International Trade: Assignment 1

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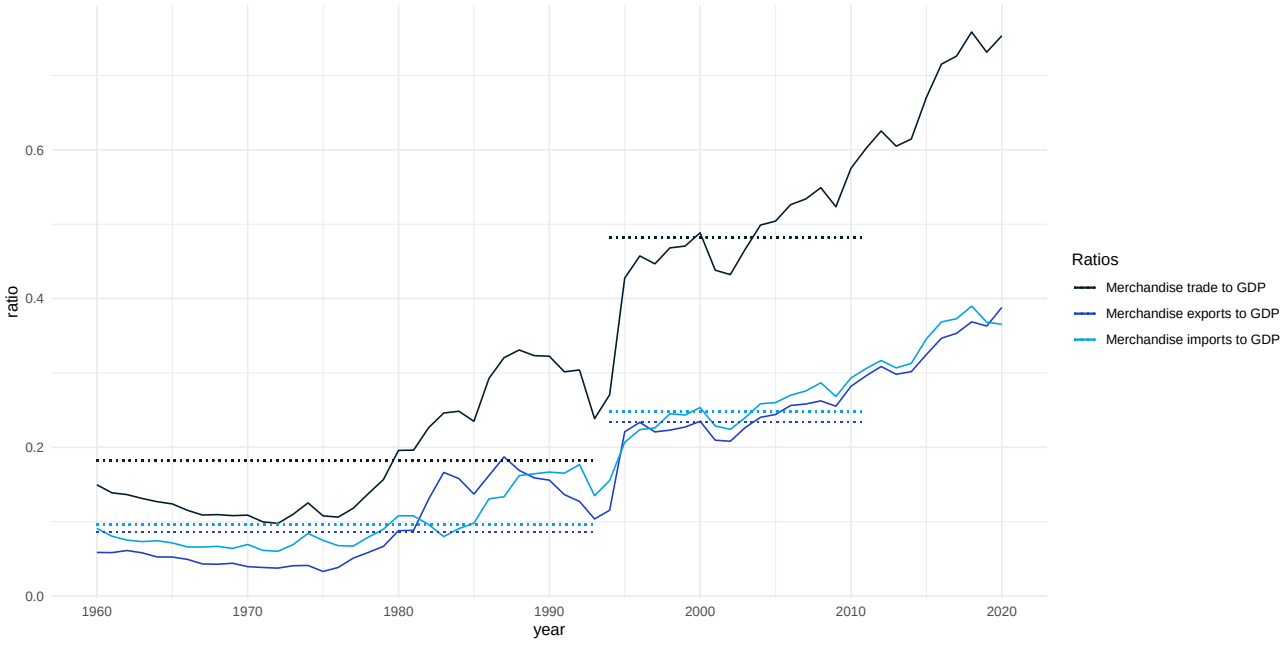
Patterns of trade[1]

[1] Data obtained from DataBank and WITS.

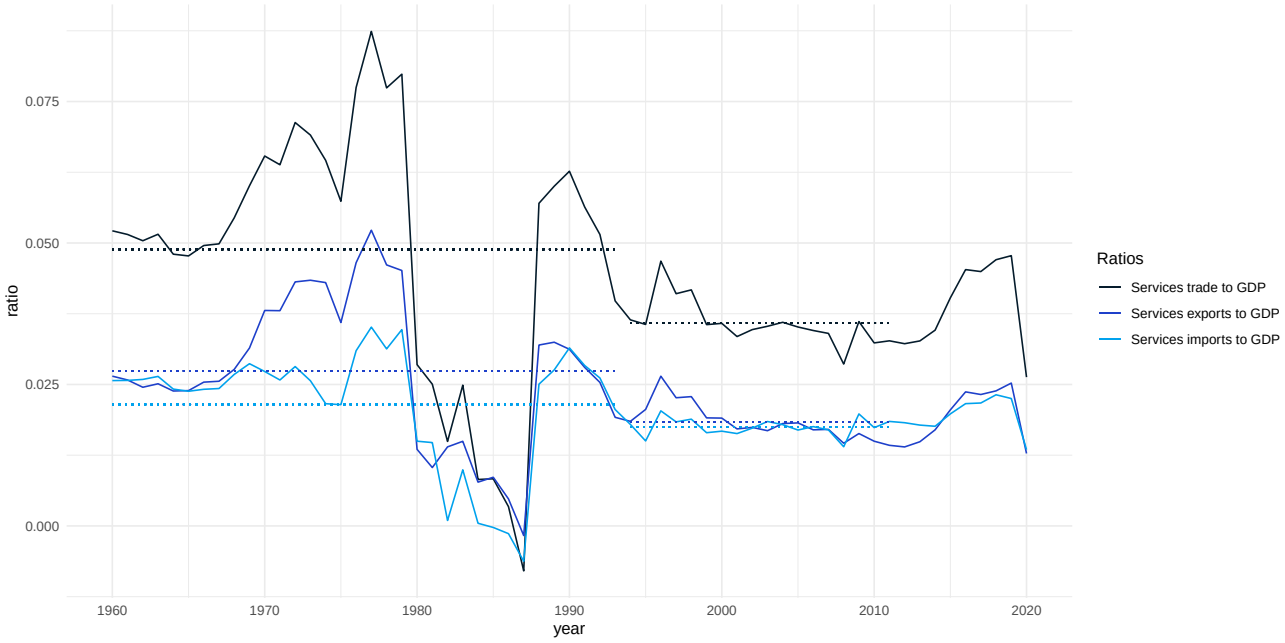
(a)

i. and ii.



- Merchandise trade to GDP ratio average before NAFTA: 0.1822774
- Merchandise trade to GDP ratio average after NAFTA: 0.4822469
- Merchandise exports to GDP ratio average before NAFTA: 0.0862539
- Merchandise exports to GDP ratio average after NAFTA: 0.2341628
- Merchandise imports to GDP ratio average before NAFTA: 0.0960235
- Merchandise imports to GDP ratio average after NAFTA: 0.2480841

iii.



- Services trade to GDP ratio average before NAFTA: 0.0488722
- Services trade to GDP ratio average after NAFTA: 0.0358815
- Services exports to GDP ratio average before NAFTA: 0.0274048
- Services exports to GDP ratio average after NAFTA: 0.0183926
- Services imports to GDP ratio average before NAFTA: 0.0214674
- Services imports to GDP ratio average after NAFTA: 0.0174889

(b)

i.

Table 1: Top 10 exported commodities in 1993

Trade value in $1000USD	Product
6485314	Petrol./bitum. oil,crude
4242559	Passenger cars etc
2779688	Electrical distrib equip
2013789	Motor veh parts/access
2008824	Electrical equipment nes
1774014	Television receivers
1719531	Telecomms equipment nes
1653492	Internal combust engines
1465697	Electric circuit equipmt
1226761	Vegetables,frsh/chld/frz

Table 2: Top 10 exported commodities in 2007

Trade value in $1000USD	Product
37937177	Petrol./bitum. oil,crude
20277045	Television receivers
18684439	Passenger cars etc
12146615	Telecomms equipment nes
11853225	Motor veh parts/access
8994584	Goods/service vehicles
8960076	Computer equipment
7780483	Electrical distrib equip
7301003	Electrical equipment nes
6322745	Electric circuit equipmt

ii.

Table 3: Top 10 imported commodities in 1993

Trade value in $1000USD	Product
2249819	Valves/transistors/etc
1976657	Electric circuit equipmt
1931746	Electrical equipment nes
1881474	Telecomms equipment nes
1837823	Articles nes of plastics
1806154	Base metal manufac nes
1745784	Electrical distrib equip
1084777	Computer equipment
1061950	Heavy petrol/bitum oils
970129	Special indust machn nes

Table 4: Top 10 imported commodities in 2007

Trade value in $1000USD	Product
15373515	Telecomms equipment nes
13886076	Heavy petrol/bitum oils
12302190	Motor veh parts/access
10141118	Electric circuit equipmt
9436330	Passenger cars etc
6569592	Valves/transistors/etc
6098386	Computer equipment
6096571	Optical instruments nes
5989200	Articles nes of plastics
5944279	Base metal manufac nes

iii.

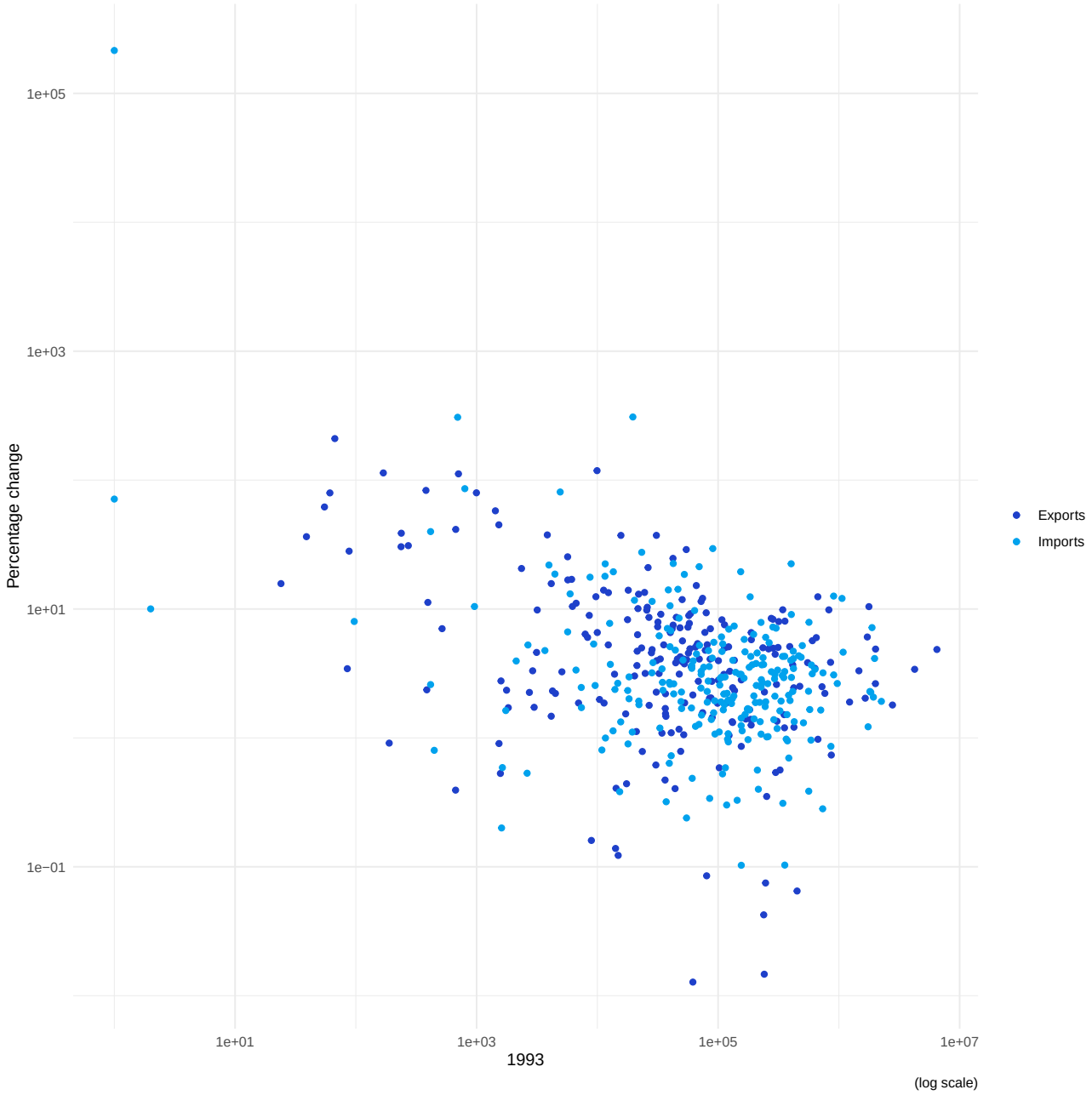
Table 5: Top 10 commodities that experienced greatest growth in exports

Product	Trade value in 1993	Trade value in 2007	Percentage change
Cheese and curd	67	14125.680	209.83104
Road motor vehicles nes	9942	1186586.096	118.35084
Tea and mate	169	19373.554	113.63641
Iron ore/concentrates	708	79841.827	111.77094
Flour/meal wheat/meslin	381	32065.129	83.16044
Pearls/precious stones	997	80428.061	79.67007
Rice	61	4910.652	79.50249
Butter and cheese	55	3457.157	61.85740
Prefabricated buildings	1431	84074.669	57.75239
Meat/offal presvd n.e.s	1529	70281.044	44.96537

Table 6: Top 10 commodities that experienced greatest growth in imports

Product	Trade value in 1993	Trade value in 2007	Percentage change
Precious metal ore/conc.	1	215157.058	215156.05800
Optical instruments nes	19685	6096571.468	308.70645
Iron ore/concentrates	697	214721.729	307.06561
Tobacco, manufactured	799	69334.933	85.77714
Coal non-agglomerated	4925	403015.007	80.83046
Silk	1	72.245	71.24500
Coin nongold non current	416	16992.294	39.84686
Natural gas	90370	2749684.017	29.42696
Nf base metal waste nes	23304	664650.037	27.52086
Knit/crochet fabrics	42507	1000009.364	22.52576

iv. and v.

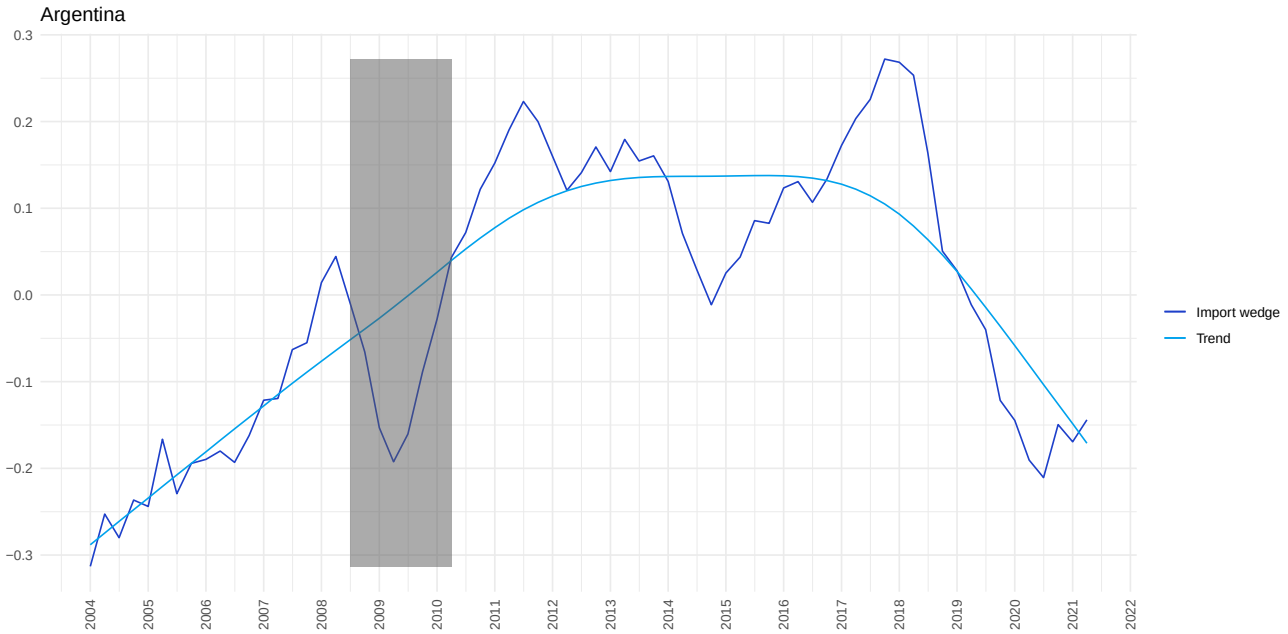


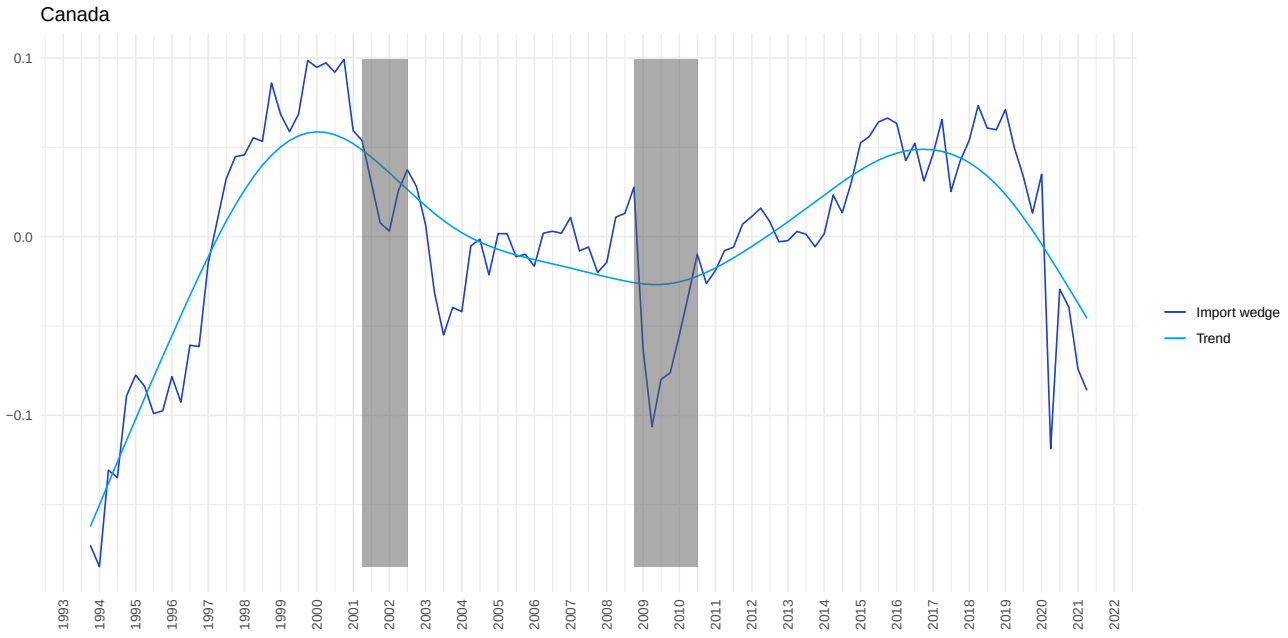
There is almost *no linear relation* between data obtained from 1993 and their percentage change to 2007 as shown with Pearson's r correlations. On the other hand, we can observe weakly **negative** monotonic and concordant relations with Spearman's ρ and Kendall's τ coefficients.

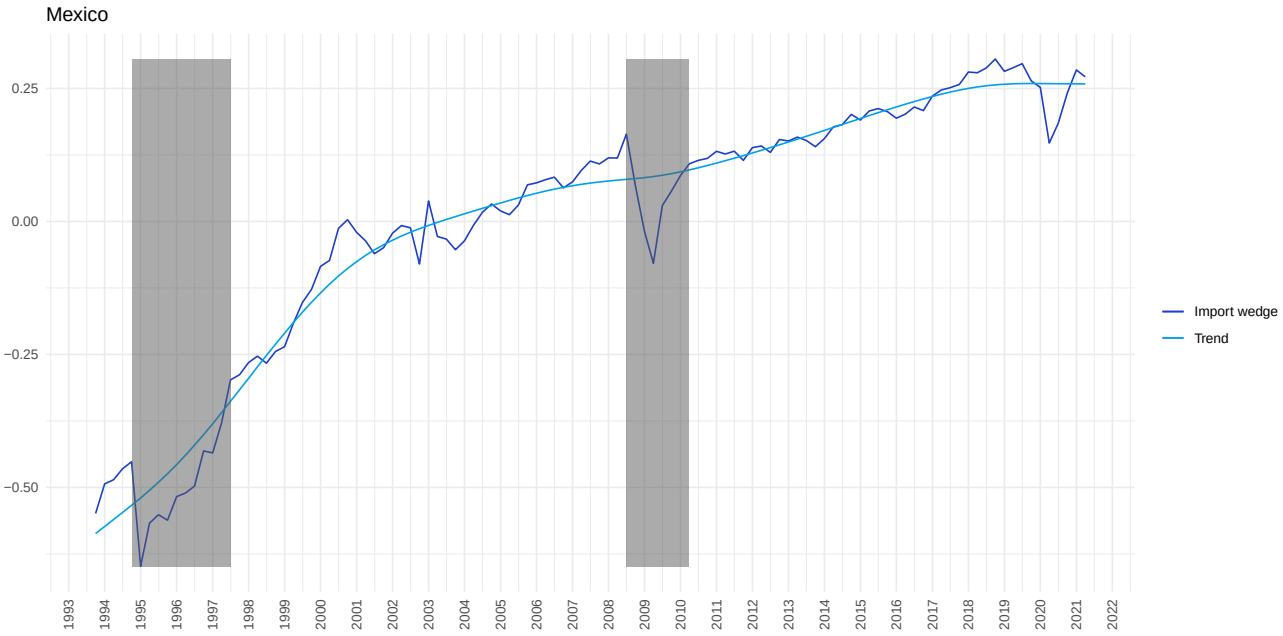
	Pearson's r	Spearman's ρ	Kendall's τ
Exports	-0.0847531	-0.176944	-0.127743
Imports	-0.0403417	-0.1013539	-0.068744

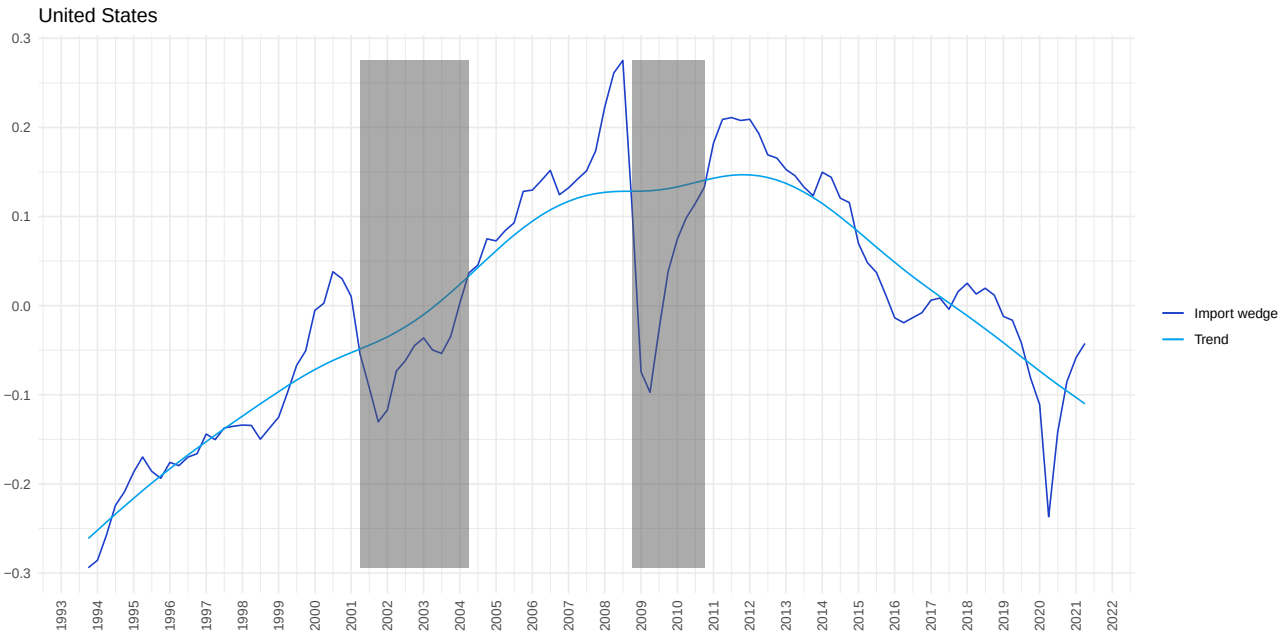
Export and import wedges[2]

[2] Data obtained from OECD









We computed the imports model prediction by the least squares method. Given

$$x_{t,m}^{\text{obs}} - y_t = \alpha_m + \sigma(p_t - p_{t,m}),$$

we can estimate

$$\begin{pmatrix} \hat{\alpha}_m \\ \hat{\sigma} \end{pmatrix} = \left(X^T X \right)^{-1} X^T Y$$

where $X = [\mathbf{1}, p - p_m]_{t \times 2}$ and $Y = \left[x_m^{\text{obs}} - y \right]_{t \times 1}$.

Thus, with our predictions $x_{t,m}^{\text{pred}} = X \cdot (\hat{\alpha}_m, \hat{\sigma})^T + y_t$, import wedges were defined as follows:

$$\tau_t = x_{t,m}^{\text{obs}} - x_{t,m}^{\text{pred}}.$$

Plus, we used the following variables:

$\log(\cdot)$	Data
p	GDP deflator
y	Volume of GDP
p_m	Imports deflator
x_m	Volume of imports

Remember that both the data and the estimate of α_m, $\hat{\alpha}_m$, are scaled logarithmically. Furthermore, the volumes of GDP and imports were measured at constant prices.

Mexican and Argentinian economies show a similar behavior around the financial crisis of 2008, since both present import wedges below the expected trend. On the other hand, it is interesting to analyze how Mexico's wedge in 1995 is below the trend while Argentina's wedge in 2018 is above its own. These two economies reacted differently towards their devaluations. It is also important to mention that the fall of the 1995 import wedge of Mexico is a fall from an increasing trend, while Argentina increases in its wedge, it is a higher import wedge from a decreasing trend.

See the **theoretical part** on the next page.

a) 2 countries h, f. 2 goods x, y. $i = h, f$

$$x_i = z_{xi} k_{ix}^{\alpha} l_{ix}^{1-\alpha}$$
$$y_i = z_{yi} k_{yi}^{\beta} l_{iy}^{1-\beta}$$

with $\beta > 0$, $\alpha > 0$

i) firms maximization problem. let prices be p_{xi}, p_{yi} and r_i, w_i price of l and k respectively

firm x

$$\max_{l,k} \quad p_{xi} z_{xi} k_{ix}^{\alpha} l_{ix}^{1-\alpha} - w_i l_{ix} - r_i k_{ix}$$

foc

$$[l_{ix}] \quad (1-\alpha) p_{xi} z_{xi} k_{ix}^{\alpha} l_{ix}^{-\alpha} = w_i$$
$$[k_{ix}] \quad \alpha p_{xi} z_{xi} k_{ix}^{\alpha-1} l_{ix}^{1-\alpha} = r_i$$

firm y

$$\max_{l,k} \quad p_{yi} z_{yi} k_{iy}^{\beta} l_{iy}^{1-\beta} - w_i l_{iy} - r_i k_{iy}$$

foc

$$[l_{iy}] \quad (1-\beta) p_{yi} z_{yi} k_{iy}^{\beta} l_{iy}^{-\beta} = w_i$$
$$[k_{iy}] \quad \beta p_{yi} z_{yi} k_{iy}^{\beta-1} l_{iy}^{1-\beta} = r_i$$

ii)

$$\frac{\alpha}{1-\alpha} k_{ix}^{-1} l_{ix}^{1} = \frac{r_i}{w_i}$$
$$\leftrightarrow \quad \frac{\alpha}{1-\alpha} \frac{l_{ix}}{k_{ix}} = \frac{r_i}{w_i}$$
$$\leftrightarrow \quad \frac{\alpha}{1-\alpha} \frac{w_i}{r_i} = \frac{k_{ix}}{l_{ix}}$$

Similarly we get

$$\frac{\beta}{1-\beta} \frac{w_i}{r_i} = \frac{k_{iy}}{l_{iy}}$$

iii) We know that in equilibrium firms make 0 profits therefore

$$p_{xi} z_{xi} k_{ix}^{\alpha} l_{ix}^{1-\alpha} - w_i l_{ix} - r_i k_{ix} = 0$$

$$\rightarrow p_{xi} = \frac{w_i l_{ix} + r_i k_{ix}}{z_{xi} k_{ix}^{\alpha} l_{ix}^{1-\alpha}}$$

On the numerator we have

$$(w_i l_{ix} + r_i k_{ix}) \frac{l_i}{l_i}$$

$$w_i l_{ix} + r_i \frac{k_{ix}}{l_{ix}} l_i$$

$$w_i l_{ix} + r_i \left(\frac{\alpha}{1-\alpha} \frac{w_i}{r_i}\right) l_i$$

$$w_i l_{ix} + \frac{\alpha}{1-\alpha} w_i l_i$$

$$w_i l_{ix} \left(1 + \frac{\alpha}{1-\alpha}\right)$$

$$\frac{w_i l_{ix}}{1-\alpha}$$

also we know that

$$x_i = z_{xi} k_i^{\alpha} l_{ix}^{1-\alpha} \cdot \frac{l_{ix}^{\alpha}}{l_{ix}^{\alpha}}$$

$$x_i = z_{xi} \left(\frac{k_i}{l_i}\right)^{\alpha} l_{ix}$$

$$x_i = z_{xi} \left(\frac{\alpha}{1-\alpha} \frac{w_i}{r_i}\right)^{\alpha} l_{ix}$$

$$p_{xi} = \frac{\frac{w_i l_{ix}}{1-\alpha}}{z_{xi} \left(\frac{\alpha}{1-\alpha} \frac{w_i}{r_i}\right)^{\alpha} l_{ix}}$$

$$p_{xi} = \frac{w_i l_{ix}}{(1-\alpha) z_{xi} \left(\frac{\alpha}{1-\alpha} \frac{w_i}{r_i}\right)^{\alpha} l_{ix}}$$

$$p_{xi} = \frac{w_i}{(1-\alpha) z_{xi} \left(\frac{\alpha}{1-\alpha} \frac{w_i}{r_i}\right)^{\alpha}}$$

Similarly

$$p_{yi} = \frac{w_i}{(1-\beta) z_{yi} \left(\frac{\beta}{1-\beta} \frac{w_i}{r_i}\right)^{\beta}}$$

Then

$$\frac{p_{xi}}{p_{yi}} = \frac{(1-\alpha) z_{xi} \left(\frac{\alpha}{1-\alpha} \frac{w_i}{r_i}\right)^{\alpha}}{(1-\beta) z_{yi} \left(\frac{\beta}{1-\beta} \frac{w_i}{r_i}\right)^{\beta}}$$

$$\frac{p_{xi}}{p_{yi}} = \frac{(1-\beta) z_{yi} \left(\frac{\beta}{1-\beta} \frac{w_i}{r_i}\right)^{\beta}}{(1-\alpha) z_{xi} \left(\frac{\alpha}{1-\alpha} \frac{w_i}{r_i}\right)^{\alpha}}$$

iv) What forces explain comparative advantages?

It depends on mainly 2 things, first which good uses one factor intensively this is (α, β) levels, and which factor is more abundant (K & L, endowments).

v) By FPE theorem by Samuelson, yes as long as they share the same Z and FIR doesn't occur.

References

DataBank. World development indicators. URL https://databank.worldbank.org/reports.aspx?source=world-development-indicators.

OECD. Organisation for economic co-operation and development statistics. URL https://stats.oecd.org/.

WITS. World integrated trade solution. URL https://wits.worldbank.org/WITS/.