

# ARTNeT Interactive Gravity Modeling Database

ARTNeT Capacity Building Workshop for Trade Research

"Trade Flows and Trade Policy Analysis"

organized by ARTNeT, ESCAP, WTO and ITD

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<http://www.unescap.org/tid/artnet/database.asp>

The screenshot shows a web browser window with the address bar containing the URL [www.unescap.org/tid/artnet/database.asp](http://www.unescap.org/tid/artnet/database.asp). The page header includes navigation links: Home :: UNESCAP :: Site map :: Contact. The main content area features the ARTNeT logo (a blue circle with a white 'A') and the text 'Asia-Pacific Research and Training Network on Trade'. To the right is the UNESCAP logo, which includes the United Nations emblem and the text 'An Initiative of UNITED NATIONS ESCAP Economic and Social Commission for Asia and the Pacific'. A left-hand navigation menu lists: Home, About ARTNeT, ARTNeT Publications, Databases, Events, Training, Publication Search, and Useful links. The 'Databases' section is highlighted in blue. The main text describes ARTNeT as an information repository providing a linkage to international organizations such as the International Trade Centre, UNCTAD, and the WTO, which facilitate researchers' access to trade data and trade analysis tools. ARTNeT also builds trade research capacity through facilitating access to relevant trade and investment related databases. In addition to the ARTNeT Trade Publications Database, ARTNeT supports the development of the trade performance indicators component of the Asia-Pacific Trade and Investment Agreement Database (APTIAD). A bulleted list of databases is shown, with 'Gravity Modeling Database' circled in blue.

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ARTNeT

Asia-Pacific Research  
and Training Network on Trade

An Initiative of  
 UNITED NATIONS  
**ESCAP**  
Economic and Social Commission for Asia and the Pacific

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**Databases**

ARTNeT acts as an information repository providing a linkage to international organizations such as the International Trade Centre, UNCTAD, and the WTO, which in turn facilitate researchers' access to trade data and trade analysis tools. ARTNeT also builds trade research capacity through facilitating access to relevant trade and investment related databases. In addition to the ARTNeT Trade Publications Database, ARTNeT supports the development of the trade performance indicators component of the Asia-Pacific Trade and Investment Agreement Database (APTIAD).

- [Gravity Modeling Database](#)
- [Trade costs](#)
- [APTIAD](#)

# Outline

- Background of the initiative
- Possible applications
- Database demonstration

# Why did we develop this interface?

- To build trade research capacity , ARTNeT facilitates access to relevant trade and investment related databases and analytical tools.
- The online gravity interface was developed with an aim to make it easier for policy researcher to get started with gravity modeling for trade research

Available online and FREE at  
<http://www.unescap.org/tid/artnet/gravity.asp>

The screenshot shows a web browser window with two tabs: 'a-Pacific Resear' and 'UN ESCAP Asia-Pacific Resear'. The address bar displays 'www.unescap.org/tid/artnet/gravity.asp'. The page header includes navigation links: 'Home :: UNESCAP :: Site map :: Contact'. The main content area features the ARTNeT logo on the left, the title 'Asia-Pacific Research and Training Network on Trade', and the UN ESCAP logo on the right. A sidebar on the left lists navigation options: Home, About ARTNeT, ARTNeT Publications, Databases, Events, Training, Publication Search, and Useful links. The main content area highlights the 'Interactive Gravity Modeling Database' with a list of links: Tutorial, Login, and Register. Below this list is a paragraph describing the initiative's goals and a link for more information.

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### Interactive Gravity Modeling Database

- [Tutorial](#)
- [Login](#)
- [Register](#)

This initiative is designed to more closely integrate the research capacity building and research programme implementation objectives and activities of ARTNeT, particularly under ARTNeT priority Theme 1 (trade, investment and domestic policy coherence for inclusive growth). It includes regional technical research workshops, support for research studies to apply techniques learned, development of related research facilitation tools, and support for dissemination of policy relevant results. [More information on ARTNeT Gravity Modeling Initiative](#)

# Data coverage

- Various countries and time periods
- Exports and imports
- GDP, GDP p.c., growth, population
- Geographical, historical , and cultural links
- Cover some trade policy data:
  - Tariffs, trade credits, trade facilitation, logistics, infrastructure
  - Behind the border barriers
  - Aid for trade
- Can include FEs (exporter, importer, time)

# Example 1: Basic Regression

- Select “ARTNeT data on trade dataset”
  - Use for general analysis and for calculate trade potential
- Set the dependent (LHS) variable to  $\log(\text{exports})$
- Standard independent (RHS) variables
  - Partner and reporter GDP
  - Distance
  - Common official language, geographical contiguity, common colonizer
- Run the regressions and interpret the results



# Step 1 Choose a dataset

ARTNeT

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Useful links

Debapriya Batcharya  
Distinguished Fellow  
Centre for Policy Dialogue, Bangladesh

## Asia-Pacific Research and Training Network on Trade

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### ARTNeT Gravity Modeling Datasets

help

**1. ARTNeT Data on Trade (1994 - 2012)**

**Summary:** (Year: 1994 - 2012) - Basic Gravity Panel Dataset - Recommended use for estimation of TRADE POTENTIALS. (This dataset is prepared by Chorthip Utoktham and Zaw win Aung.)

[Use this data](#)

**2. ARTNeT Data on Trade Facilitation (2006)**

**Summary:** Year 2006; include trade facilitaiton and behind-the-border regulatory indicators. (This dataset is prepared by Yann Duval, Chorthip Utoktham and Ming Xu.)

[Use this data](#)

**3. ARTNeT Aid for Trade dataset (2002 - 2007)**

**Summary:** (Year: 2002 - 2007) Time series data in constant 2007 US Dollars extracted from OECD Creditor Reporting System for the years 2002 to 2007. (This dataset is prepared by Nadim Schumann)

[Use this data](#)



# Step 2 Choose variables

## ARTNeT Gravity Modeling Analysis Tool

[Filter data](#) [Export data to excel file](#) [Select another dataset](#)

### Select dependent variable

In\_export\_value

### Choose independent variables [data description](#)

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> In_export_value            | <input type="checkbox"/> In_us_gdp_growth                | <input type="checkbox"/> In_us_gdp_growth_jagged |
| <input type="checkbox"/> In_jp_gdp_growth           | <input type="checkbox"/> In_jp_gdp_growth_jagged         | <input type="checkbox"/> In_cn_gdp_growth        |
| <input type="checkbox"/> In_cn_gdp_growth_jagged    | <input type="checkbox"/> In_in_gdp_growth                | <input type="checkbox"/> In_in_gdp_growth_jagged |
| <input checked="" type="checkbox"/> In_reporter_gdp | <input checked="" type="checkbox"/> In_partner_gdp       | <input checked="" type="checkbox"/> In_distance  |
| <input checked="" type="checkbox"/> dum_contiguous  | <input checked="" type="checkbox"/> dum_comlang_official | <input type="checkbox"/> dum_comlang_ethno       |
| <input type="checkbox"/> dum_colony_link            | <input checked="" type="checkbox"/> dum_com_colonizer    | <input type="checkbox"/> dum_cur_colony          |
| <input type="checkbox"/> dum_col_aft_1945           | <input type="checkbox"/> dum_same_ctry                   | <input type="checkbox"/> In_otc_rpt              |
| <input type="checkbox"/> In_otc_par                 | <input type="checkbox"/> In_otc_by_ex_rpt                | <input type="checkbox"/> In_otc_by_ex_par        |
| <input type="checkbox"/> In_otc_by_gdp_rpt          | <input type="checkbox"/> In_otc_by_gdp_par               |  |

### To add fixed effect dummies

- reporter dummies
- partner dummies
- year dummies

check for **no intercept**

 **Run Regression**

# Step 3 Define the sample

## Asia-Pacific Research and Training Network on Trade



### ARTNeT Gravity Modeling Analysis Tool

To filter dataset

Reporter:

<input checked="" type="checkbox"/>	Armenia	▲
<input checked="" type="checkbox"/>	Australia	☰
<input checked="" type="checkbox"/>	Austria	
<input checked="" type="checkbox"/>	Azerbaijan	
<input checked="" type="checkbox"/>	Bangladesh	
<input checked="" type="checkbox"/>	Belgium	
<input checked="" type="checkbox"/>	Brazil	
<input checked="" type="checkbox"/>	Brunei	
<input checked="" type="checkbox"/>	Cambodia	▼

Partner:

<input checked="" type="checkbox"/>	Armenia	▲
<input checked="" type="checkbox"/>	Australia	☰
<input checked="" type="checkbox"/>	Austria	
<input checked="" type="checkbox"/>	Azerbaijan	
<input checked="" type="checkbox"/>	Bangladesh	
<input checked="" type="checkbox"/>	Belgium	
<input checked="" type="checkbox"/>	Brazil	
<input checked="" type="checkbox"/>	Brunei	
<input checked="" type="checkbox"/>	Cambodia	▼

Year:

<input checked="" type="checkbox"/>	1994	▲
<input checked="" type="checkbox"/>	1995	☰
<input checked="" type="checkbox"/>	1996	
<input checked="" type="checkbox"/>	1997	
<input checked="" type="checkbox"/>	1998	
<input checked="" type="checkbox"/>	1999	
<input checked="" type="checkbox"/>	2000	
<input checked="" type="checkbox"/>	2001	
<input checked="" type="checkbox"/>	2002	▼

➡ Apply filter

# Step 4 Getting your (OLS) results

 Run Regression

## Regression Statistics

R Square	0.757465
Adjusted R Square	0.757438
Standard Error	1.909805
Observations	55273

## ANOVA

	DF	Sum of Squares	Mean Square	F	Significance F
Regression	6	629539.790483	104923.298414	28766.956087	0
Residual	55266	201574.716230	3.647355		
Total	55272	831114.506713			

## Parameters

(Intercept)	-11.7729	0.10808	-108.927882	0
ln_reporter_gdp	1.14452	0.004111	278.432163	0
ln_partner_gdp	0.97735	0.003275	298.453318	0
ln_distance	-1.12773	0.009933	-113.533961	0
dum_contiguous	0.60628	0.044736	13.552410	0
dum_comlang_official	0.94801	0.029243	32.418178	0
dum_com_colonizer	1.40568	0.045487	30.902613	0

## Example 2: Trade potential

- Calculate estimated to actual trade ratios for the following country pairs:
  - Exports from Thailand to USA for 2011, and averaged over 1994-2011
  - Exports from USA to Thailand for 2011, and averaged over 1994-2011

Choose countries and years for trade potential estimation.

Reporter:

- Sri Lanka
- Sweden
- Switzerland
- Tajikistan
- Thailand
- Tonga
- Turkey
- Turkmenistan
- United Kingdom

Partner:

- Thailand
- Tonga
- Turkey
- Turkmenistan
- United Kingdom
- United States
- Uzbekistan
- Vanuatu
- Vietnam

Year:

- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011

➔ **Generate estimation** for In\_export\_value

**note** 

Reporter	Partner	year	Actual	Predicted	Estimated to Actual Trade Ratio
Thailand	United States	1994	9,516.585	642.579	0.07
Thailand	United States	1995	10,068.099	801.656	0.08
Thailand	United States	1996	10,027.076	926.402	0.09
Thailand	United States	1997	11,439.253	795.389	0.07
Thailand	United States	1998	12,150.818	597.048	0.05
Thailand	United States	1999	12,659.633	704.788	0.06
Thailand	United States	2000	14,724.806	749.693	0.05
Thailand	United States	2001	13,169.936	722.787	0.05
Thailand	United States	2002	13,506.536	831.916	0.06
Thailand	United States	2003	13,671.640	995.027	0.07
Thailand	United States	2004	15,502.663	1,217.181	0.08
Thailand	United States	2005	17,024.771	1,433.163	0.08
Thailand	United States	2006	19,646.952	1,822.940	0.09
Thailand	United States	2007	19,372.064	2,336.024	0.12
Thailand	United States	2008	20,097.781	2,662.313	0.13
Thailand	United States	2009	16,684.693	2,506.853	0.15
Thailand	United States	2010	20,230.266	3,230.113	0.16
Thailand	United States	2011	21,891.200	3,679.463	0.17
Thailand	United States	average	15,076.932	1,480.852	0.09

# Example 3: Trade projection

- Using 2011 as the base year, calculate trade projections for:
  - Thailand's exports to Cambodia, China, Indonesia, India, and Japan, based on an expected 2% fall in reporter and partner GDP
  - Thailand's exports to USA, Canada, Germany and Japan, based on expected 1% fall in international transport costs

### Set condition for trade projection.

In_reporter_gdp	<input type="button" value="change condition"/>	2 % Decrease
In_partner_gdp	<input type="button" value="change condition"/>	2 % Decrease
In_distance	<input type="button" value="change condition"/>	no specific condition set, same values from based year will be used.
dum_contiguous	<input type="button" value="change condition"/>	no specific condition set, same values from based year will be used.
dum_comlang_official	<input type="button" value="change condition"/>	no specific condition set, same values from based year will be used.
dum_com_colonizer	<input type="button" value="change condition"/>	no specific condition set, same values from based year will be used.

Select reporter :   Select based year :

Select partners

<input type="checkbox"/> Armenia	<input type="checkbox"/> Australia	<input type="checkbox"/> Austria	<input type="checkbox"/> Azerbaijan
<input type="checkbox"/> Bangladesh	<input type="checkbox"/> Belgium	<input type="checkbox"/> Brazil	<input type="checkbox"/> Brunei
<input checked="" type="checkbox"/> Cambodia	<input type="checkbox"/> Canada	<input checked="" type="checkbox"/> China	<input type="checkbox"/> Czech Republic
<input type="checkbox"/> Denmark	<input type="checkbox"/> Fiji	<input type="checkbox"/> Finland	<input type="checkbox"/> France
<input type="checkbox"/> Georgia	<input type="checkbox"/> Germany	<input type="checkbox"/> Greece	<input type="checkbox"/> Hong Kong, China

for **In\_export\_value**

Reporter	Partner	Prediction under new conditions	Predicted value of based year	Difference between new prediction and based year value
Thailand	Cambodia	256.048	267.262	-11.215
Thailand	China	8,872.000	9,260.590	-388.590
Thailand	India	2,691.853	2,809.755	-117.902
Thailand	Indonesia	1,608.819	1,679.284	-70.466
Thailand	Japan	4,906.008	5,120.890	-214.881



# Example 4: Trade effects of tariffs

- Select “trade facilitation dataset”
  - Use for general analysis and to calculate trade potential
- Set the dependent (LHS) variable to  $\log(\text{exports})$
- Independent (RHS) variables
  - Partner and reporter GDP per capita
  - Partner and reporter populations
  - Distance
  - Common language, geographical contiguity, colony, common colonizer
  - Simple avg tariffs in the partner (importing) country
- Run the regressions and interpret the results
- Analyze trade impact of a 5% cut in tariffs

# Value of the interactive tool

- Easy for policy researcher to get started with gravity
- A wide variety of downloadable trade-related data, in particular on trade facilitation
  - Saves researchers a lot of time and resources in terms of data collection and preliminary analysis
- Some extensions from the basic model are possible such as fixed effects
- A useful tool for getting a back-of-the-envelope answer to trade-related policy questions

**Thank you!**