer preferences
- Most forest products are intermediate goods
 - They are used in other industrial processes or commercial activities (e.g. construction), such that technological changes in end-use sectors can influence demand
- A correlation between increasing incomes and preferences for environmentally friendly products may increase demand

2. Drivers of demand for forest products

1. Population growth

- This increases the demand by increasing the number of forest product consumers
- World population has roughly doubled in the last 60 years
 - Population growth rates in developed countries have declined, and account for 20% of global population
 - Asia and Africa account for 75% of the global population
- Forecasts for 2030
 - Population growth rate in developed countries would be 6% p.a
 - Population growth in less developed economies would be ~30% p.a

2. Income growth

- Demand for forest products increases as countries become richer
 - An exception is wood fuel, whose usage decline as incomes increase, because people switch to more convenient types
- Skew in GDP distribution
 - Organization for Economic Cooperation and Development (OECD) countries account for 80 % of world GDP
 - Asian developing countries account for 13%
 - Less developed countries account for 7%
- GDP of less developed countries are expected to double, but GDP of developed countries are expected to increase by about 50%

2. Drivers of demand for forest products

- Population and income growth also may reduce the supply of forest products
 - Increasing population density increases the pressure to convert forestland into other uses and thus reduce forest area
 - Higher incomes tend to result in higher demands for environmental services from forests resulting in resources depletion (Solberg *et al* 1996)
- **Overall conclusion indicate that forest products demand may shift to Asia and Africa**

3. Factors affecting supply of forest products

1. Forest products from natural forests

- Changes to natural forest management regimes (-)
 - Due to the growing influence of “sustainability”, the objectives of natural forest management is shifting away from commercial extraction to harmony with ecological and social sustainability
- Forest loss due to deforestation (-)
 - This reduces forest area directly, and also extraction due to management-initiated logging bans
- Forest change due to degradation (-)
 - This could be due to loss of site fertility, soil erosion, fragmentation, and loss of standing biomass
 - Harvesting volume per unit area decreases impacting forest businesses

2. Forest products from managed plantations (public or private)

- Increased afforestation rate (+)
 - In managed plantations can enhance forest products supply
- Development gains due to genetic and silvicultural interventions (+)

3. Augmentation by non wood fiber supplies (+)

- Increased use of non wood fiber (from straw, cotton, hemp, and sisal) for paper and pulp industry (wood is major source, at 92%) can ease supply constraints in the fiber industry

3. Factors affecting supply of forest products ...

- Most regions recover about 40% of the papers consumed, except Africa (poor infrastructure) and former USSR (abundant forests)
- Europe and USA are the largest consumers of recovered paper

Region	Wastepaper recovery	Recovery as a proportion of paper consumption	Consumption of recovered paper	Consumption of recovered paper as a proportion of paper production
	1,000 MT	%	1,000 MT	%
Europe	31,923	45	32,297	46
Asia-Pacific	35,603	40	40,946	40
North America	41,999	40	34,427	45
Latin America	4,354	42	5,853	31
Africa	901	26	924	23
Former USSR	40	1	629	2
World	115,820	41	116,076	41

Source: Maabe and Pande (2007)

3. Factors affecting supply of forest products ...

- A sample empirical formulation to describe the factors affecting the supply of forest products:
- Short-run supply of forest products = β_0
+ β_1 * price
+ β_2 * proportion of forests in public ownership
+ β_3 * forest area
+ β_4 * forest density (= growing stock / forest area)
+ β_5 * real interest rate
+ β_6 * total income per capita (= GDP / N) + ε

4. Water – an important forest product

- Fresh water is an important forest product whose importance cannot be stressed, even during the current pandemic, in view of its excess use in hand washing and hygiene (as important as physical distancing)
- Water is the primary medium through which climate change impacts trickle down to the community and individuals, through reduced predictability
- Growing populations' demand for water
 - increases the need for energy-intensive water pumping, transportation, and treatment
 - Leads to the degradation of critical water-dependent carbon sinks such as peatlands
- A warmer climate causes more water to evaporate from both land and oceans
 - in turn, a warmer atmosphere can hold more water
 - roughly 4% more water for every 1F rise in temperature

4. Water – an important forest product

- These changes lead to negative consequences in the water cycle
 - Increased precipitation and flooding in certain areas and
 - less precipitation and severe scarcity of water (droughts) in other areas
- This influences almost all aspects of the economy including
 - drinking water, sanitation, health, food production, energy generation, and the achievement of the Sustainable Development Goals (SDGs).
 - In coastal areas when more freshwater is removed from rivers and aquifers, saltwater will move farther upstream into the river mouth and the aquifer, which will put pressure on the limited freshwater available on the coast,
 - This forces water managers to seek costly alternatives like desalination plants
- [The importance of conserving forest lands is crucial for our economy](#)

5. The Elasticity Of Supply

- *Price elasticity of supply* is a measure of how much the quantity supplied of a good responds to a change in the price of that good.
- Price elasticity of supply is the percentage change in quantity supplied resulting from a percent change in price.

$$\text{Price elasticity of supply} = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

- Ability of sellers to change the amount of the good they produce.
 - Beach-front land is inelastic.
 - Books, cars, or manufactured goods are elastic.
- Time period.
 - Supply is more elastic in the long run.

Problem 1

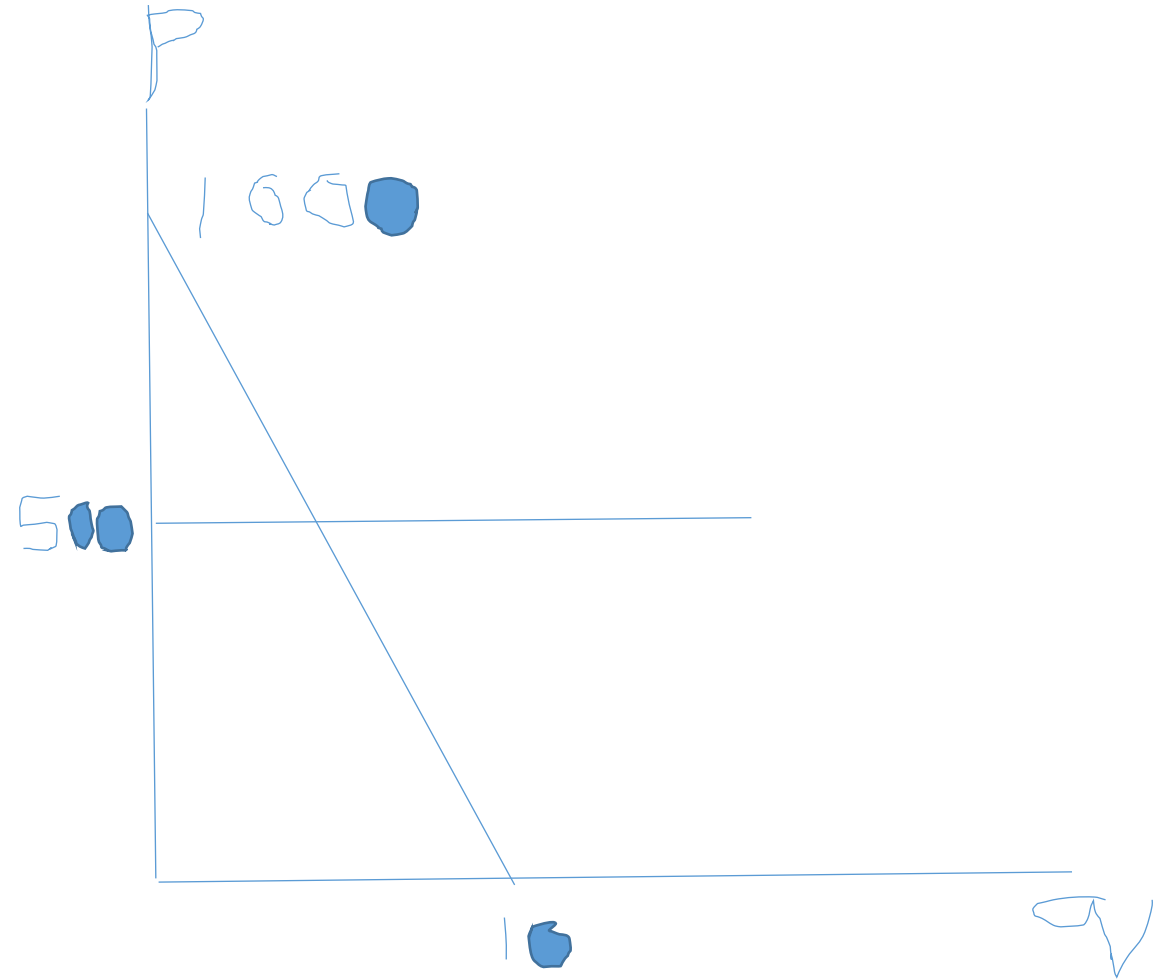
Suppose the state is trying to decide how many miles of a very scenic river it should preserve. There are 100 people in the community, each of whom has an identical inverse demand function given by $P = 10 - 1.0q$, where q is the number of miles preserved and P is the per-mile price he or she is willing to pay for q miles of preserved river. (a) If the marginal cost of preservation is \$500 per mile, how many miles would be preserved in an efficient allocation? (b) How large is the economic surplus?

Solution

- $P = 10 - 1 q$; private inverse demand curve -----(1)
- There are 100 persons in this community, and the community or market demand curve would be: $P = 1000 - 100q = (10-1q) * 100$ from vertical summation -----(2)
 - Scenic beauty is a public good, and for public goods, we summate the demand curve vertically (whereas for all private goods like cars, tv, and so on, we summate the demand curves horizontally)
- For efficient allocation, Price = $P =$ marginal cost (MC) ; Given that marginal cost = $MC = 500$ (which means the supply curve is $P = 500 q$, such that $dP/dq = MC = 500$)
- $P = 1000 - 100 q = 500$, on solving yield $q = 5$ miles, which is the efficient allocation
- The economic surplus is the consumer surplus, and equal to the triangle, as discussed in class = $0.5 * 5 * 500 = \$ 1250$.

Solution

Price



References

1. Forest product market developments: the outlook for forest product markets to 2010 and the implications for improving management of the global forest estate, FAO WP series
2. <https://www.thehindu.com/opinion/op-ed/water-wisdom-during-a-pandemic/article31528795.ece>

End of session

Thanks