Trade flows during the period 1950-1977 : Comparative Advantage, Bilateralism and Intra-Industry Trade during the Benelux and E.E.C. periods

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1. INTRODUCTION

About a quarter of a century ago[1], we started approaching trade flows, especially in the case of customs unions, by a share and shift method which can also be called spline.

We adjusted for each curve showing a given share of export from country i, to country j, a regression of the following type :

$$S_{i,j} = \sigma_{i,j} + \theta_{i,j} T + \theta'_{i,j} T' + u_{i,j} \qquad (1)$$

Where $S_{i,j}$ is country i's share in the import of country j^F and where $\sigma_{i,j}$, $\theta_{i,j}$, θ'_{ij} are parameters rends. The last 2 pertain to the whole period (T=1,2, ... ,n...N) and the final period (T=n+1, n+2, ...N) respectively.

We thus surmise a general trend, $\theta_{i,j}$ (a year) and a break in the trend after the first n years.

In a similar way, $S'^1_{i,j}$ is a country j's share in the export of country j to i (as a percentage of j's total export) and we have now :

$$S'_{i,j} = \sigma^*_{i,j} + \theta^*_{i,j} T + \theta^{*'}_{i,j} T' + u_{i,j} \qquad (2)$$

Using this approach, we shall investigate the following questions :
1. How strong is trade cration inside a customs area ?

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[1] in H. GLEJSER, « The respective impacts of relative income, price and technology changes, U.S. foreign investment, the E.E.C. and EFTA on the American balance of payments », in H. Glejser, « Quantitative Studies of International Economic Relations », North Holland, Pr. Co. Amsterdam, 1976.

2. How strong is trade division or rather induced integration i.e. the increase in the relative trade of a few countries, similar in development to the custom union. If it is strong something like a second customs area is being created alongside the first one.
3. What theory of international trade - comparative advantage, bilateralism or intra-sector trade is indicated by our analysis.

We successively analyze the following periods :
1. 1950 to 1958 : the pre. -E.E.C. (and also Benelux) period.
2. The period 1959 to 1972 : the first E.E.C. (with 6 members)
3. The period 1973 to 1977 : the second E.E.C. with 9 countries (essentially plus the U.K.).

2. **THE FIFTIES AND SIXTIES**

A. *Shares of U.S. import*

The calculated share of the six founders in U.S. import in 1950 ($\sigma_{6,U.S.}$) was extremely[2] low : between 6.8 and 7.5 % - i.e. less than a quarter of Canada's share (23.5 %). Italy and France were lowest : 0,9 % and 1 %, about two thirds of Australia or Japan in Table 1.

As from 1950, to 1958 the $\theta_{i, U.S.}$ was positive almost everywhere, from Europe and Japan, particular for Japan, W. Germany and the U.K. The coefficients were however low or negative for Belgium and the Netherlands (diversion by the Benelux) and also negative for Australia and Canada from which war deliveries had been switched to the war-front in the forties and early fifties. We can surmize that either U.S. import did not rise much from Latin America, Asia (outside Japan) and Africa and in Eastern Europe or went down there.

The change that came about around 1958 was more dramatic especially outside the E.E.C. : for Japan, $\theta + \theta'$ was estimated at 0.75 % a year and Canada's at 0.52 % : this is considerably more in absolute valve than the highest figures for the E.E.C. : + 0.22 % for Germany, -0.10 for Italy, -0.05 for Belgium and France.

Thus import from Germany to the U.S. rose after the E.E.C. The decline in other members' trade was very small.

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[2]   H. Glejser, estiates of Trade effects of Portugal's and Spain's entry to the European Union, De Economist 144, n°2, 1996.

Induced trade surpased for U.S. trade diversion in Italy, France and even Germany etc. especially in Japan and Canada.

Summarizing, the U.S. import share increases yearly by θ + θ' (i.e. the trend after 1958), by 1.45 % a year because of induced trade with the three non - E.E.C. nations, by 0.32 % because of an increasing trend with Germany and Italy and by - 0.12 because of diversion in Belgium, France, the Netherlands and the other Efta countries.

There must thus be an enormous yearly loss by 1.65 % (= 1.45 % + 0.32 % - 0.12 %) in trade with other areas of the world as E.E.C. diversion was inexistent or even replaced by an astonishing creation (for Germany and Italy).

That the induced integration phenomenon in a few countries can be very large can be illustrated by Table 3.

Table 1 : Parameter estimates of the U.S. import shares as in equation (1)[3] in
1949, from 1950 to 1958 and from 1959 to 1972

	$\hat{\sigma}$	$\hat{\theta}$	$\hat{\theta}'$	$\hat{\theta} + \hat{\theta}'$	$\overline{R}^2$	D.W.
Belgium	1.7	0.12	-0.17	-0.05	0.55	2.06
		(4.70)	(-5.02)			
W. Germany	1.7	0.49	-0.27	0.22	0.96	2.02
		(11.25)	(-4.53)			
France	1.0	0.23	-0.28	-0.05	0.73	1.38
		(7.05)	(-6.10)			
Italy	0.9	0.17	-0.07	0.10	0.94	1.37
		(7.24)	(-2.07)			
The Netherlands	1.5	-0.03	0.02	-0.10	0.31	1.68
		(-2.23)	(1.38)			
E.E.C.[4]	(7.5)	(1.00)	(-0.77)	(0.23)	(0.73)	(1.86)
		(8.28)	(-4.85)			
U.K.	3.5	0.32	-0.32	0.00	0.73	1.43
		(5.93)	(-4.27)			
Other Efta countries	3.9	0.10	-0.11	-0.01	0.60	2.01
		(3.31)	(-0.27)			
Australia	1.5	-0.07	0.11	0.04	0.32	0.88
		(-1.70)	(2.32)			
Canada	23.5	-0.39	0.91	0.52	0.61	1.41

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[3]   The figures between brackets are the estimated standard errors.
[4]   Treated globally

Japan	1.4	(-2.19) 0.58 (5.59)	(3.70) 0.17 (1.43)	0.75	0.98	2.42

Table 2 : Parameter estimates of the U.S. export shares in equations (2)

	$\hat{\sigma}*$	$\hat{\theta}*$	$\hat{\theta}'*$	$\hat{\theta}*+\hat{\theta}'*$ [5]	$\overline{R}^2$	**D.W.**
Belgium	2.0	-0.02 (-0.66)	0.04 (0.92)	0.02	0.01	2.05
W. Germany	2.0	0.66 (7.33)	-0.62 (-4.48)	0.04	0.83	1.33
France	2.3	0.21 (3.16)	-0.16 (-2.04)	0.05	0.63	1.84
Italy	2.2	0.15 2.07	-0.12 (-1.22)	0.03	0.29	1.20
Netherlands	1.7	0.16 (3.89)	-0.12 (-2.54)	0.04	0.72	1.81
Whole E.E.C.	8.3	1.63 (7.97)	-1.65 (-6.14)	-0.02	0.83	1.51
U.K.	5.1	0.22 (1.60)	-0.18 (1.11)	0.04	0.21	2.13
Other Efta countries	6.6	0.45 (2.32)	-0.29 (-1.30)	0.16	0.66	2.33
Australia	1.4	0.00 (0.00)	0.11 (2.57)	0.11	0.73	0.95
Canada	21.2	-0.24 (-0.99)	0.64 (1.95)	0.40	0.64	1.00
Japan	4.2	0.41 (3,39)	0.13 (0.74)	0.54	0.79	1.93

Table 3 : Induced integration figures outside the E.E.C. (1951-1972)

	$\hat{\theta}$	$\hat{\theta}'$	$\hat{\theta}+\hat{\theta}'$	$\overline{R}^2$
Australia from Japan	0.16 (0.83)	0.87 (3.61)	1.03	0.94
Canada from Japan	0.17 (2.95)	0.07 (0.87)	0.24	0.88
Canada from US	-1.04 (-5.87)	1.41 (5.94)	0.37	0.68
U.S. from Japan	0.58	0.17	0.75	0.98

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[5] For all countries, the sign is positive i no diversion of U.S. export. For import there were 4 (small) negative coefficients out 10 of but the sum of the six positive coefficients was even larger that of the 10 there (1.65 as against 1.43 here). The negative coefficients of Table 1 summed up to -0.21). The similarity between 1.43 and

1.42 (1.63 - 0.21) is remarkable. Note that the sum of the $\hat{\sigma}'$s is larger for export than import (48.7 as against 40.6)

	(5.54)	(1.43)		

Before discussion the correlation of the Tables, let us present the interpretation of the possible results :

(1) $\rho_{\sigma,\sigma*} > 0$ bilateralism (in the past)
(2) $\rho_{\sigma,\sigma*} \leq 0$ comparative advantage (in the past)

(3) $\rho_{\sigma,\theta} > 0$ intra-trade or bilaterslism
(4) $\rho_{\sigma,\theta} \leq 0$ comparative advantage (recently)

(5) $\rho_{\theta,\theta*} > 0$ bilateralism (recently)
(6) $\rho_{\theta,\theta*} \leq 0$ comparative advantage

Table 4 : Shares (%) in the impors of Australia, Canada, Japan and the U.S.A.[6] (induced integration)

Australia from	I^b	$\hat{\sigma}$	$\hat{\theta}$	$\hat{\theta}'$	$\overline{R^2}$	D.W.
Canada	1958	4.28	-0.19 (-1.47)	0.32 (2.03)	0.300	2.12
Japan	1959	1.65	0.16 (0.83)	0.87 (3.61)SS	0.936	1.54
U.S.	1958	11.70	0.31 (0.87)	0.75 (1.78)	0.888	1.51

Canada from	I^b	$\hat{\sigma}$	$\hat{\theta}$	$\hat{\theta}'$	$\overline{R^2}$	D.W.
Australia	1960	0.48	0.02 (1.17)	0.01 (0.20)	0.284	1.45
Japan	1960	0.17	0.17 (2.95)SS	0.07 (0.87)	0.882	0.69
U.S.	1960	76.30	-1.04 (-6.09)SS	1.41 (5.94)SS	0.650	0.68

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[6]   Figures in parentheses are r-values, S means significant at the 5 % level, and SS significant at the 1 % level.

$\overline{R^2}$ is the determination coefficient corrected for the loss of degrees of freedom. I^b is the start of the second period.

Japan from	I^b	$\hat{\sigma}$	$\hat{\theta}$	$\hat{\theta}'$	$\overline{R^2}$	D.W.
Australia	1958	5.85	0.29 (2.16)	-0.28 (-1.72)	0.237	1.62
Canada	1958	5.76	-0.27 (-5.87)SS	0.34 (6.17)SS	0.659	1.85
U.S.	1960	34.50	0.03 (0.09)	-0.94 (-2.45)S	0.740	2.11

U.S. from	I^b	$\hat{\sigma}$	$\hat{\theta}$	$\hat{\theta}'$	$\overline{R^2}$	D.W.
Australia	1958	1.50	-0.07 (-1.76)	0.11 (2.32)S	0.317	0.88
Canada	1960	23.50	-0.39 (-2.19)SS	0.91 (3.70)SS	0.606	1.41
Japan	1958	1.40	0.58 (5.59)SS	0.17 (1.43)	0.983	2.42

The rang correlation (Spearman) between $\hat{\sigma}$ and $\hat{\sigma}*$ in Table 4 is negative (-0.41), it is not significant and indicates measures now let us look at tables 1 and 2 old (nonsignificant) bilateralism. The only similarities in ranking are for Canada (ranks 1 and 1) and the U.K. (ranks 2 and 3). Those where trade flows relatively little affected by the war operations.

After 1950, we notice a reshifting : the rank-correlation between $\hat{\sigma}$ and $\hat{\theta}$ is -0.41 marking the return of most European countries toward a larger share and also the effect of comparative advantage.

The rank correlation between $\hat{\theta}$ and $\hat{\theta}*$: 0.72 with standard error 0.31 (according to the formula[7] $\sigma_\rho = \dfrac{1}{\sqrt{n-1}}$). The rank correlation between $\hat{\theta}'$ and $\hat{\theta}*$: 0.84 with standard error 0.31.

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[7] See G. Yule and M. Kendall : « An introduction to the theory of statistics, 1953, p. 455.

The rank correlation between $\hat{\theta}+\hat{\theta}'$ and $\hat{\theta}*+\hat{\theta}*'$: 0.71 with same standard error 0.31.

All three correlations are statistically significant at the 5 % confidence level. They indicate recent bilateralism. The exception are rather small liberal European countries - Belgium, France, other Efta and the Netherlands against nations like Japan, Canada, Germany, the U.K. and Australia where negativity (i.e. comparative advantage) dominates.

B.   *Shares in U.S. export*

The conclusions (in table 2) are very similar to those we obtained for U.S. import (Table 1) : after 1950, the in U.S. export share grew by 0.54 (0.41+0.13) in the case of Japan, by 0.40 in the case of Canada and by 0.11 in the case of Australia. the only considerable increase inside Europe was the group of non-U.K. Efta countries : 0.16.

For the U.K. and the rest of the E.E.C., the coefficients are also all positive but very small : 0.05 for France, 0.04 for Germany, the U.K. and the Netherlands and 0.03 for Italy. It is again clear that induced integration took place (especially with Japan and Canada) without any clear diversion from E.E.C. and Efta countries. Diversion must then have occurred in the four geographic - political areas mentioned before (Latin America, Africa, Eastern Europe and Asia). One sector where import and export to Europe and Canada went up in relative terms was agriculture especially trade with France, Germany, and Canada[8] (see Table 3). It must be that the rise here happened again at the expense of agricultural trade with the other areas.

C.   *Trade between Australia, Canada, Japan and the U.S. before and   after the start of E.E.C.*

To investigate induced integration, i.e. the large increase in mutual trade between a small number of countries excluded from customs union, we shall calcultate the values of $\theta* + \theta'*$ in the trade with each other in Table 4.
The highest figures show for the import of the smallest country here Australia from the U.S. (1.06) and Japan (1.03) - the largest in this exercise. Then follow : Japan from the U.S. (0.75), Canada from the U.S. (0.52), the U.S. from Canada

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A t- test would yeld a value of 3.07 which is significant at the 1 % level (ibidem).
[8]   It seems that the CAP favoured the production of meat and dairy products necessitated more cereal import from the U.S.

(0.37) etc the lower being Canada from Australia (0.03) and Australia from Japan (0.01).

The increase is largest for large exporters (U.S. and Japan) but tends to be also considerable for small importers - cfr Australia from the U.S. and Japan and Canada from the U.S.

Note that the 12 sums of the estimated $\theta^* + \theta^{*'}$ are positive. Yet five in twelve of the θ, the trend before the E.E.C. are negative(by far the lowest is -1.04) : a further « detricotage » could have probably prevented the birth of NAFTA thirty years later.

Table 4 shows a clear increase of the parameters i.e. for induced integration after the start of E.E.C. : ten coefficients in 12 are positive of which five are significant. This is very different from $\hat{\theta}$, before the European customs union, for which only 7 coefficients are positive and only two significantly so (3 are negatively significant)[9]. There has been a general acceleration after the E.E.C. started especially Canada from the U.S. (1.41 as against 1.04 before) and U.S. from Canada (0.91) and Japan from Australia (0.86).

If we now look for evidence on comparative advange or, on the contrary either intra-industry or bilateralism in 1950 by rank correlating the $\hat{\theta}$'s in the two directions in Table 4, we obtain $\rho = -0.15$ which does not differ from zero (thus rather comparative advantage). The only pairs pointing out to a positive correlation in the set are : Canada and the U.S. ; Australia and the U.S.; and perhaps Australia and Canada. Japan stands outside this short list of positive correlations of σ and σ^* after the war - contrary to the three allies which showed some bilateralism.

We now test for differences in $\hat{\theta} + \hat{\theta}^*$ in export and import of the four Pacific countries (six flows in each direction again).

We obtain a negative rank correlation of -0.49, which is nonsignificant but is essentially due to the negative correaltion between the U.S. and Japan (-0.94 and 0.75). However there is a positive link for the U.S. and Canada (0.37 and 0.07) and Australia and Canada (0.13 and 0.03) : again small countries, especially Canada, dominate this grouping of positive links between additional export and import whereas the two large nations exhibit strong negative links.

But all in all, negativity dominates i.e. an indication of comparative advantage.

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[9] $\hat{\theta}$ and $\hat{\theta}'$ are both positive in 5 cases in 12 : the highest values are Australia from Japan and the U.S. : and Japan from the U.S. - which shows or reconstruction of the Japanese economy early oriented towards the Pacific except Canada. Note also the negative value of $\hat{\theta}'$ for Japan from U.S.

3. FROM THE BENELUX TO THE E.E.C. WITHOUT AND WITH THE U.K.

The first sections were devoted to the E.E.C and Efta members and to the main outsiders. We thought however that some lessons could be learned for a previous customs union : the Benelux which started a decade before the E.E.C (6 members - including the 3 Benelux countries) - which would become 9 as of 1973 when the U.K., Denmark and Ireland joined.

Table 5 presents the main results from our regressions : $\hat{\sigma}$ is as before, $\hat{\theta}$ pertains to the pure Benelux period, $\hat{\theta}'$ to the E.E.C. period (1959-1972) and $\hat{\theta}''$ to the E.E.C. of 9 from 1973 to 1977.

Belgium and the Nethelands differ greatly in their $\hat{\theta}$: Belgium is the main origin of goods of the Netherlands in 1950 but the U.S. comes first for Belgium. As to exports Germany comes first for the Netherlands whereas the Netherlands lead the way for Belgian export.

The rank correlation of the σ 's - import and export amounts to 0.71 for the Netherlands and 0.66 Belgium. In view of the small numer of observation (6 for the Netherlands and 5 for Belgium) these results are non significant but weakly point out to past bilateralism.

The $\hat{\theta}$ and $\hat{\theta}'$ coefficient for the Netherlands and Belgium are generally impressive especially for Belgium import from the Netherlands (0.54 and 0.59). Yet all the results are overshadowed by the potentous come back of Germany after the war[10] (e.g. in the Belgian market) and to a much lesser extent of Italy and France. The brunt of trade diversion is borne by the U.K. and by the U.S. : Belgian export share to the U.S. declines by -0.49 while its import share from the U.S. falls yearly by -0.66.

When the E.E.C. (6 members) soars the trade diversion is between the Benelux-members. $\hat{\theta}'$ is particularly low for the import of Belgian from Holland (-0.59) whereas the fresh members usually benefit from the customs union. The U.S. and, the U.K. go on loosing.
As from 1973, the U.K. gains enormously whereas the others lose : the losses of Germany are most impressive. Notice that the sum of three coefficient for the U.K. is always positive (e.g. 0.25 in the import of Belgium) : this contracts with

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[10] Germany is first in all four rankings of Table 5. It probably accounts for the value zero of $\hat{\theta}$ in the first line of Table 5 (Netherlands from Belgium).

Table 5 : Results for the Trade shares of Benelux

A. Import of the Netherlands from :						
	$\hat{\sigma}$	$\hat{\theta}$	$\hat{\theta}'$	$\hat{\theta}''$	$\overline{R}^2$	D.W.
Belgium	18.4	0.00	-0.05	-1.10	0.99	1.92
Germany	12.0	1.00	-0.47	-1.46	1.00	1.96
France	4.1	-0.13	0.50	-0.64	0.99	1.79
Italy	1.2	0.21	-0.01	-0.39	1.00	1.82
U.K.	9.9	-0.27	0.10	0.42	1.00	1.70
U.S.	11.5	0.10	-0.32	0.17	1.00	2.01
Rest of the World	42.9	-0.91	0.25	3.00		

B. Import of Belgium from :						
	$\hat{\sigma}$	$\hat{\theta}$	$\hat{\theta}'$	$\hat{\theta}''$	$\overline{R}^2$	D.W.
the Netherlands	10.4	0.54	-0.59	-	0.84	2.20
Germany	7.5	1.02	0.52	-	0.98	1.94
France	8.6	0.26	0.12	-	0.88	1.07
U.K.	9.1	-0.11	-0.03	0.39	0.76	1.89
U.S.	15.9	-0.66	0.46	-	0.27	2.38
Rest of the World	48.5	-1.07	-.48			

C. Export of the the Netherlands to :						
	$\hat{\sigma}$	$\hat{\theta}$	$\hat{\theta}'$	$\hat{\theta}''$	$\overline{R}^2$	D.W.
Belgium	13.8	0.21	-0.32	0.20	1.00	2.02
Germany	15.0	0.48	0.52	-1.70	0.90	1.74
France	4.4	0.09	0.34	-0.58	0.93	1.79
Italy	1.2	0.23	-0.05	-0.35	0.99	1.79
U.K.	14.0	-0.42	0.17	0.53	0.99	1.86
U.S.	6.2	-0.09	-0.04	0.02	0.75	1.74
Rest of the World	46.4	-0.50	-0.70	1.88		

D. Export of Belgium to :						
	$\hat{\sigma}$	$\hat{\theta}$	$\hat{\theta}'$	$\hat{\theta}''$	$\overline{R}^2$	D.W.
the Netherlands	18.5	0.35	-0.26	-	0.41	1.59
Germany	6.1	0.71	0.37	-	0.95	1.68
France	8.6	0.12	0.69	-	0.91	1.60
U.K.	10.	-0.49	0.38	0.69	0.82	1.57
U.S.	7.6	0.28	-0.49	-	0.27	2.38
Rest of the World	49.2	0.97	-0.69			

Germany as said before and also the U.S. and Italy which has a negative sum of the two or three coefficients in all cases (e.g. -0.21 in the export shares of Belgium). The last three, France, the Netherlands and Belgium are mixed with a dominane of positive coefficients.

All in all, long term trends with the U.K., France, the Netherlands in Belgium has generally been upwards but always downwards with Germany the U.S. and Italy.

For the U.S. this is, of course, blatant trade diversion. But for Germany and Italy[11]. ? Could it be that the former became oriented more towards Central (Switzerland and Austria) and Northern and Eastern Europe ? Italy towards the Mediterranean world ? The integrated Benelux, the U.K. and France would represent the North West shib of Europe where economic integration would be at its highest as from 1973. Of course this should be checked by the trade between France and the U.K. etc and do not forget the soaring oil price.

We rank-correlated the $\hat{\sigma}$'s for both the trade flows with 6 (Netherlands) and 5 (Belgium) countries. We obtained $\rho = 0.71$ and $\rho = 0.40$. With such a small numbers of observations, none is significantly different from zero. The same exercise for θ and $\theta*$ yields : 0.88 and 0.60. O.88 is significantly different from zero. This all points to bilateralism.

For $\hat{\theta}'$ we obtain -0.03 and -0.10 and finally for $\hat{\theta}$ (Netherlands) : 0.66 - again of bilateralism;

What we find here is approach by the literature on the E.E.C. in general, which supports intra-industry trade close to bilateralism.

A last in Table 5 : are R² and D.W. correlated between export and imports ? The answer seems to be positive as we have for the R² of Belgium : 90 (significant) whereas the R² of the Netherlands are too close to call. As to the D.W. coefficients we have respectively 0.70 nd 0.37 : this could suggest using the S.U.R.E. method of estimation.

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[11] Italy is the only European country examined here that borders only on one E.E.C. country or with some generosity two. With some generosity again, the Netherlands, the U.K. and France border on three and Belgium and Germany on four. This is without counting Luxembourg which would add one unit to France, Belgium and Germany (now five). This consideration may shed some light on the Italian case but not on the German.

4.   <u>CONCLUSION</u>

There is plenty of evidence in our results yet it is often contradictory as far as choosing ONE theory of trade is concerned : comparative advantage and bilateralism come out most frequently[12].

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[12]   S. Moro and me found comparative advantage dominating in the case of Spain and Portugal (.... p. 30).