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A Brexit Hysteresis-Exercise: Relevant Bottom Lines and Prospective Price-Sensitivity Patterns in Current EU-UK Trade and Traffic Flows

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Abstract

In a period of sluggish economic growth, the Brexit saga adds additional uncertainty to trade issues, concluding half a century of troubled EU-UK experience. In the post-Brexit era, the UK will be the third external EU_27 partner after the USA and China. Especially inbound trade *(from the UK to the continent)* is bound to suffer from price-sensitivity effects if tariff-related barriers are activated. The dominant outbound leg to the UK shows more variety in the trade basket, but it remains doubtful whether the visible trade with the continent will reach a better balance, relative to services. This paper also assesses the automotive value chain *(cars versus components)* in order to add multi-national logistics as well. The period of observation since the June 23rd vote in 2016 is too short for empirical evidence on *economic hysteresis* in the *trade-creation-trade-diversion* paradigm. Yet, some indications of *trade deflection* are detected in a sequence of numerical steps. They suggest still speculative Brexit effects in the transition period over the next decade, including an impending hysteresis pattern of which the first signs are evidenced. This ground research offers an empirical scheme for a future statistical follow up of this interplay between trade and sovereignty.

JEL classification :F11, F13, F15
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1. Land of Soap and Sorry[1]

On June 23th 2016, the midnight update of the Brexit votes turned the balance from a neat ***'in'*** into a ***brEXIT-YES*** after the Cornwall votes and others from rural and coastal fishing areas came in. The effects on the financial markets were instant and benchmarking because in one night the mood tilted from an expected ***remain*** into a ***leave***. This span dropped the £/€-rating to 1.1, a quite stable minus 10%-record, the lowest over two decades after a top 1.7 in 2000, then already with warnings about Japanese investment (Brown, 2000).

[1] (Claessens 2017)

The asset outflow is not compensated by an upgraded rest fraction, though no over-all effects have been published as yet. Now that the first emotions have settled in a sour *morning-after feeling* on a *hard Brexit*, the question remains to which extent the famous night-of-the-proms-hymn *land of hope and glory* might switch into *land of soap and sorry*, or anyway a growing uncertainty with some *hope and worry!* In one of the first BBC overviews, end-of-July 2016, Martin Gilbert reported an outflow in post-Brexit trading of Aberdeen Asset Management of about £ 9 billion, a Brexit of 3% of its assets out of the UK though the market performance of the rest fraction improved. The volatility on financial market was said to concern especially commercial property in the upper-middle quartiles, but forecasts soon widened to a pending depression in the whole service sector, including banking. Experts claim that one quart of the British pre-Brexit GDP is related to the London City, with the value added of the maritime and transport sector only exceeding £ 10 billion. Within transportation, Ryanair's CFO Neil Sorahan predicted a *slowdown somewhat* depending upon Theresa May's margins to negotiate on the single market. Relocations in banking and insurance started in 2017 with beneficiary EU capitals such as Dublin, Paris, Amsterdam and Brussels. The magazines, newspapers and BBC produce better updates than this contribution which is confined to visible trade. The appointment of the French Barnier for the European Commission offers little chance for a Swiss *special treatment (i.e. within Schengen)* nor the Norwegian EEA as a solution at stake; even the Canadian CETA excludes services. Yet the UK could return to the EFTA, the free trade club of the *'outer seven'* that Britain left in 1973, to join the *'inner six'*, then the former European Economic Community for the call of the common market (Kissinger, 1979) . Some predicted before that these outer seven and the inner six would follow a diverging course (Kreinin, 1967 and Walsh and Paxton, 1971). To a certain extent they were right half a century later!

The question on which model is bound to appear after the ill-fated *opt-out* attitude and the other exception clauses, the UK could negotiate from Tatcher's '*money back'* one-liner (1993) at the time of the Maastricht-treaty up to the pre-Brexit Osborne-achievements. The referendum evidenced that even that final bid did not stand the polls. Nevertheless, this *not enough* did include an access to the unified market without the Euro and €-related monetary and fiscal rules, the free movement without immigration *(especially labour)* and a common safety policy without the eventual perspective of the *ever closer Union*. The latter appeared to be the saturation point in the hard but inevitable logic of hysteresis!

1.1 Hope but Worry

The British-English agony against any of these three items became almost enigmatic of what Great *(or small)* Britain is entitled to get more in negotiations without either paying a fair contribution or obtaining a *hard-Brexit* downgrade to basic WTO rules. On March 29th 2018, the BBC news reported '*one year to go'* in the UK-Brexit saga. It concluded a first stage in the negotiations, including most pending issues except trade, i.e. the divorce bill of about 39 billion £, the mutual migration of citizens and labour contracts and the legal status of the EU court of justice. The outcome of the eventual *not-so-free* trade deal remains unclear due to the link to the *'not-so-hard-border'* across the Irish island.

Now, one year later, the only 'yes-votes' applied to two extensions of that date. By March 2019, the MP votes against any deal seem to consolidate a kind of transition period, suggesting much trade-related research to update, including the intra-Ireland border issue *(backstop)*. The potential dismemberment or devolution of the UK means more than a matter of internal UK borders, in which prime minister Theresa May was initially eager to promise *practical solutions*. The Scottish prime minister Nicola Sturgeon replied (BBC, 2016) by blaming the political *irresponsibility* which tends to pull Scotland in '*unchartered political*

territory' and threatened to refuse *(by a new Scottish referendum)* '*bearing the burden of austerity against its will'*. Her interviews defined the Brexit-era as a period of '*uncertainty, upheaval & unpredictability'* against her legitimate claims of '*certainty, stability & maximum control on our own destiny'*; the latter concerns primarily the sectors related to universities, agri-business, democracy, human rights, solidarity, the economy in general and the co-partnership within EU rules under Sturgeon's antithesis '*influence⇔abide'*.

It eventually produced the request for referendum (69 votes against 59) on March 27th 2017 on the position of pro-EU Scotland and what eventually the ***U*** in the UK stands for. After a standstill on most issues for almost a full year, emotions sparked off again after the *hard-Brexit* thesis obtained the MP majority votes and PM May wrote her Brexit letter on March 28th 2017 in line with article 50 of the Lisbon treaty. Since then, the international press kept blaming the *soap & sorry* components in the public opinion, including the legitimate fear on the eventual trade consequences. The Scottish devolution thesis seems to have softened (but for how long?) and the intra-Ireland border took the lead as an issue at stake in any transitional *free-trade* debate, until the delivery date of this contribution when the British parliament voted against the deal with a 58 margin (286 votes against 344 votes) on the supposed day of leaving, 29th March 2019, improving yet from a 149-votes margin (242 against 391 votes) on February 13th, after the shocking 230 margin (202 against 432) on January 15th, the day that some newspapers quoted as 'mayday'. After this the British £ witnessed a new dip and the GDP is said to have lost some percentages.

1.2 Grand Totals from WTO

Currently, the UK service trade recovers from a 5% low in 2016 by a 6% export growth against 4% for imports. The latest WTO 2017 records mark a service surplus of $ 137 billion of which $ 120 is currently intra-EU. This fails to compensate the $ 200 billion deficit in merchandise trade, though UK exports recovered in part by 9% in 2017 to 445 billion $ from the dip of -11% in 2016. In the same period, imports rose at a minor rate of 2% in 2016 and 1% in 2017 to the current 644 billion $. These rough totals (in $) seem promising as they are confirmed by the last entries from Eurostat in 2018 (in €). The UK keeps improving its terms of trade because its extra-EU exports rise faster than imports. For the last release of Eurostat records (2018), the intra-EU flows with the UK stagnates with a negative trend setting in. Al this highlights the need for assessing the visible trade between the UK and the EU within the scope of the pending Brexit-related trade flipping.

2. The DOT Bottom Lines[2]

The extra-EU trade is subject to stagnating world trade (from US$ 18.2 trillion in 2012 down to US$ 16.2 in 2016 and up to 17.7 trillion $ in 2017). The 2018 growth estimates are down to only 3% in 2018 and forecasts even to a lower 2.6% in 2019. Yet the EU internal market keeps growing except for UK trade. Without the UK, the intra-EU_27 traffic now scores neatly above 3 trillion Euro (3,000 billion).

2.1 Direction of trade (DOT)

When assessing the direction of trade, the Brexit-effect starts numerically as a switch from an intra-EU traffic to extra-EU trade. Then, the UK becomes the third external-trade partner of the EU with almost half a trillion euro, i.e. 194 + 301 = 495 billion € *(the intra-EU arrivals and departures in Table 1)* or third after the USA and China. The totals of Table 1 *(update of*

[2] (Claessens, 2007 & 2017)

April 2019) portray two full years after the Brexit vote in June 2016, but are still with *the UK on board*. The four top-blocks concentrate on the extra-EU trade in volume *(million metric tons)* and value ***(billion Euro in bold)***. The EU external imports (M) and exports (X) both drop by the UK share which tends to diminish in volume terms but rises in €-value. Then, the share of the UK in the current intra-EU traffic (dep.= departures & arr.= arrivals) is transferred to the extra-EU trade, at least in this purely numerical procedure. It is clear that the current intra-EU departures from the UK *(reporting)* to the EU eventually become EU imports after the Brexit and vice versa; the intra-EU arrivals in the UK become EU exports, all of this contingent to the extent that Brexit itself does not change the trade parameters.

Table 1 : Evolution of Brexit-relevant totals, combining intra-EU traffic and extra-EU trade

DOT - Items	2008	2012	2014	2016	2017	+/- %	2018	+/- %
EU(M) volume	1 806	1 627	1 617	1 691	1 759	4.0	1 784	1.4
- of which UK	- 185	- 182	- 186	-159	-169	6.6	-170	0.6
+ intra-dep.UK	+ 121’	+ 112’	+ 111’	+107’	+107’	0.3	+108’	0.9
= M rest EU 27	1 742	1 556	1 543	1 639	1 697	3.5	1 723	1.5
EU(X) volume	536	616	641	669	696	4.1	683	-1.9
- of which UK	- 48	- 46	- 43	- 48	-53	10.3	- 51	-3.8
+ intra-arr.UK	+ 95”	+ 104”	+ 111”	+ 120”	+123”	2.1	+ 124”	0.8
= X rest EU 27	584	674	710	740	766	3.4	775	1.2
EU(M) €- value	**1 585**	**1 796**	**1 684**	**1 708**	**1 856**	**8.7**	**1 980**	**6.7**
- of which UK	**- 218**	**- 208**	**- 245**	**- 284**	**- 275**	**-3.4**	**- 269**	**-2.2**
+ intra-dep.UK	**+179°**	**+ 185°**	**+182°**	**+ 176°**	**+188°**	**7.3**	**+194°**	**3.2**
= M rest EU 27	**1 546**	**1 701**	**1 621**	**1 599**	**1 770**	**10.7**	**1 905**	**7.6**
EU(X) €- value	**1 309**	**1 684**	**1 703**	**1 745**	**1 879**	**7.6**	**1 956**	**4.1**
- of which UK	**-143**	**- 183**	**-198**	**-194**	**-205**	**5.7**	**-217**	**5.9**
+ intra-arr.UK	**+230***	**+ 258***	**+275***	**+290 ***	**+295 ***	**1.7**	**+ 301***	**2.0**
= X rest EU 27	**1 396**	**1 759**	**1 762**	**1 841**	**1 969**	**6.9**	**2 039**	**3.6**
volume arrivals	1 581	1 718	1 749	1 788	1 912	7.0	1 953	2.1
- of which UK	- 95”	- 104”	-111”	-120”	+123”	2.1	124”	0.8
= rest EU 27	1 486	1 614	1 638	1 668	1 790	7.3	1 829	2.2
vol. departures	1 593	1 716	1 739	1 762	1 877	6.6	1 903	1.4
- of which UK	-121’	- 112’	-111’	-107’	-107’	0.3	108’	0.9
= rest EU 27	1 472	1 604	1 628	1 655	1 771	7.0	1 795	1.4
arrivals value €	**2 665**	**2 771**	**2 855**	**3 029**	**3 276**	**8.2**	**3 446**	**5.2**
- of which UK	**-230***	**- 258***	**-275***	**-290***	**-295***	**1.7**	**301***	**2.0**
= rest EU 27	**2 435**	**2 513**	**2 580**	**2 738**	**2 980**	**10.9**	**3 145**	**5.5**
departures val.€	**2 739**	**2 840**	**2 936**	**3 110**	**3 347**	**7.6**	**3 518**	**5.1**
- of which UK	**-179°**	**- 185°**	**-182°**	**-176°**	**-188°**	**7.3**	**194°**	**3.2**
= rest EU 27	**2 561**	**2 655**	**2 754**	**2 934**	**3 159**	**7.7**	**3 324**	**5.2**

Notes: traffic is between EU member states only; trade is extra-EU; **value flows in billion € are in bold;** volume flows are in million metric tons; rest EU_27 = EU-28 without UK **.**

Over the past decade, EU volume imports dropped from 1806 million tons (EU-28) to 1723 million (EU_27) and exports rose from 536 to 775 million tons. In Euro terms, EU imports keep growing (1585 billion € in 2008 including the UK, and 1905 billion € in 2018 without the UK); EU_27 exports exceed the 2 trillion (2039 billion €). On the export legs, the value transfers of the intra-effect exceed the extra-effect, since the UK trade is still more tied to the EU than to the rest of the world. Initially, the intra-traffic totals simply drop by the UK-share, which is identified by the symbols “ and ‘ (for *tonnage trade)* and * and ° *(in €-value terms)*; these symbols are repeated in Table 1 in the relevant boxes of external trade. Since the intra-

EU market is growing at a steady pace, the benchmark of 3 trillion €, which was lost in 2016 by the Brexit corrections (° & *), is recovered by the EU_27 in the latest 2018 release.

2.2 Renewed Brexit Mercantilism?

The right column includes the annual %-changes for the last years after the 2016 vote but still before the eventual (but delayed) Brexit date. The expected *slam-dunk* did not happen as yet, but two major *predicted* changes are about to set on, as far as visible trade is concerned:

First, UK value exports beyond the EU grew by 5.7 % and 5.9% and expeditions to the EU_27 only by 1.7% and 2.0 % (*-mark). In tons, UK exports grew by 6% between 2016 and 2018, such that the dips since 2012 are compensated. UK imports from the rest-of-the-world drop in value (- 3.4 % and -2.2%) and are now below the 2012 total. Volume imports in tonnage rise only by 6.6 % and 0.6% which does not compensate the dip of 2016. Hence, the UK terms of trade improve because of the high-value export growth and cheaper imports. This produces a positive experience of the UK Brexit perspective, the more that the EU as a whole does not follow that pattern.

Second, the internal market *(rest EU_27)* keeps growing at a faster rate without the UK than with the UK *(the current EU-28).* This fuels the fear for *trade flipping* away from the EU. It may be retarded by the 'sunk costs' of existing value-chains (Franz, p. 7) though major relocations did already start (cf. infra 'coercivity' in Figure 2).

Of course, the Brexit dynamics will change the structure of both the internal market and the extra-EU trade. Table 1 suggests a trend in the EU-UK volume traffic with an inbound leg dominance in 2008 (UK> EU) which flipped to an outbound dominance (EU > UK) in 2017. There is no acceleration in 2018 as a whole but the inbound value trade shows some '*false peaks'* in January 2019, due to stockpiling in view of the *Brexit bug.* Table 2 evidences that this seems only relevant on the extra-EU trade and not (yet) on the internal market. In value terms, the outbound dominance (EU>UK) consolidates in spite of the lower growth (1.7% and 2% of EU expeditions to the UK) compared to inbound (7.3% and 3.2% of EU arrivals from the UK). If this trend holds on, the current visible trade surplus in favour of the continent will drop, the dominant leg (EU>UK) may lose relative weight such that both trade legs become a bit more balanced. This means fewer trucks with more backloads on ferries and short-sea sailing and with a lesser impact of the *dominant leg*.

Table 2: Imports in January from EU28 (extra and intra) into the UK, the EU28 and the Euro area

From EU28 (extra):	Jan. 2017	Jan. 2018	(2018/17)	Jan. 2019	(2019/18)	(2019/17)
to UK	21 864	24 592	12.5 %	26 432	7.5%	20.9 %
to EU28	158 541	171 848	8.4 %	178 524	3.9%	12.6%
to Euro area	119 678	127 200	6.3 %	131 016	3.0%	11.0%
From EU28 (intra)	Jan. 2017	Jan.2018	(2018/17)	Jan. 2019	(2019/18)	(2019/17)
to UK	23 059	24 650	6.9 %	25 761	4.5 (%	11.7 %
to EU28	253 253	276 906	9.3 %	not yet	--	--
to Euro area	186 750	202 739	8.6 %	available	--	--

On the pure external market, UK exporters hope to conquer new markets as they are now hampered by package deals within the EU common trade policy in which the UK has to abide by the continental majority rules! Among the examples, reaching public broadcasting *(e.g. BBC-at-one)* are the Scottish whisky, which is now subject to the dominance of continental wine and beer producers, and other typical products such as the old-fashioned Hovercrafts or curling stones from *Ailsa Craig* blue hone granite and the like. More relevant issues refer to the crux transnational value chains. Assembly lines may re-locate as already happens in the

automotive industry *(Ford and BMW as well as the Japanese Honda, Nissan and Toyota)* and electro-mechanic engineering as reported in *the Economist* of February 23rd and confirmed by Japanese business concerns in *the Japan Times on Sunday* of March 17th. Thus, our 'new' extra-EU trade totals are hypothetical and provisional by combining the dropping of the UK part of the extra-EU trade and adding the relevant intra-share of the UK. A final point is the possibility how these numbers may change and settle at some new equilibrium or trend. Actually, the *dropping* internal market and the *rising* extra-EU trade are subject to price (viz. tariff) related items, and these prices and/or average (administrative) costs are bound to rise. This analysis is conducted by a basic market-share model which is simplified from price theory in the textbooks of internal trade (Goldstein and Kan, 1985) .

3. Market-share Models[3]

A market-share model, as applied to trade flows, follows basic price theory, with:

Log M = a + b . log MWT + c . log p + d . log pworld, with:

- M : imports from an external partner (following the Eurostat geonom);
- MWT: imports from a relevant total, i.e. the extra-EU world (or geonom nr. 1010);
- MCT: imports from the competitive world, i.e. the world (geonom 1010) minus the imports from the partner-at-stake;
- p: price, defined by average value, i.e. EU-trade in value € / EU-trade in volume (tons) for individual partner countries, up to the finest detail of the CN-8 nomenclature of almost 10,000 products; at this maximum detail the ratio of average value approaches the notion of price;
- pworld = world trade with EU in value € / world trade with EU in volume, detail cf. p;
- b : mass effect indicating that larger markets might improve market share. When this effect is assumed to be neutral, then b = 1 and the market share is defined as M/MWT; then, the model can be simplified as:

Log (M/MT) = a' + e'. log (p/pworld). It can be proven that the elasticity e' has one unit difference between the calibration in volume (tons) compared to value terms;

- pcomp instead of pworld; pcomp stands for price of competition and adapts the notion of 'world price' for each individual trade partner by:

  world value trade minus value trade with partner country, divided by
  world volume trade minus volume trade with partner country.

Log (M/MT) = a" + e". log (p/pcomp), in which the elasticity e" has still about one unit difference, depending on the share of the partner a stake in the EU trade total.

It is too early to calibrate these parameters by a (mini) time series of two years only. Instead, it is already informative to assess some *'snapshots'*, i.e. the possible outcomes of the evolution which already present indications of the market parameters over a single period, i.e. the dip after the 2014 peak. In general, six situations are possible which are summarized in Table 3. The inbound (UK>EU) application is given in Table 4.

Only Spain and Italy witness a traffic growth with the UK and gain market share relative to world imports. The other listed member states, as well as the EU-total, show declining volumes and value between 2012 and 2016, connected to a higher weighted average value. The UK-EU average dropped more in volume *(from 6.09 % to 5.67 %)* than in value *(9.34 %*

[3] (Claessens and Goessens, 1994)

to 9.31 %), making the ratio between the two market shares rising from 1.59 to 1.90. The latter suggests an increase of the average weighted value of traffic *(or average 'price' if this was applied to individual products rather than to an average basket)*. The record for the channel neighbours is quite different. Belgium portrays a sharp decline of the UK market-share, but this is due to the rise of world imports at the Belgian trading gates *(both in volume and value);* apparently, the latter has more to do with the inauguration of a new container dock in the port of Antwerp than with the cross-channel traffic!

Table 3: Alternative price-sensitivity 'snapshots' cf. market-share evolution.

	elastic		inelastic		trade upgrade ⇔ price erosion			
market share	€	Volume	€	volume	€	Volume	€	volume
price up	down EU-UK UK-Be UK-De UK-Fr	down UK-EU UK-Be UK-De UK-Fr	up	down	up	Up	not rele-vant	not relevant
price down	Up UK-Es UK-It	Up UK-Es UK-It	down	up	not relevant	Not Relevant	down UK-NL	down UK-NL

Table 4: Inbound market share and relative 'prices' (source: Eurostat trade data).

reporters |	EU inbound from UK		EU import from world +UK|		UK share & ratio	
EU imports	UK 2012	UK 2016	world 2012	world 2016	% 12	% 16
in million €	185 391	175 387	1 984 150	1 883 135	9.34	9.31
Vol. (1000 t.)	106 090	101 688	1 743 118	1 792 497	6.09	5.67
€/kg & ratio	*1.75*	*1.72*	*1.10*	*1.01*	*1.59*	*1.70*
Belgium						
in million €	18 571	15 609	129 414	138 198	14.35	11.29
Vol. (1000 t.)	10 641	8 731	88 104	93 739	12.08	9.31
€/kg & ratio	*1.75*	*1.79*	*1.43*	*1.44*	*1.22*	*1.24*
Netherlands						
in million €	27 810	22 097	277 009	263 921	10.04	8.37
Vol. (1000 t.)	28 182	25 366	282 177	307 318	9.99	8.25
€/ kg	*0.99*	*0.87*	*0.98*	*0.98*	*1.01*	*0.89*
Germany						
in million €	41 163	38 653	368 796	359 193	11.16	10.76
Vol. (1000 t.)	18 038	18 423	239 343	257 125	7.54	7.16
€ / k	*2.28*	*2.07*	*1.48*	*1.34*	*1.48*	*1.54*
France						
in million €	25 934	21 694	198 847	181 437	13.04	11.96
Vol. (1000 t.)	12 790	9 023	154 458	149 329	8.28	6.04
€ / kg	*2.03*	*2.40*	*1.22*	*1.14*	*1.66*	*2.11*
Spain						
in million €	10 951	12 269	131 135	119 464	8.35	10.27
Vol. (1000 t.)	4 644	7 103	169 965	173 626	2.73	4.09
€ / kg	*2.36*	*1.73*	*0.73*	*0.64*	3.23	2.70
Italy						
in million €	9 691	10 990	187 178	155 222	5.17	7.08
Vol. (1000 t.)	1 628	3 134	210 131	202 581	0.77	1.55
€ / k	*5.95*	*3.51*	*0.85*	*0.72*	7.00	4.88
Keys: €/kg = average value of intra-EU UK traffic to EU and extra-EU world (without UK); UK shares = UK versus extra-EU world plus UK (as if UK were already extra EU)						

The situation of UK traffic to French and German markets is similar to Belgium, though to a lesser extent. In both cases, world imports drop, but UK traffic even more, such that the market shares drop as well. At the contrary, the Netherlands constitute the only EU inbound gate where the UK traffic is valued at less than one euro per kilogram and this even drops to 87 cents in 2016. In view of the lost market share, this situation is apparently linked to price erosion. Of course, this type of analysis gains relevance when applied to specific products; this contribution on the grand totals only provides the headlines at stake.

4. Grand totals, weights and market shares

The EU imports from the UK are first related to a relevant (import) total, i.e. world imports i.e. extra-EU and intra-EU traffic (Table 5/a). Then follows the reverse outbound leg from the EU into the UK. Then, both exercises are repeated from the EU export standpoint; these are the weights relative to the export total.

4.1 Market shares

The over-all picture suggests price erosion with dropping market shares at lower values. The last year, however, a 'normal' price elasticity emerges with a slight rise in market shares. One reason is related to a changing basket composition.

Table 5/a: UK market-share on the inbound EU market

Years	2012	2016	2017	2012	2016	2017	2012	2016	2017
Items	EU 27 import from UK			EU import (extra + intra)			*UK share & ratio*		
Bill. €	189	180	197	4 029	4 178	4 561	*4.68*	*4.30*	*4.31*
Mio t	110	107	119	3 053	3 194	3 380	*3.62*	*3.36*	*3.53*
€/kg	*1.71*	*1.67*	*1.65*	*1.32*	*1.31*	*1.35*	////	////	////
Ratio	////	////	////	////	////	////	*1.29*	*1.28*	*1.22*
Table 5/b: EU market share in the inbound UK market									
	EU 27 exports to UK			UK imports			*EU share & ratio*		
Bill. €	258	291	296	541	575	570	47.6	50.5	51.9
Mio t	104	120	123	295	279	292	35.3	42.9	42.1
€/kg	*2.48*	*2.42*	*2.41*	*1.84*	*2.06*	*1.95*	////	////	////
Ratio	////	////	////	////	////	////	1.35	1.18	1.23

In the previous period, the dominance of fuels *(HS-2 chapter 27)* was the main reason of price erosion. Among the other top five, pharmaceutical products and electric machinery lost market share due to a price-elastic response to higher unit value, whereas jewelry and non-electric machinery kept their price-inelastic setting but lost market-share as well. Whatsoever the reasons and the composition, this evidence suggests that the average EU-inbound trade basket from the UK tends to be relatively price-sensitive. At the contrary, the dominant EU exports (table 5/b) to the UK tend to a recent product upgrading. This could be explained by dominant price inelastic products such as jewels, pharmaceuticals, non-electric machinery and the procurement of parts and components in the (automotive) value-chains. The latter evidence does not as yet include a trade impact of plant closure or plant migration to the continent. Finally, on the same trade leg, fuels are price-elastic and electric machinery tends towards price-erosion.

‘4.2 Market Weights

Then, two export-weights are compared in line with the market-shares. The first series (Table 6/a) shows a recent decline of value-weights of the UK (including lower average value) in view of the faster growing exports to the world (incl. intra-EU).

Table 6/a: UK weights of the EU outbound trade (extra-EU plus intra market)

	2012	2016	2017	2012	2016	2017	2012	2016	2017
	EU 27 exports to UK			EU exports to the world			UK weights & ratio		
Bill. €	269	315	320	4 524	4 860	4 833	5.94	7.02	6.63
Mio t	107	121	128	2 322	2 436	2 430	4.62	5.21	5.28
€/kg	2.51	2.60	2.50	1.95	1.93	1.99	////	////	////
Ratio	////	////	////	////	////	////	1.29	1.35	1.26

The second outbound table (6/b) confirms the trade flipping of UK exports to the non EU world instead of the continental dominance before. The product-weight analysis on the EU-outbound exports may portray price-inelasticity for electric machinery and pharmaceuticals, whereas electric machinery and automotive exports are elastic. Whatsoever the ultimate calibrated parameter, in all concerned industries the CEO offices cry for clear answers to trade policy, in order to adapt their business models.

Table 6/b: UK weights on the EU market compared to UK world exports

	2012	2016	2017	2012	2016	2017	2012	2016	2017
	UK exports to EU 27			UK exports to the world			EU weights and ratio		
Bill. €	185	176	189	368	370	393	50.3	47.5	47.9
Mio t	112	106	107	158	155	160	70.7	68.8	66.8
€/kg	1.66	1.65	1.76	2.33	2.39	2.46	////	////	////
Ratio	////	////	////	////	////	////	0.71	0.69	0.72

5. Inward/Outward Processing and Automotive Value-Chains

Our study now adds a typical *value-chain* in the automotive sector by comparing imported cars (HS 87.03) and trucks (HS 87.04) with components (HS 87.08) from Japan to the UK and comparative assembly plants on the continent, e.g. France *(with Toyota)* and Hungary *(with Suzuki)*. Evidently, the components (HS 87.08), including the gear boxes, go anywhere, including non-Japanese automotive assembly lines as well. The finer detail on the Comext nomenclature HS-6 or CN-8, as well as a full list of host states, is beyond the scope of this contribution which is confined to a basic but suggestive setting. For each block in Table 7, the first three lines list value trade in 1000 euro. Then follows volume trade in metric tons and the ratio gives €/kg. At this detail, the latest 2018 statistics were not yet available. The import of finished cars in the UK is situated in a price-elastic setting. The French exports tend to grow at lower prices and the imports are higher valued. Does the UK import cheaper Japanese cars and export expensive Jags or RR ? Whatsoever the outcome of this product detail, the French market acts in the opposite way, importing the luxury items and exporting their own basics. Both in Hungary and the United Kingdom, the total imported value of cars (87.03) doubles at a lower unit value, and in France the same happens to imported components (87.08), may-be to the recent Toyota plant in Valenciennes or transit sales to others.

Table 7 : EU automotive trade with Japan by EU reporting member states

Trade items		United Kingdom		France		Hungary	
HS-4	Year	Imports	Exports	Imports	Exports	Imports	Exports
8703	2012	726 767	532 807	604 275	170 933	7 910	70 830
Cars	2016	1 336 574	914 359	596 120	178 853	18 453	30 096
1000€	2017	1 389 722	1 006 692	550 206	191 516	49 642	50 115
tons	2012	56 332	27 433	48 654	15 059	870	4 302
tons	2016	126 982	43 739	41 104	15 490	2 257	3 282
tons	2017	136 869	48 390	37 125	17 603	6 147	4 699
8703	*2012*	*12.90*	*19.42*	*12.42*	*11.35*	*9.09*	*16.46*
€/kg	*2016*	*10.53*	*20.90*	*14.50*	*11.55*	*8.18*	*8.51*
€/kg	*2017*	*10.15*	*20.80*	*14.82*	*10.88*	*8.08*	*10.67*
8704	2012	9 706	3 611	6 040	182	5	-
Trucks	2016	6 170	11 763	4 521	195	3 162	-
1000€	2017	5 934	10 956	4 113	28	2 102	-
tons	2012	1 363	451	657	19	2	-
tons	2016	861	1 410	571	23	347	-
tons	2017	755	1 107	535	2	281	-
8704	*2012*	*7.12*	*8.01*	*9.19*	*9.58*	*2.53*	
€/kg	*2016*	*7.17*	*8.34*	*7.92*	*8.48*	*9.12*	
€/kg	*2017*	*7.86*	*9.90*	*7.69*	*14.00*	*7.48*	
8708	2012	1 216 324	100 364	349 748	123 868	128 430	9 609
Comp.	2016	610 744	71 727	531 698	78 774	214 440	12 812
1000€	2017	703 496	92 650	736 249	91 058	184 978	10 166
tons	2012	109 684	8 397	26 096	7 400	13 048	1 109
tons	2016	71 770	3 663	42 683	3 326	17 262	1 543
tons	2017	75 870	4 258	57 747	3 983	14 622	1 192
8708	*2012*	*11.09*	*11.95*	*13.40*	*16.74*	*9.84*	*12.42*
€/kg	*2016*	*8.51*	*19.58*	*12.46*	*23.68*	*12.42*	*8.30*
€/kg	*2017*	*9.27*	*21.76*	*12.75*	*22.86*	*12.65*	*8.53*

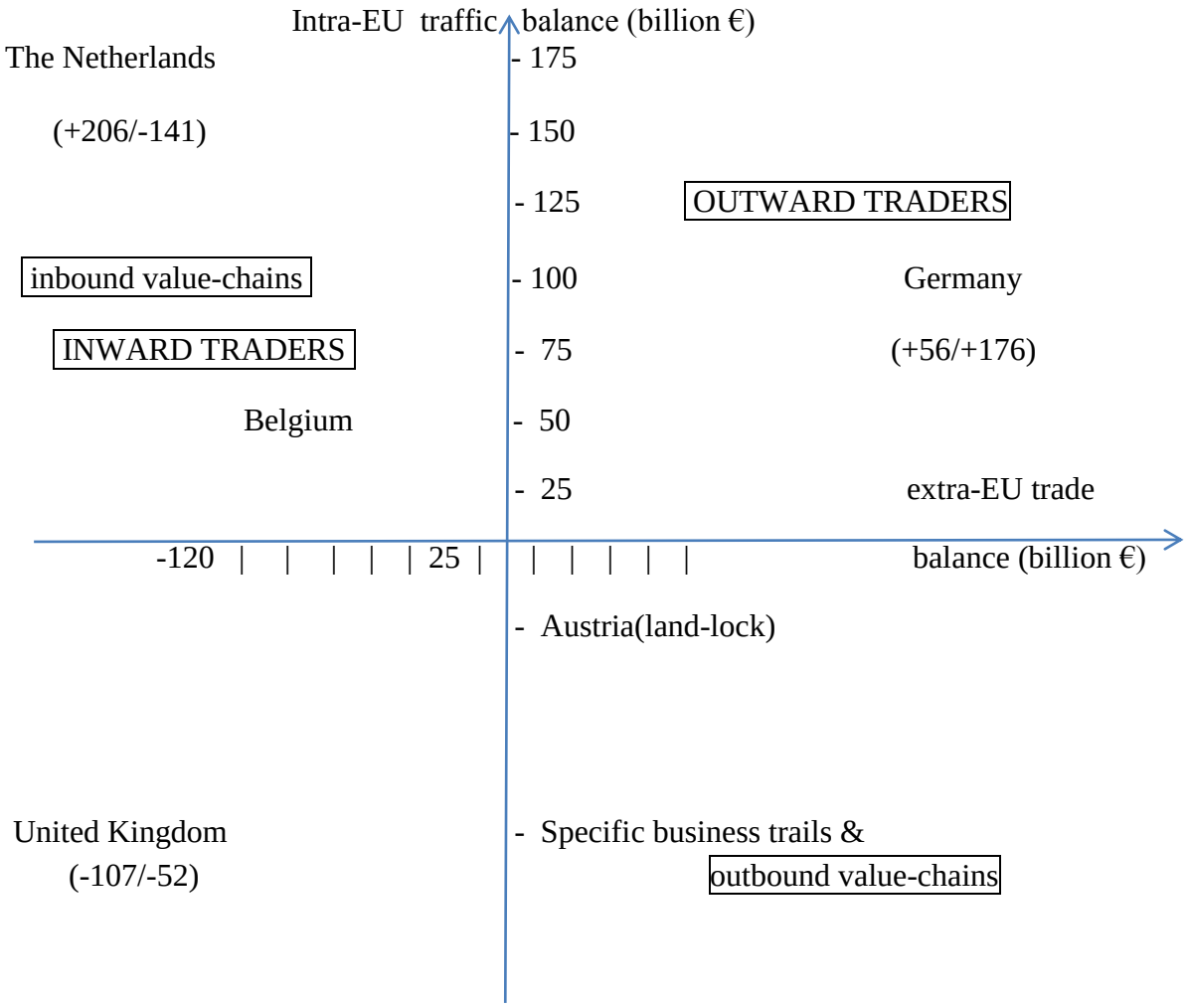
More striking is the neat decline in Japanese exports of components to the UK. This indicates some trade deflection of the IP value-chains (inward processing) in the UK for ultimate exports. This relocation is highlighted by recent press releases (the Economist, February 23rd 2019) explaining this finding within the end of the *'diesel era'*. Though this corollary already happened before *the 2016 vote*, the brexit consequences are about to cluster and even cumulate all these evil effects, the so-called 'coercivity paradigm' in hysteresis (cf. infra) !

6. The internal market after the Brexit

The UK flows can be compared with the main trading member states by plotting the extra-EU trade balance with the intra-EU traffic balance; the logic is that extra-EU trade may overlap with intra-EU traffic and produce a double counting; the balances do not! Figure 2 compares both balances by producing 4 alternative combinations:

- In the top right quadrant, Germany, often nick-named as *export fetishism*, combines a positive trade balance on the external (+180 billion €) and the internal (+56 billion €) market. In principle, only Germany qualifies for such an outward balance at a ratio of more than 3,000 € per capita, though other countries score on this item for specific industries *(viz. competitive advantage)*.

Figure 1: external trade balances compared to intra-EU traffic balances



Source: reworked with 2019 updated after Claessens e.a. (2002, 2007 & 2018)

- On the top left quadrant, the Netherlands manage to switch an external inbound deficit of -141 billion € into a surplus of 65 billion €, thanks to an outbound distribution on the internal market cashing 206 billion. This balance of more than 3,500 € per capita does not result from industrial transformation but embodied services through so-called EDC or European Distribution Centres (Van Laarhoven, Van der Hoop, e.a.). The question is how this trade deflection differs from pure transit!
- On the bottom side, the right quadrant features Austria, acting as a typical land-locked economy, for which much inbound trade is customs cleared in another *(coastal)* country. For specific industries *(e.g. Airbus)* the setting of the bottom right quadrant may widen to any intra-EU value chain in which the components are imported from EU subcontractors, and the final product *(i.e. the plane)* leaves the EU country of final assembly *(i.e. Toulouse-France)*.
- On the bottom left quadrant, the UK features the largest negative traffic balance on the intra-EU market, to which a historic negative trade balance is added with the rest of the world. Both balances will now become external and are bound to be subject a mercantilistic trade policy. Currently this negative visible balance is not compensated

by a positive balance for services. Only in some of the Tatcher's PM years, the current account was positive.

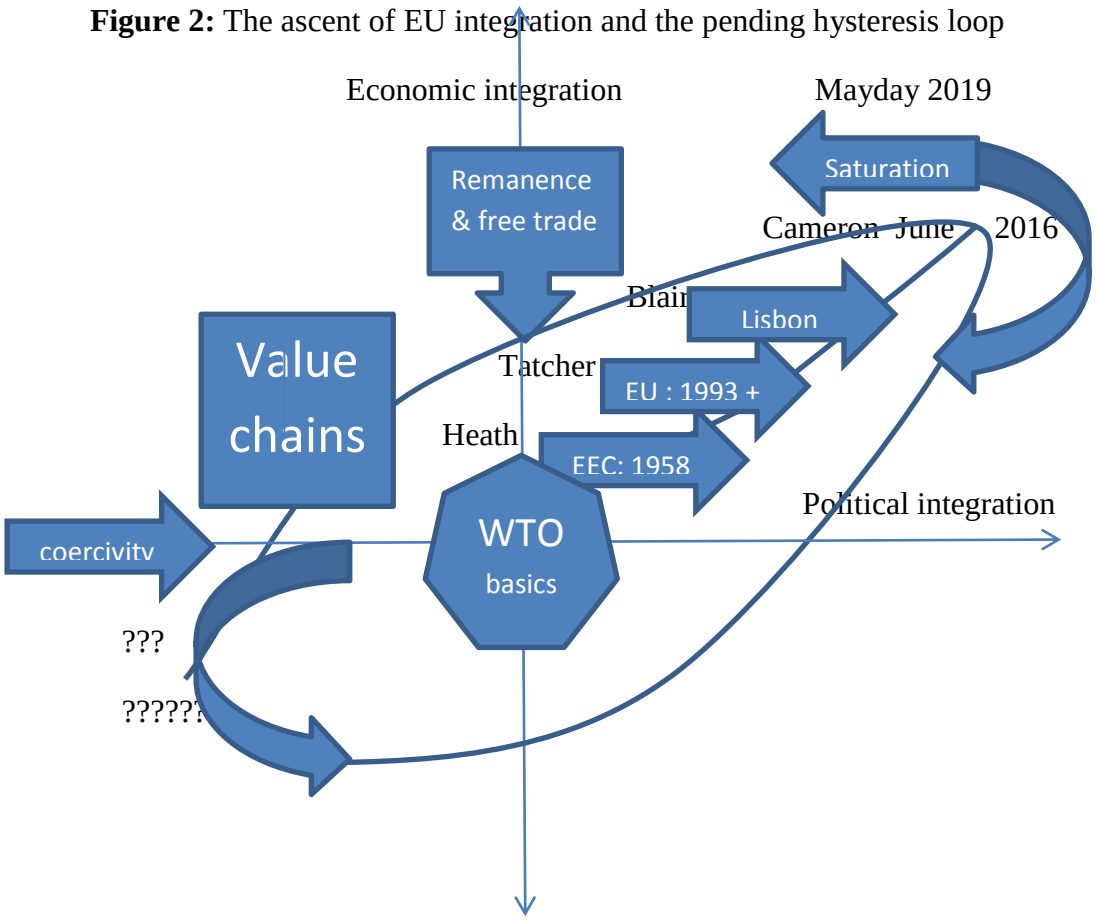
A forecast on the internal market falls beyond the scope of this paper, since the UK will soon leave this intra-EU traffic. Nevertheless, the growing asymmetry on the intra-EU traffic starts irritating the deficit member states. Panagiotis Liargovas (European Commission, p. 52) warns for a *'beggar thy neighbour policy'*. For the UK, the future trade deficit will start at the current total of € 159 billion of which 107 with the EU. This compares with the service balance surplus of US$ 137 of which 120 with the EU. Any kind of future trade relation is bound to negotiate these trade imbalances, but then including the intra-Irish flows which are part of a 50% surplus in favour of the UK.

7. Hysteresis-studies

Since the 2016 Brexit vote only two calendar years evidenced the Brexit preparation, i.e. 2017 and 2018. After the final deal, discussions on trade creation, trade diversion and trade deflection may start in the way opposite *(hysteresis)* to the initial growing customs union. Relevant data are then WTO-based in current $ and euro-based Eurostat date which will treat the UK as an external partner, i.e. without the relevant market-share calculus of this report. In that period beyond 2019, the *hysteresis debate* can set on. A definition of the latter is given by Göcke (2001, p. 168) : *hysteresis occurs when a past temporary change of the relevant forcing variables led to a change in the economic behaviour of the observed unit(s), but a removal to the initial value of the forcing variables does not include a complete change back to the initial behavior.* It is clear that the *'forcing variable'* was the need for policy-related or further political integration in order to build the *level playing field* for the benefits of the *common market* at the end of the sixties. This was explicitly mentioned by Henry Kissinger (1979) in his report on the Nixon visit to Europe and PM Edward Heath (Van de Meerssche, pp. 97-103) who had earlier been European advisor to the Macmillan administration at the time of general De Gaulle's (1967) first veto. With the final integration by the Delors administration and the Maastricht EU treaty, PM Margaret Tatcher (1993) repeatedly reported that her final point was not that *'federalist approach of the Brussels bureaucracy'*. This British feeling of *'saturation'* kept its contingencies to the initial attitude (Young, 2003) as it now marks the split between hardliners and soft Brexiteers, between feelings of national(istic) sovereignty and the scale benefits of free trade on a real *unified market*, which is a bit more than just a customs union (Degryse, pp. 440-443) .

So our hysteresis graph is sketched along the twin perspective of political versus economic integration (Sidjanski and Wessels, 2014), though other cause-and-effect relationships may be advanced *(current account etc.)*. The 2016 no-vote to the Osborne negotiations is clearly a saturation to further political integration after all the previous but ill-fated opt outs. The recent call for an 'own' foreign-trade policy is bound for a leaving of any kind of customs union as soon as the 'backstop' issue on the intra-Irish border will allow. Then, two notions appear to be important. First, the notion of *remanence* or *retentivity* could be derived from existing literature on hysteresis, i.e. the action of 'hidden variables' (Cross and Davidson), viz. past investment which is not recuperated immediately *(the so-called sunk costs)*. Remanence then means that some activities will remain located in the UK, though they once arrived because of the entry into the common market. This could be an average conduct for the nation.

Figure 2: The ascent of EU integration and the pending hysteresis loop



Source: adapted from David Halliday & Robert Resnick (1960), Physics, p. 929

However, a much more tricky semiotic equivalent is the threat of *coercivity*, in physics a negative force neutralizing all remaining magnetism. In reality, multinational companies are scaling back *(Nissan, Ford),* quitting the UK *(Honda)* or relocating operating headquarters to the continent *(Panasonic and Sony)*. This conduct is not average but industry or plant specific and is related to the Brexit-impact on multi-national value chains which aim at the *'unified market'*. The above quoted article in The Economist *(23th February, p. 29)* was titled 'Call my bluff' on plant closures but concluded (quote): *'Now it turns out that they were not … More firms may yet follow their example'*.

8. Evaluation: Beyond PM Theresa May's Real *'Mayday'*

This paper addressed a listing of the main visible-trade related effects to be tracked during the years to come. As far as the intra-EU traffic is concerned the UK-related flows become 'extra EU_27 trade' and will be subject to a variety of tariffs and trade-related cost increases. This taste-making exercise pointed at a some price sensitivity, though a real tariff-sensitivity analysis requires the finest possible product detail at CN-8. Moreover, our analysis crossed a worldwide trade decline between 2012 and 2016, though part of the dip recovered in 2017. Nevertheless, the combination of the dropping market shares and the rising relative value of the trade baskets suggests a price-elastic setting, especially for EU imports from the UK *(now UK expeditions)*. At the opposite, the dominant EU expeditions *(eventually extra-EU exports)* to the UK are less price sensitive. This suggests that any mutual trade barrier might deteriorate the visible-trade balance in favour of the rest-EU27. On top comes the effect on

the *(still positive)* invisible-trade balance *(incl. services)* which may worsen the bill of the UK-EU relations. The only positive point might be the improved terms of trade with the outside world though this is confined to a few niches. A return to the pre-1973 situation is quite improbable and thus some *retentivity* could remain in line with hysteresis theory. The intra-Irish border *(where the UK features a 50% surplus, partly transit)* will probably lose weight and gain balance. Other similarities with hysteresis experience in other fields wait for applications (Bragger, 2003, Cross, 2008, Davidson, 1993, Franz, 1990) when post-Brexit data will be available. Yet, the procedure, here presented, seems adequate for a follow-up during the coming transition period in view of more structural changes and relocations in the global value chains, e.g. inward processing assembly and other items of industrial and commercial transformation. Evidently, the final MP votes after March 2019 are not included in this paper. The speculative prediction is that the UK leaves anyway and any customs union *(because of the backstop)* with the remaining EU_27 will be temporary; a hard Brexit will only add an extra shock effect and, maybe, some temporary chaos. Any future deal with the Union will be a combination of a large variety of previous examples, from the newborn deal with Japan, the CETA with Canada, a combination between EFTA and EEA (Edye and Lintner, p.408) and the current neighbourhood policy of the Union. One conclusion seems clear: national(istic) sovereignty is not compatible with the scale benefits of a large, unified transcontinental market. The analysis in this paper suggests a checklist in the follow up of this sad but unique event, which eventually will be instructive in the literature on hysteresis in economics in general and international trade in particular.

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Vocabulary & selective abbreviations

Remanence: a measure of the remaining magnetization (in the hysteresis loop) when the driving field is dropped to zero; the 'semiotic' understanding is that this level is higher zero, sometimes also refeered to as retentivity.
CETA: Comprehensive Economic and Trade Agreement,
Coercivity: in the hysteresis loop, a measure of the reverse field needed to drive the magnetization to zero after being saturated,
ECSC: European Coal and Steel community with common supra-national 'High Authority',
EEA: European Economic Area,
EEC: European Economic Community (Customs Union with Council and Commission),
Geonom: nomenclature of trade partners (and totals) in Eurostat trade statistics,
Inner six: initial six MS of the 1950 treaty of Paris, establishing the ECSC, and the 1957 treaty of Rome establishing the EEC; they became 9 in 1973 including Denmark, the UK and Ireland,
Outer seven: the initial EFTA (European Free Trade Association) was assumed to grow away from the EEC. Eventually, five of the seven EFTA members joined the European Union.
Abbreviations: MS: member state, DOT: direction of trade, MP: member of Parliament; PM: prime minister; EP: European parliament, HS *(Eurostat)*: Harmonised System: HS-2: 2 digits; HS-4: 4 digits; HS-6: 6 digits; CN-8: 8digits, IP: inward processing of extra-EU, tax exempted components for re-export of final products.
Mayday: term, used in press releases after PM Th. May's defeated deal, January 16th 2019.