

# Structural relations between Land Use Displacement, Agricultural Intensification and Forest Transitions

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## OBJECTIVES

- Theories which integrate different types of land use change in a systemic way remain to be developed [1].
- Explanations of land use changes are often based on inductive generalization rather than deductions from theories.
- Objective: To **test theories** from different fields that explain land use changes and to organize them in a coherent structural model.

## HYPOTHESES

### - Environmental Kuznets Curve [2]:

An inverted U shaped relationship exists between environmental degradation and economic development.

### - Forest Transition (Economic development & globalization pathways) [3,4]:

Turnaround from forest decline to forest recovery can be explained by industrialization, urbanization, and agricultural intensification.

### - Unequal Ecological Exchange [5]:

Less developed countries trading preferentially with high-income countries, as well as those that gain low added value from their exports exploit their natural resources and thus have higher deforestation rates.

### - Pollution haven [6]:

Regulatory stringency in some countries shifts polluting industries towards countries with weaker environmental regulations.

### - Leakage [7]:

Stricter land use policies in a country affect land use in other places through increasing imports or reducing exports of agricultural products.

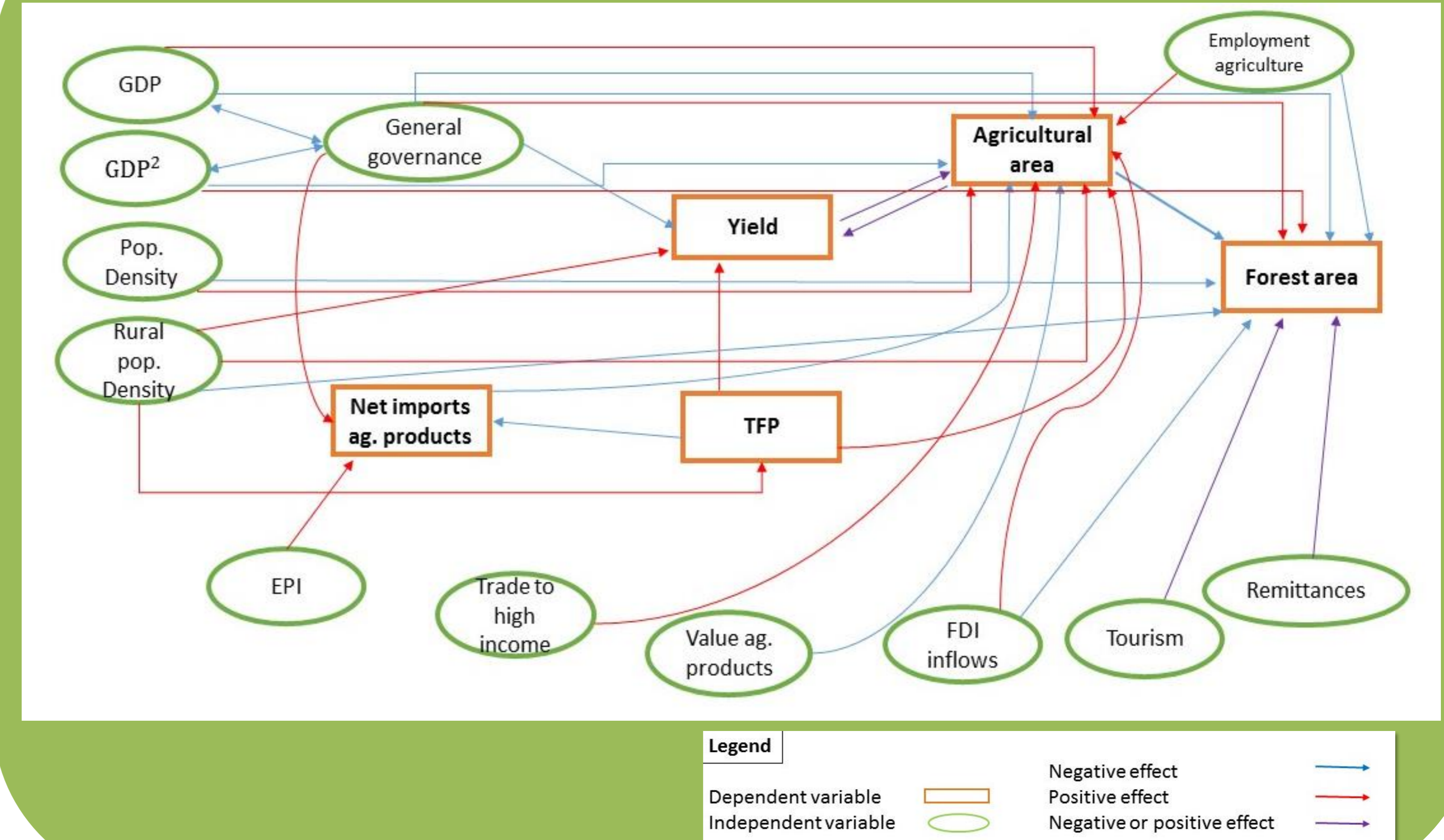
### - Induced intensification [8]:

Response to demographic, social, and economic pressures leads to the adoption of increasingly productive land-use systems.

### - Rebound effect vs land sparing [9]:

Agricultural intensification can either spare land or lead to a rebound effect depending on conditions about land availability, characteristics of the product and markets, and types of intensification.

## STRUCTURAL MODEL

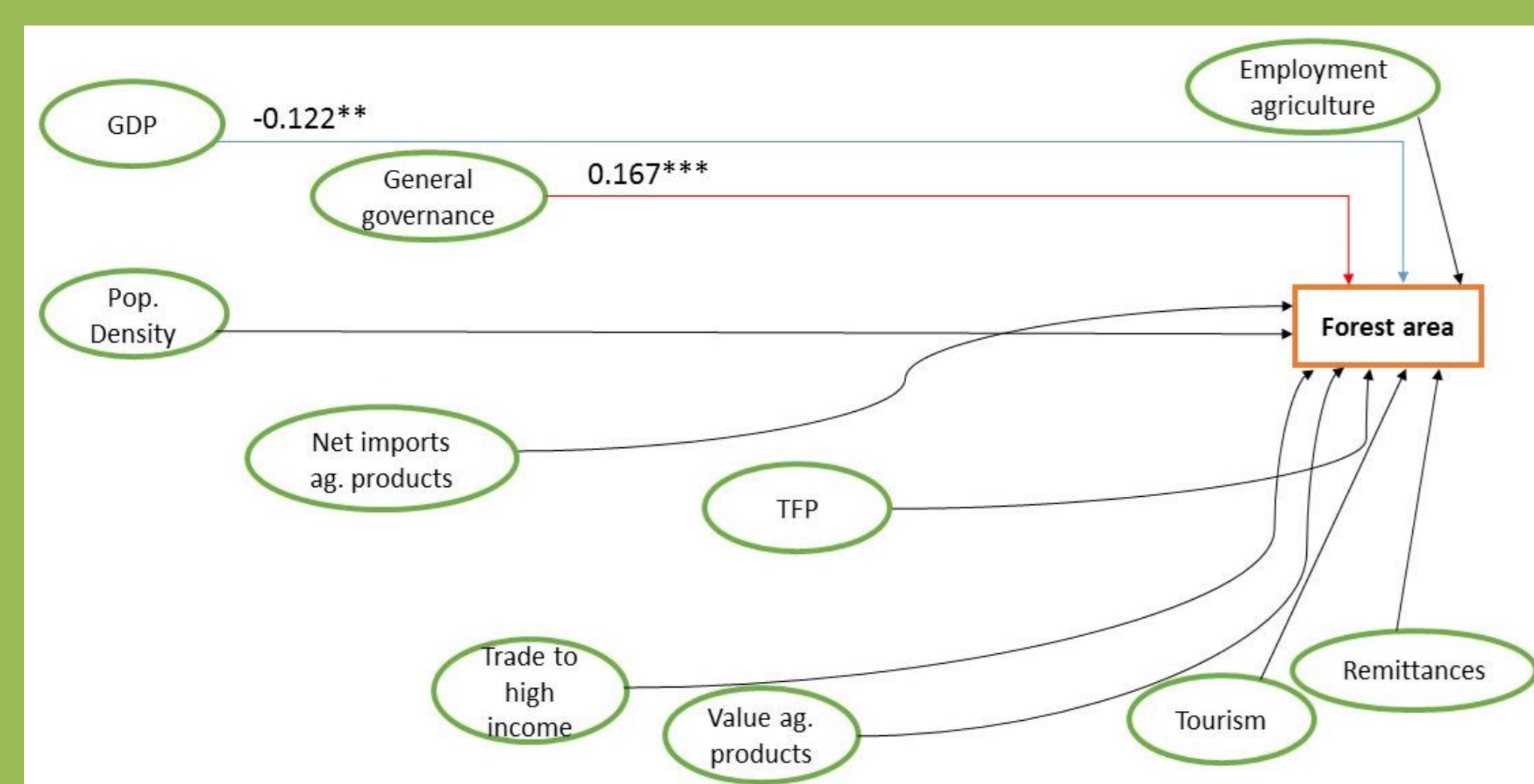


### Panel data econometrics:

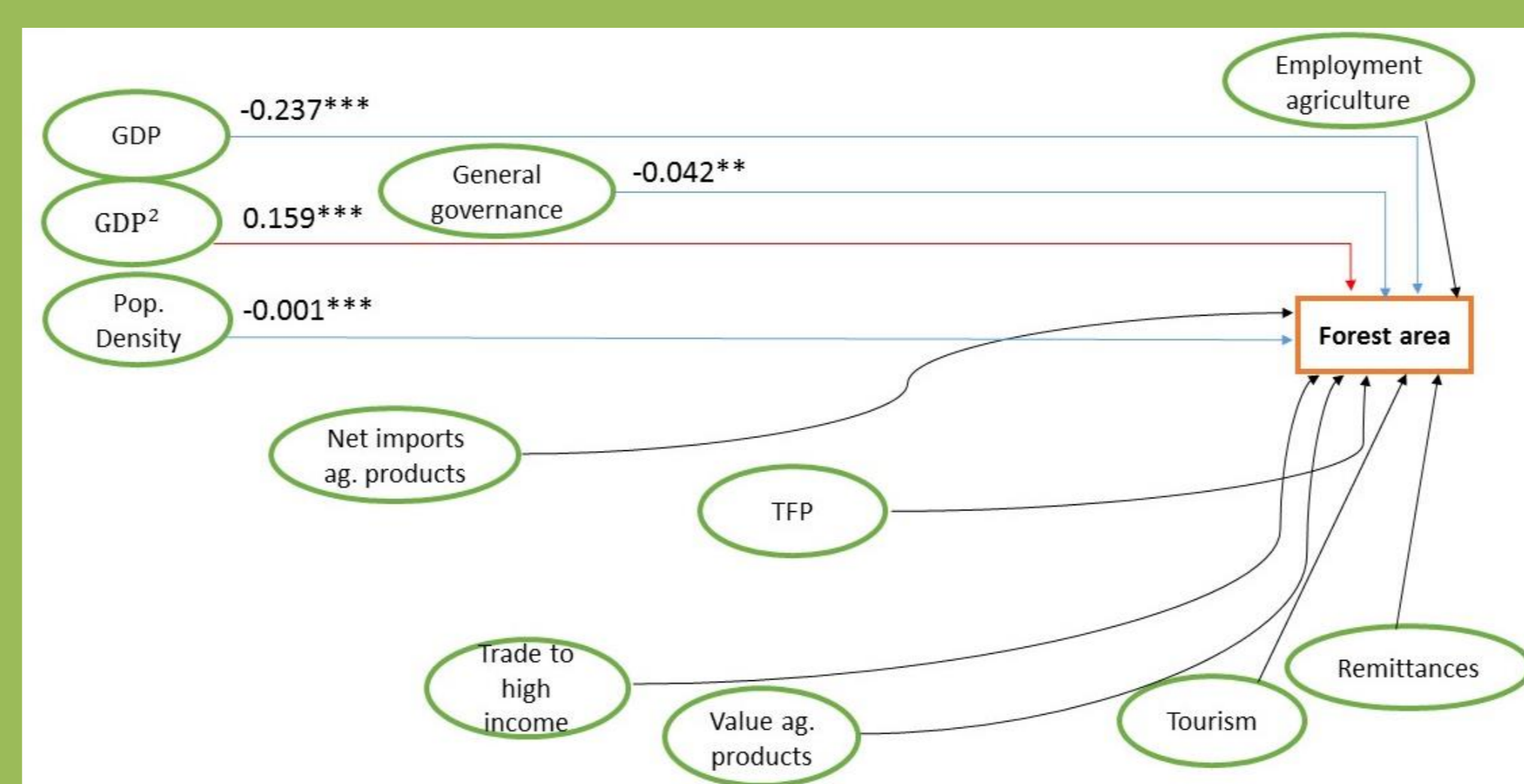
- 285 countries grouped by income: high ( $\geq 12,476\$$ ), middle ( $12,235\$-1,006\$$ ) & low ( $\leq 1,005\$$ ).
- Yearly observations from 1960 to 2016 (57 periods).

## PRELIMINARY RESULTS (Only forest area as dependent variable)

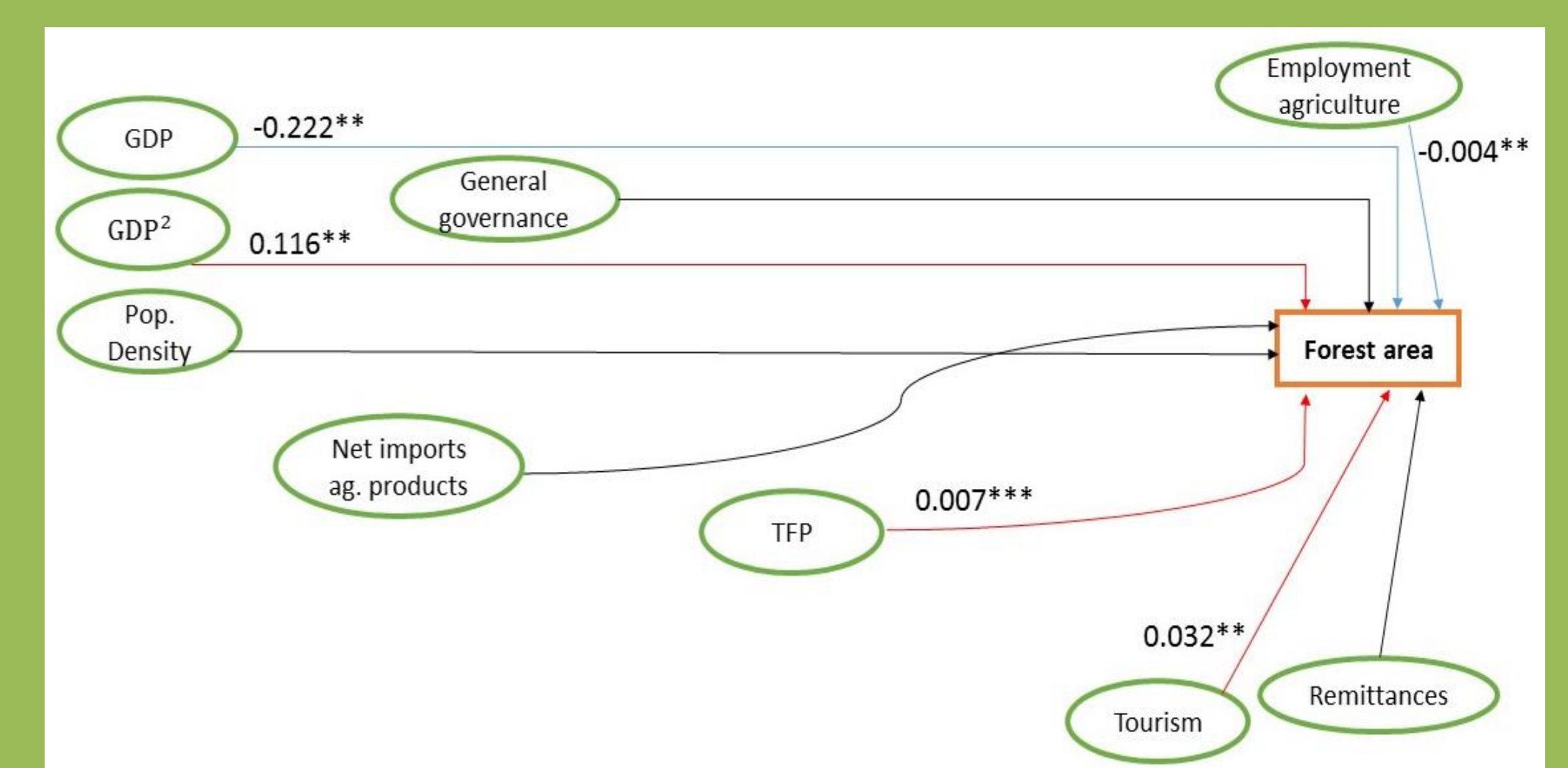
### Low Income



### Middle Income



### High Income



Note: significance at 1% (\*\*\*) and 5% (\*\*)

## CONCLUSIONS

- An Environmental Kuznets Curve (EKC) is shown across the three groups of countries (see GDP and GDP<sup>2</sup> variables).
- Improved governance has a positive effect on forest cover in low income countries but a negative one in middle income countries.
- Population density is a significant factor of deforestation for middle income countries.
- For high income countries, Total Factor Productivity (TFP) has a positive and significant effect on the forest area. For these countries, improved agricultural technologies contribute to spare land for forest.

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