

Birds of the same feather trade together:

Investigating Homophily in Deep Trade Agreements

GRAD-E1426 Applied Network Analysis

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Presentation Outline

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Background and motivation

Revisiting the evolution of PTAs

2

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Understanding PTA formation

Revisiting the evolution of preferential trade agreements

Background and motivation

There has been an **unprecedented rise in PTAs**

- Agreements notified to the WTO **grew sevenfold** in the last three decades (1990-2022)
- All WTO members are currently a party of at least one PTA

PTAs have become **deeper and broader** in scope

- PTAs have gone **beyond simply facilitating market access** through taxes and tariffs
- New forms of cooperation go **beyond the mandate of WTO** (*data protection, intellectual property, human rights, environmental laws*)

Deep PTAs have a more **holistic effect** on economies

- Boosts productivity in services sectors and facilitates development of **diversified and resilient supply chains**
- More effectively promotes **peace and stability** and encourages **democratic reforms**

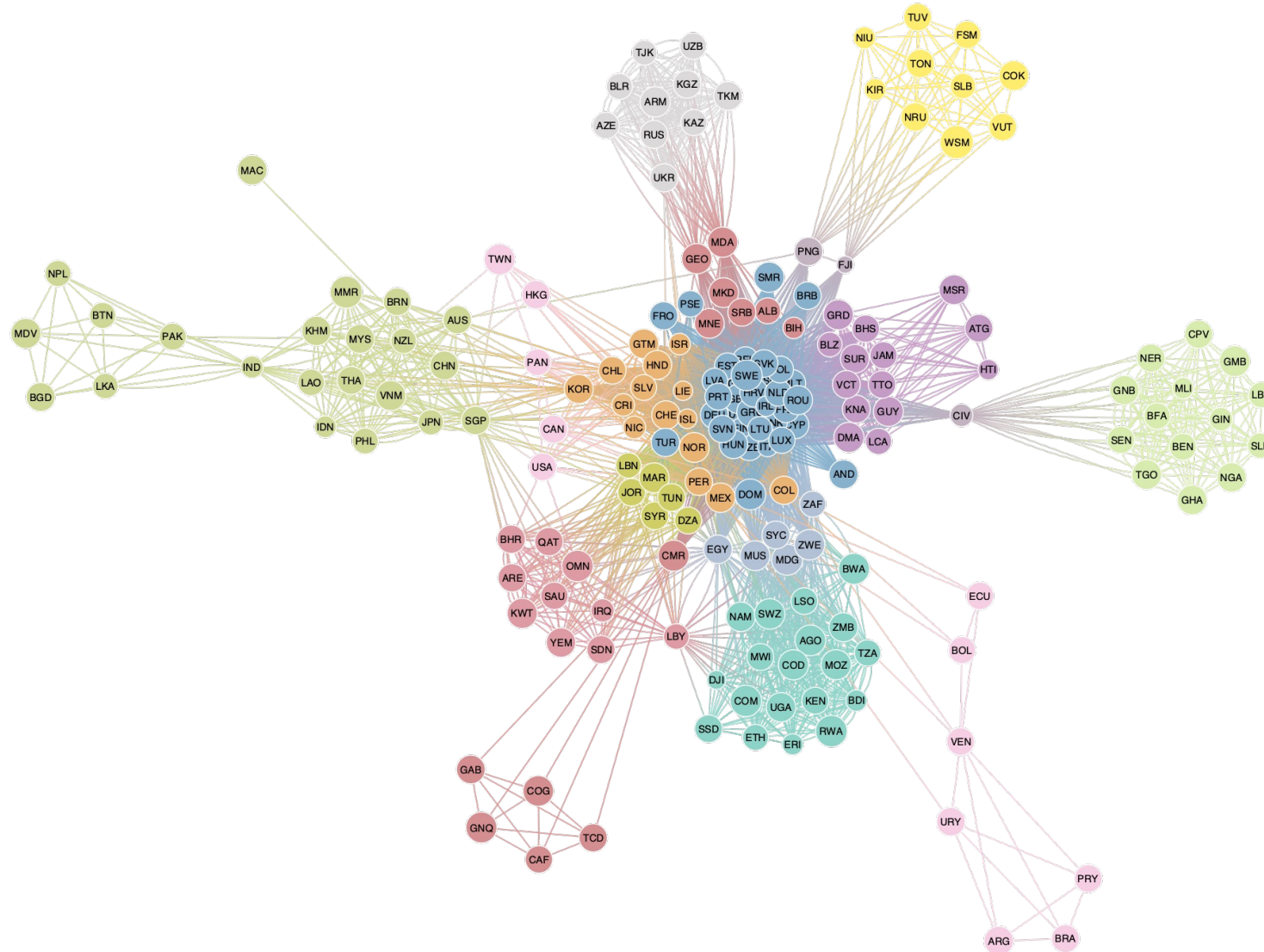


How are deep trade agreements formed?
What factors determine the choice of partners in deep PTAs?

Illustrating the network of trade agreements

Descriptive statistics

1 2 3 4



Network features

189 countries
261 trade agreements
3,141 bilateral partnerships
57 years

Region
Income class
GDP
Political structure

PTA policy areas

1. Import tariffs
2. Non-tariff barriers
3. Behind-the-border policies
4. Services
5. Technology
6. Investment and capital
7. Labor
8. Other policies
9. Non-economic policies

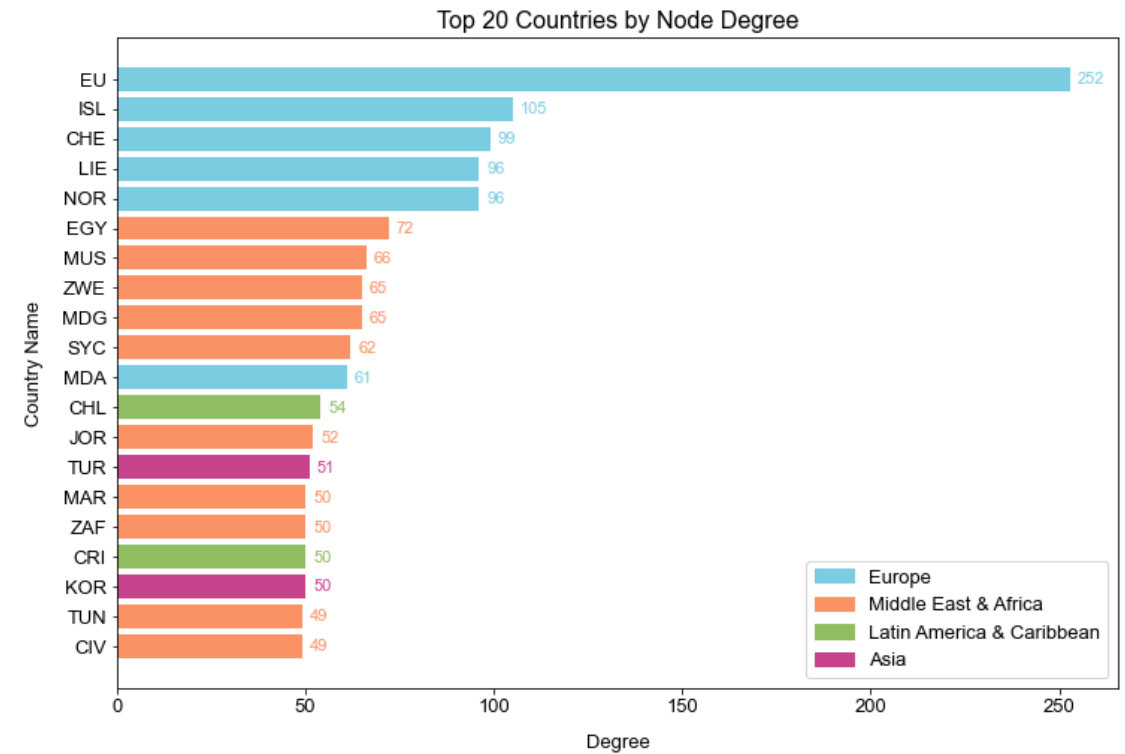
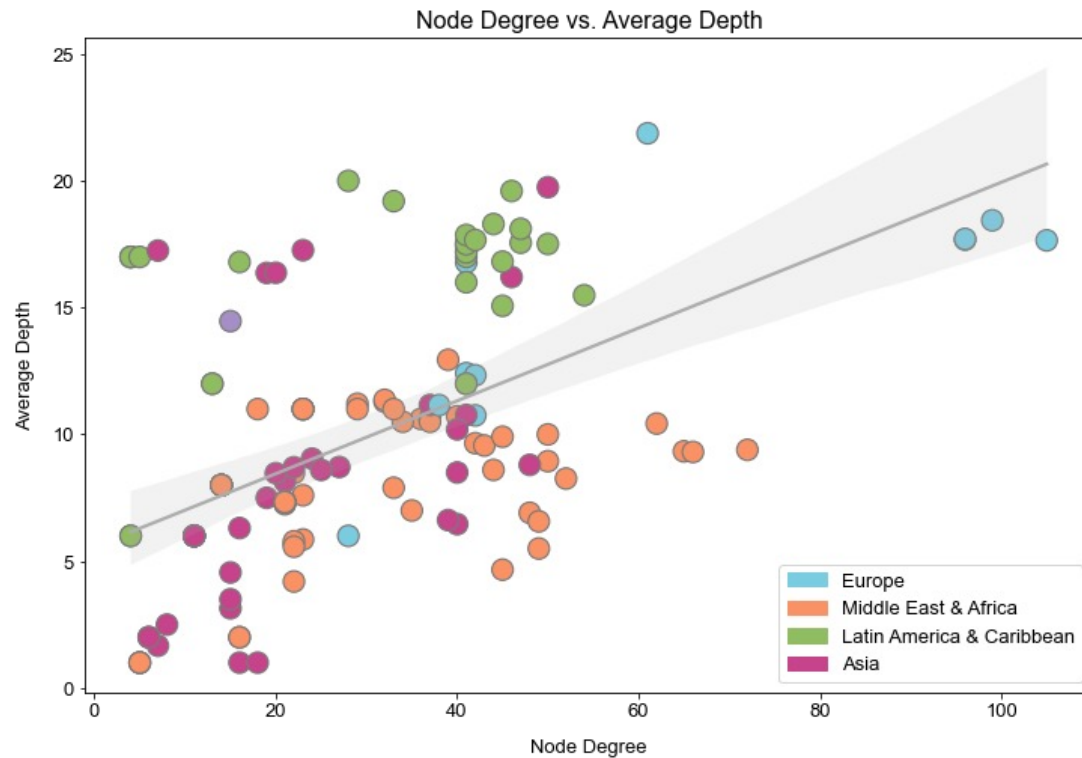
Non-economic provisions

- Environmental laws
- Cultural cooperation
- Data protection
- Health
- Human rights
- Illicit drugs
- Money laundering
- Political dialogue
- Terrorism

Illustrating the network of trade agreements

Descriptive statistics

Well-connected countries are more likely to sign deep trade agreements



Fitting an exponential random graph model

Empirical analysis

1

2

3

4

Gains from PTAs can be economic or political, so they are also bound to the economic and political characteristics of PTA partners



Economic

- Net welfare gain to offset losses from trade diversion
- Geographic proximity, symmetry of economic size



Political

- Maximizing gross social welfare
- Regime structure (democracies are likely to form PTAs with other democracies)

Partnerships are dependent on the **attributes of participants** and countries are not indifferent to their trade partners



Homophily

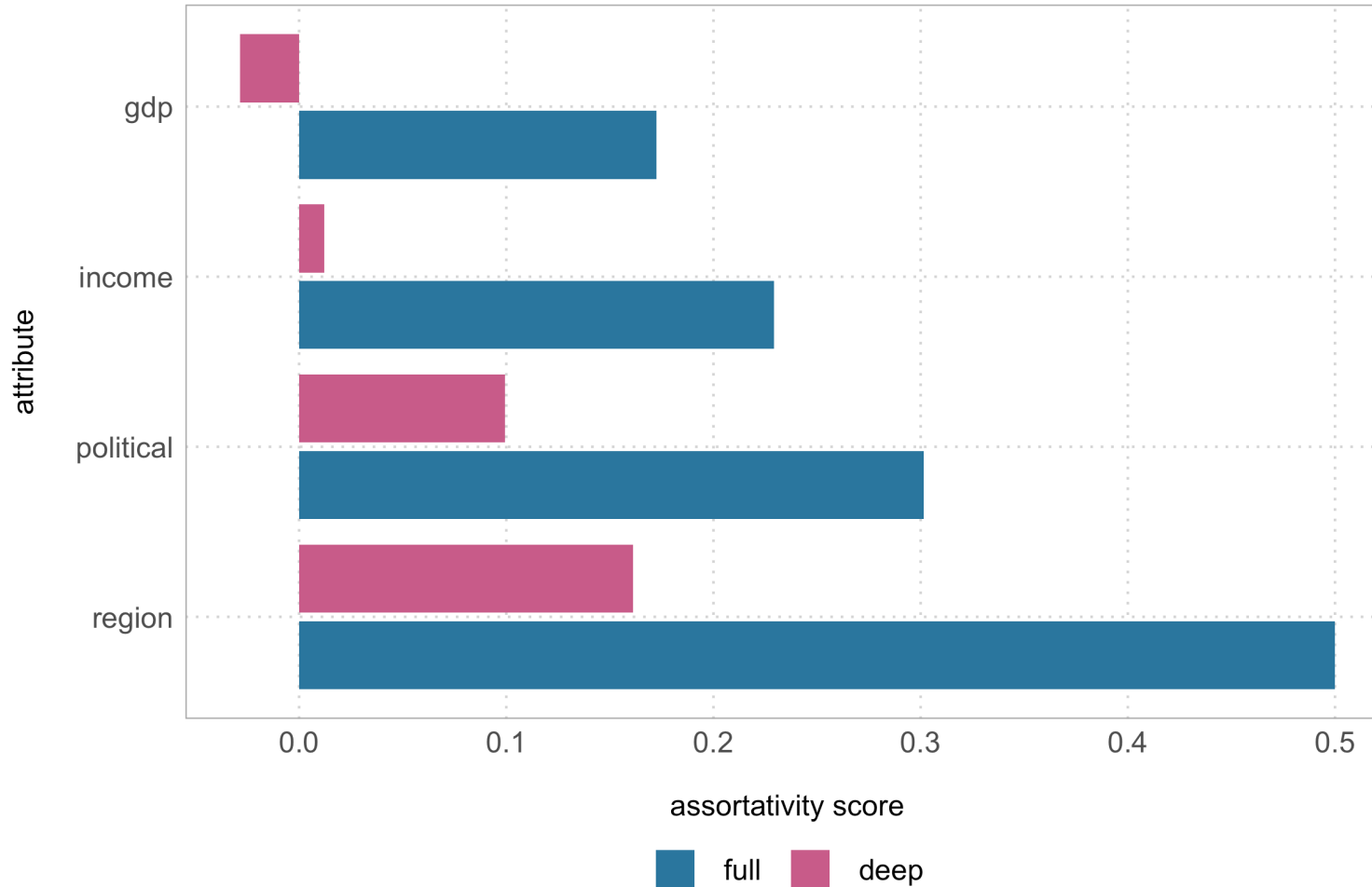
In social networks is the tendency to form social ties according to the similarities in people's attributes

Fitting an exponential random graph model

Empirical analysis

Assortativity Scores with Select Node Attributes

Full vs Deep Trade Networks



Region

Regional classification of a node based on WB

Income class

Income classification of a node based on WB

Political institutions

Freedom House Democracy Index of a node based on Free in World: free, partly free, not free

GDP

Gross domestic product of a node in 2019

Fitting an exponential random graph model

Empirical analysis

Using ERG to examine:

- probability of observing a set of ties
- how **similarities in nodal attributes influence** presence and absence of PTA links

Coefficients: likelihood (**log-odds ratio**) of tie formation with respect to the node attribute

Goodness-of-fit measures: AIC, BIC, log-likelihood for measuring how well models explain the data

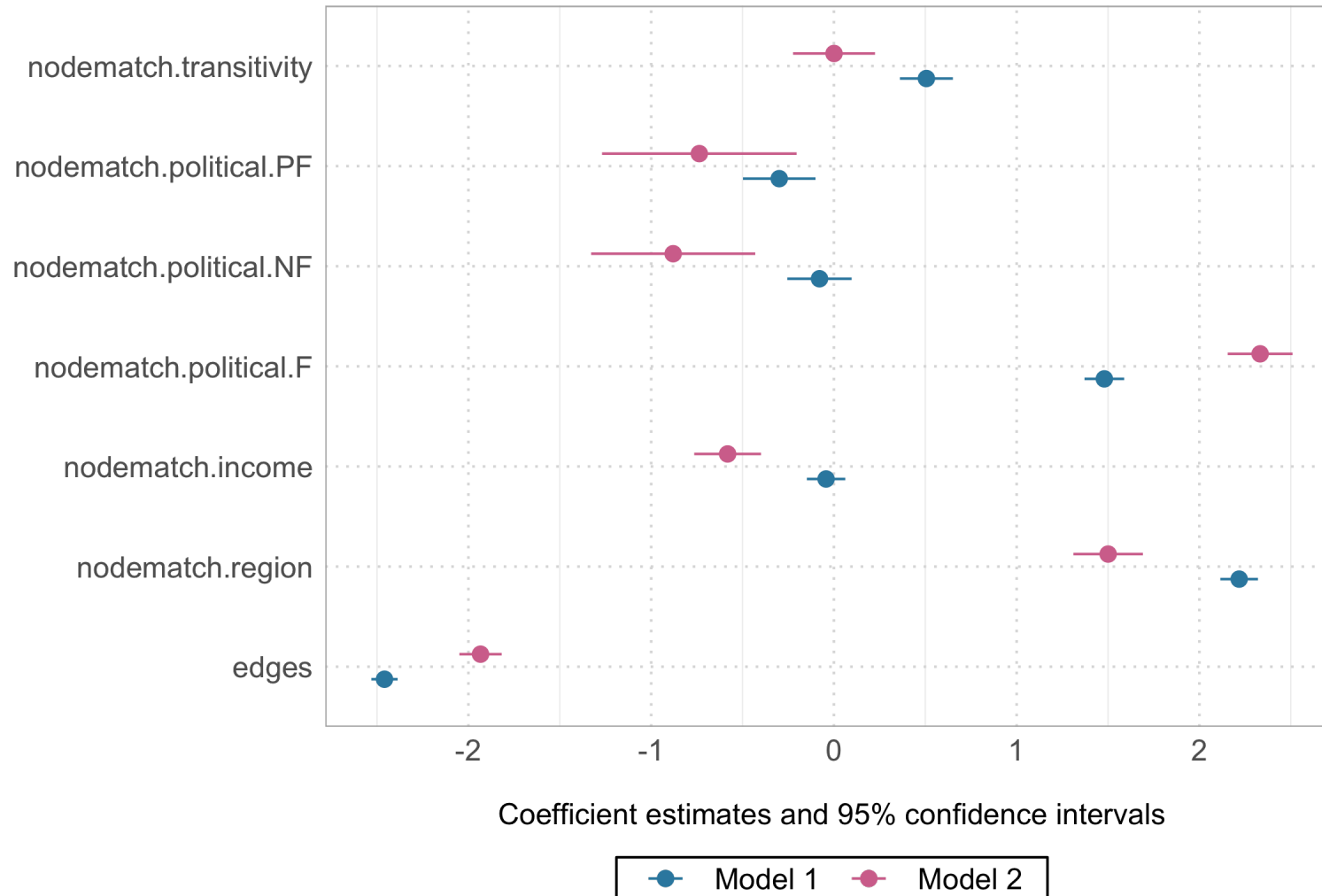
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
edges	-1.467*** (0.020)	Baseline model: probability of an edge being in the network					-2.065*** (0.430)
nodematch.region		0.225*** (0.038)					2.251*** (0.053)
nodematch.income			-0.964*** (0.034)				0.091+ (0.053)
nodematch.gdp				-2.197* (1.050)			
nodefactor.political.F					-0.281*** (0.017)		0.418+ (0.217)
nodefactor.political.NF					-1.350*** (0.032)		-0.657** (0.218)
nodefactor.political.PF					-1.048*** (0.029)		-0.385+ (0.218)
nodematch.transitivity			Accounts for network structure			-0.317*** (0.051)	0.694*** (0.075)
AIC	15374.8	22052.0	21206.6	22079.7	14414.4	22048.4	11949.4
BIC	15382.4	22059.6	21214.3	22087.4	14437.4	22056.1	12003.2
Log.Lik.	-7686.385	-11024.983	-10602.320	-11038.847	-7204.203	-11023.197	-5967.711
independence	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
iterations	5.000	3.000	4.000	3.000	5.000	4.000	5.000

Fitting an exponential random graph model

Empirical analysis

Determinants of Trade Agreement Formation

Exponential Random Graph Results, Deep vs Full PTA Networks



Key insights on deep PTAs:

- Political freedom is the most important determinant of deep PTA formation
- PTA between countries in partially free and non-free countries are unlikely
- In deep PTAs, links are more likely in countries with different income classes
- Countries in the same region are likely to form ties, but less than the full network

- Deep trade agreements are different from earlier PTAs not just in their objectives but also in the way they are formed
- Homophily in social networks can also be observed in trade agreement networks – countries with shared attributes are more likely to form PTAs
- Political freedom is a major determinant of deep PTA formation: ties are more likely to be formed if partner countries are both democracies compared to if they belong to the same income class or region.
- In general, this suggests that countries enter deep trade agreements for more than economic gains – there more consideration for political and social benefits of PTAs