THE POTENTIAL OF DIGITAL SERVICES TRADE TO FOSTER REGIONAL INTEGRATION IN LAC

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CONTEXT

- Today, more services are traded than goods worldwide in terms of value added.

- Especially, digital services: "everything that is ordered and/or delivered digitally" (OCDE).

- There are restrictions on trade in digital services, mainly of a regulatory nature, which hold back the dynamics of trade.

- Fostering regional integration of digital services in LAC would promote its economic development.

- Most studies on these restrictions and their impact focus on OECD countries, whereas little work has been done on LAC.

GOALS

- Analyze the impact of regulatory and other barriers on bilateral modern services trade of LAC countries with partners in and outside the region;

- Identify drivers of trade in modern services in LAC; and

- Assess the potential of these trade flows as a future engine of regional integration.

STYLIZED FACTS

- Exports of digital services from LAC grew 7% on average per year between 2005 and 2021; more than total services exports (5.1%).

- The share of digital services in total exports of services in LAC increased from 22% to 29% in the same period; which contrasts with the figures for the whole world (44% to 62%).

- LAC countries differ widely in their export performance of digital services, with Brazil, Argentina, Costa Rica, Mexico and Colombia being the largest exporters.

- Small countries (Uruguay, Costa Rica, Chile, Colombia, and the Dominican Republic) show the highest growth rates in exports of digital services.

STYLIZED FACTS (2)

- Low regional integration in digital services:
  - Only for Argentina and Paraguay, LAC represents more than 25% of the destination market.
  - For Saint Lucia, Uruguay, Saint Vincent and the Grenadines, Grenada, Colombia and Costa Rica, LAC represents between 15% and 25%.
  - For the rest of the countries in the region (25), LAC represents less than 15% of the market.

- Members within trade blocs (Pacific Alliance; Central American Common Market; Mercosur; Caricom, and Andean Community) are little relevant as a destination for each member´s digital services exports.

- As there is scope to increase the regional integration in digital services, it is important to study the main facilitators and obstacles of trade in digital services in LAC.

OBSTACLES AND DRIVERS OF DIGITAL SERVICES TRADE IN LATIN AMERICA AND CARIBBEAN

GRAVITY MODEL WITH "GRAVITAS"

$$X_{ij}^k = \frac{Y_i^k E_j^k}{Y^k} \left(\frac{\tau_{ij}^k}{\pi_i^k P_j^k}\right)^{(1-\sigma_k)} e_{ij}^k$$

- where,

- X^k_{ij} is the amount of exports from country i to country j

- Y^k_i and E^k_j are the production and expenditure of country i and country j, respectively

- Y^k is the world production

- τij represents trade costs between the two countries

- π_i^k is the outward multilateral resistance and P_j^k is the inward multilateral resistance, both non observable variables.

EMPIRICAL STRATEGY

- Poisson Pseudo-Maximum-Likelihood (PPML) method

$$X_{ijt} = exp^{\left[Z'_{k,ijt}\beta_k + v_{ij} + p_{jt} + \gamma_{ij}\right]} * \epsilon_{ijt}$$

- Where X_{ijt} is the value of **exports of digital services** from country i to country j in year t; Z′ is a k x 1 vector of specific independent variables for exporting-importing country pairs in year t that can have an effect on exports; while β_k is the k x 1 vector of regression coefficients to be estimated.

- Santos and Tenreyro (2006) shows that PPML estimator allows the **direct inclusion of trade flows of zero value** and **avoids biases in the coefficients in the presence of a heteroscedastic error term**.

- Besides, Fally (2015) shows that the PPML estimator is **consistent with the theoretical assumptions** underlying gravity models.

EMPIRICAL STRATEGY (2)

The vector Z′ contains two set of variables:

1. Trade obstacles and enablers (**commonly used in literature**):
   a) Distance between the countries (km)
   b) Dummy variable equal to 1 if countries i and j have a common border, zero otherwise (CNTG)
   c) Dummy variable equal to 1 if countries i and j have a common language, zero otherwise (LANG)
   d) Dummy variable equal to 1 if countries i and j have equal colonial ties, zero otherwise (CLNY)
   e) Human capital indicator: mean years of schooling
   f) Investment in telecommunications infrastructure
   g) Broadband use per Internet user

EMPIRICAL STRATEGY (3)

2. Trade policy variables (**<u>our main contribution in the paper</u>**):

    a) The value of the DSTRI Heterogeneity Index (HDSTRI)

    b) Dummy variable equal to 1 if countries i and j have a free trade agreement for goods with a chapter on services (FTAser)

Trade volume effect of continuous variables. In the case of continuous variables, such as bilateral distance, the interpretation of the estimate of the coefficient of the continuous variable is simply a elasticity of (the value of trade flows) with respect to the continuous variable.

Trade volume effect of indicator variables. The volume effects triggered by a change in an indicator gravity variable, such as the presence of FTA with chapter on services, can be calculated in percentage

$$\left[e^{\hat{\beta}_{dummy}} - 1 \right] \times 100$$

EMPIRICAL STRATEGY (4)

- Baldwin and Taglioni (2006) emphasize the importance of adequate control for the terms π_i^k (outward multilateral resistance) and P_j^k (inward multilateral resistance). So, following Hummels (2001) and Feenstra (2016), we use **exporting country-year (v_{it})** and **importing country-year (p_{jt}) fixed effects** to control for outward multilateral resistance and inward multilateral resistance, respectively.

- Because of potential endogeneity of trade policy, Yotov and others (2016) recommend the use of **country-pair fixed effects (γ_{ij})** in panel gravity models. They can account for both the potential endogeneity of trade policy and all time-invariant gravity covariates (v.g. colom, commonleng, etc). Besides, Egger and Nigai (2015) and Agnosteva et al. (2014) show that country-pair fixed effects are a better measure of bilateral trade costs than the standard set of gravity variables.

- Finally, (ϵ_{ijt}) is the usual residual.

DATA

- **Data panel** for the period 2005-2021.

- The **dependent variable is the amount in dollars of DS exports** from each exporting country to its different trading partners (importing countries). The data on exports of digital services come from the latest version (April 2023) of the OECD-WTO Balanced Trade in Services (BaTIS) database.

- We consider **89 countries**, from which **17 are from LAC** (Argentina, Bolivia, Brasil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, México, Panamá, Paraguay, Perú, República Dominicana y Uruguay).

DATA (2)

- The **Heterogeneity Digital Services Trade Restrictiveness Index (HDSTRI)** is built by evaluating, for each pair of countries and each measure, whether or not the countries have the same regulation on trade in modern services. The HDSTRI index takes the value from 0 to 1. The HDSTRI will be equal to 0 if the two countries under analysis have the same regulation in terms of the DSTRI, or 1 if the two countries have totally different regulations. The closer to 1, the higher the level of restrictions between countries.

- **FTA with chapter on services**. Dummy variable equals to 1 if countries i and j have a free trade agreement for goods with a chapter on services.

DATA (3)

- **Mean years of Schooling, reported by UNDP**. The value of both the DS exporting country and the importing country or countries are used.

- **Investment in telecommunications infrastructure**. The annual amount in USD, according to the International Telecommunication Union (ITU) of the United Nations. The value of both the DS exporting country and the importing country or countries are used.

- **International Bandwidth use** (per Internet user), based on data from the United Nations International Telecommunication Union (ITU). The value of both the DS exporting country and the importing country or countries are used.

RESULTS

TABLE 1: MODEL RESULTS (DEPENDENT VARIABLE: EXPORT OF DIGITAL SERVICES)

	(1) All World	(2) LAC with LAC	(3) LAC with Rest of World
Independent variables			
Distance	0***	0***	0***
	(0)	(0)	(0)
Contiguous	.474***	.466***	-2.751***
	(.031)	(.052)	(.072)
Common language	.357***	1.701***	.672***
	(.02)	(.144)	(.035)
Common Colony	.072**	-.224	.426***
	(.033)	(.211)	(.058)
_cons	22.146***	16.796***	20.313***
	(.013)	(.09)	(.077)
Observations	590325	13804	78851
Pseudo R²	.962	.911	.97
Exporter-year FE	YES	YES	YES
Importer-year FE	YES	YES	YES

Robust standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

- The model fits very well (Pseudo R2 > 0.90).

- All trade cost variables **with expected sign and statistically significant**.

- **Importer and exporter fixed effects** were used to control for outward and inward multilateral resistances.

RESULTS (2)

TABLE 2: MODEL RESULTS (DEPENDENT VARIABLE: EXPORTS OF DIGITAL SERVICES)

	(1) LAC with LAC	(2) LAC with Rest of World
Independent variables		
DSTRI Heterogenity	-9.237***	.304
	(2.955)	(.251)
Mean years of schooling	.154**	-.007
	(.075)	(.031)
Investment in Telecoms	0.00**	0.00
	(0.00)	(0.00)
Broadband Use (per Intuser)	0.00***	0.00
	(0.00)	(0.00)
_cons	5.454	21.363***
	(6.425)	(3.277)
Observations	330	2161
Pseudo R^2	.997	.999
Exporter-year FE	YES	YES
Importer-year FE	YES	YES
Bilateral FE	YES	YES

Standard errors are in parentheses
*** *p<.01, ** p<.05, * p<.1*

- Model fits very well (Pseudo R2 > 0.95).

- **In LAC, a 1% decrease in the heterogeneity** of regulations (0.01 decrease in 0 to 100 index) for trade in digital services **would substantially increase this type of trade at the intraregional level by 9%.** Not so when LAC exports to the Rest of the World.

- **Education and investment in telecommunications** are important to facilitate trade in digital services, mainly at the intraregional level.

- **Country-pair fixed effects** were used in addition to importer and exporter fixed effects to control for any endogeneity bias.

RESULTS (3)

TABLE 3: MODEL RESULTS (DEPENDENT VARIABLE: EXPORT OF DIGITAL SERVICES)

	(1) LAC with LAC	(2) LAC with Rest of World
Independent variables		
FTA (with Services chapter)	.164**	.15*
	(.075)	(.085)
Mean years of schooling	.025	-.011
	(.015)	(.012)
Investment in Telecoms	0.00	0.00***
	(0.00)	(0.00)
Broadband Use (per Intuser)	0.00	0.00
	(0.00)	(0.00)
_cons	15.49***	21.146***
	(1.288)	(1.245)
Observations	3114	19498
Pseudo R^2	.995	.997
Exporter-year FE	YES	YES
Importer-year FE	YES	YES
Bilateral FE	YES	YES

Standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1*

- Model fits very well (Pseudo R2 > 0.95).

- **The existence of FTA with a chapter on services increases** trade in digital services by **18% among LAC countries**, and by **16% when LAC exports to the rest of the world**.

- **Country-pair fixed effects** were used in addition to importer and exporter fixed effects to control for any endogeneity bias.

NEXT STEPS

- Explore other possible variables that may affect trade in digital services among LAC and other regions like Asia.

- Carry out robustness exercises on the estimates made, especially because of the use of digital services exports from BaTIS database.

THANK YOU

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