



Changes over time in caesarean section

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Methodology

To bring together data from studies since 2004 to investigate trends in overall caesarean section and caesarean section by sub-group

Countries and Data

- Overall caesarean section rate (including data from OECD when we don't have all data)
- Countries with data in 2004 are included in the main study

Tertiles were calculated from the 2004 cesarean section rates. 3 groups of countries were formed:

- 1st tertile (green)
- 2nd tertile (blue)
- 3rd tertile (red)

These tertiles are retained for subgroup analysis

Did countries with low CS in the beginning of the 2000s continue to have low CS or have trajectories differed?

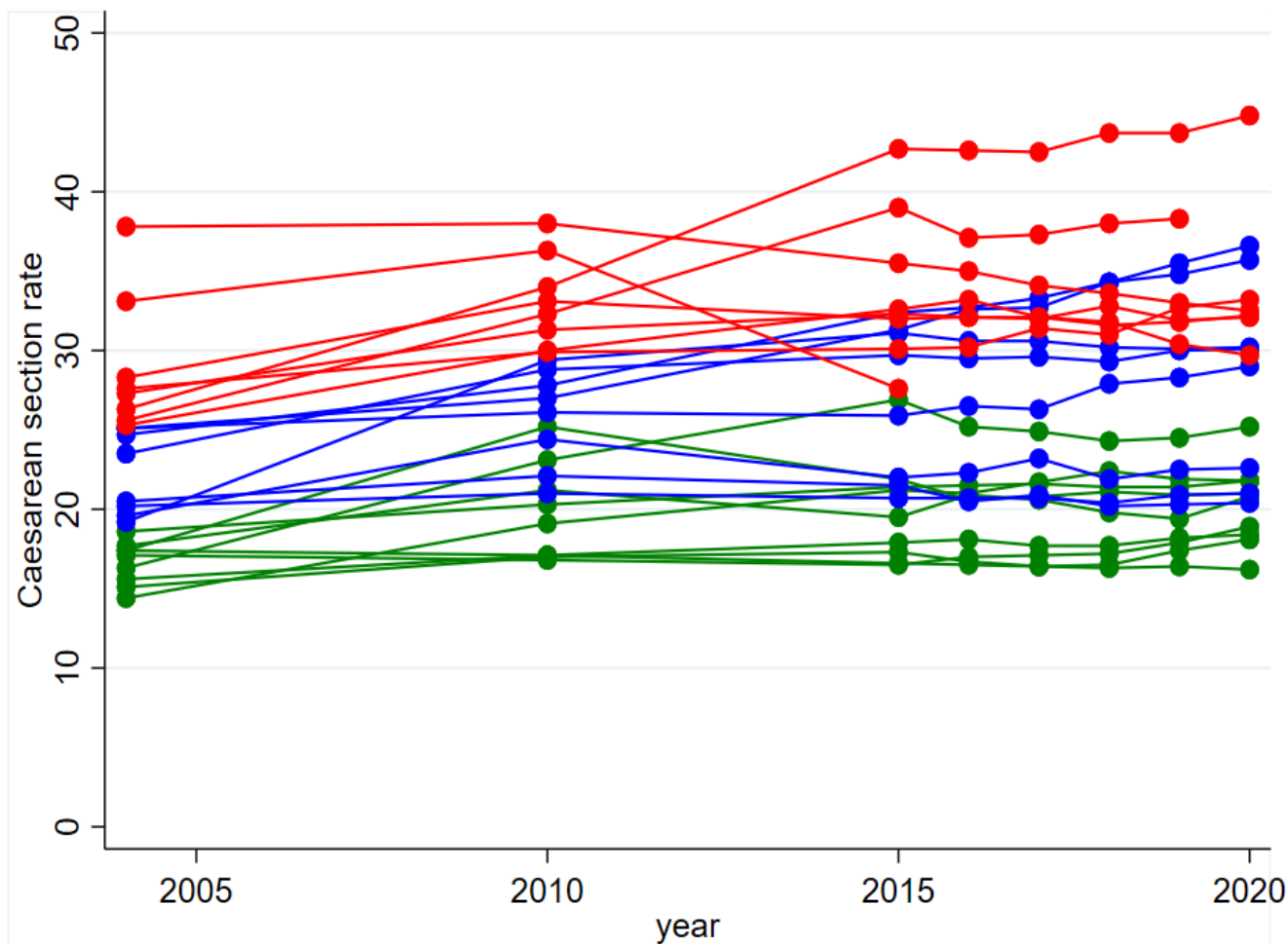


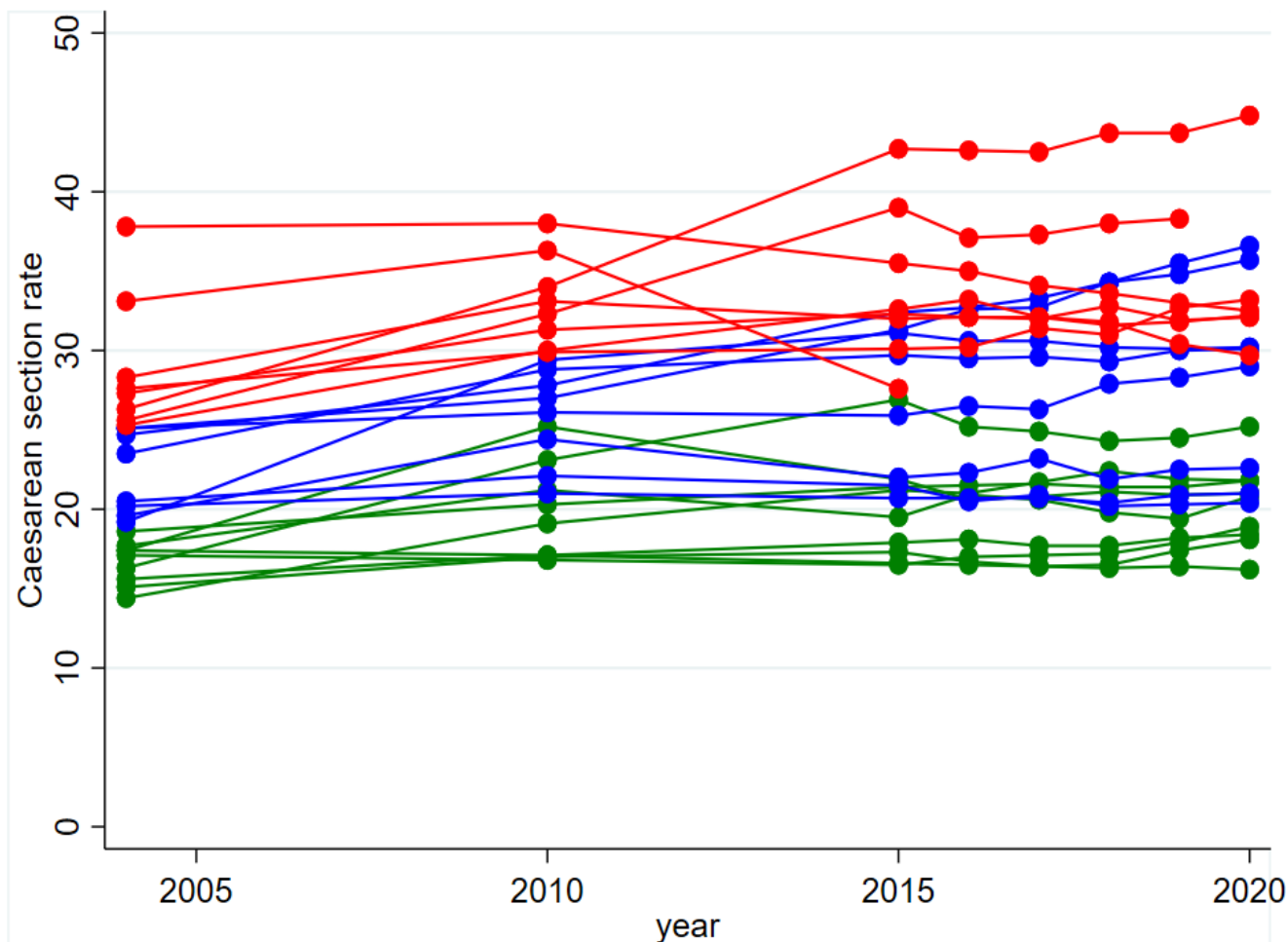
Figure I. – Total caesarean section rates

Mostly yes.

Based on the CS_total_rates_graph it is quite obvious that countries with low SC rates at the beginning of 2000' continued to have lower rates at 2020 and trajectories are flat or with mild increases (1st tercile group).

Second tercile group (blue) indicates that there are two groups: one with quite flat curves (3 countries) and a second one with sharper increases over time (4 countries).

Did countries with low CS in the beginning of the 2000s continue to have low CS or have trajectories differed?



1st Tertile:

Belgium, Czech Republic, Estonia, Finland, Lithuania, Netherlands, Norway, Slovenia, Sweden

2nd Tertile:

Austria, Denmark, France, Ireland, Latvia, Slovakia, UK: Wales, UK: Scotland

3rd Tertile:

Germany, Italy, Hungary, Luxembourg, Malta, Poland, Portugal, UK: Northern Ireland

Figure 1. – Total caesarean section rates

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups:
by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

By multiplicity

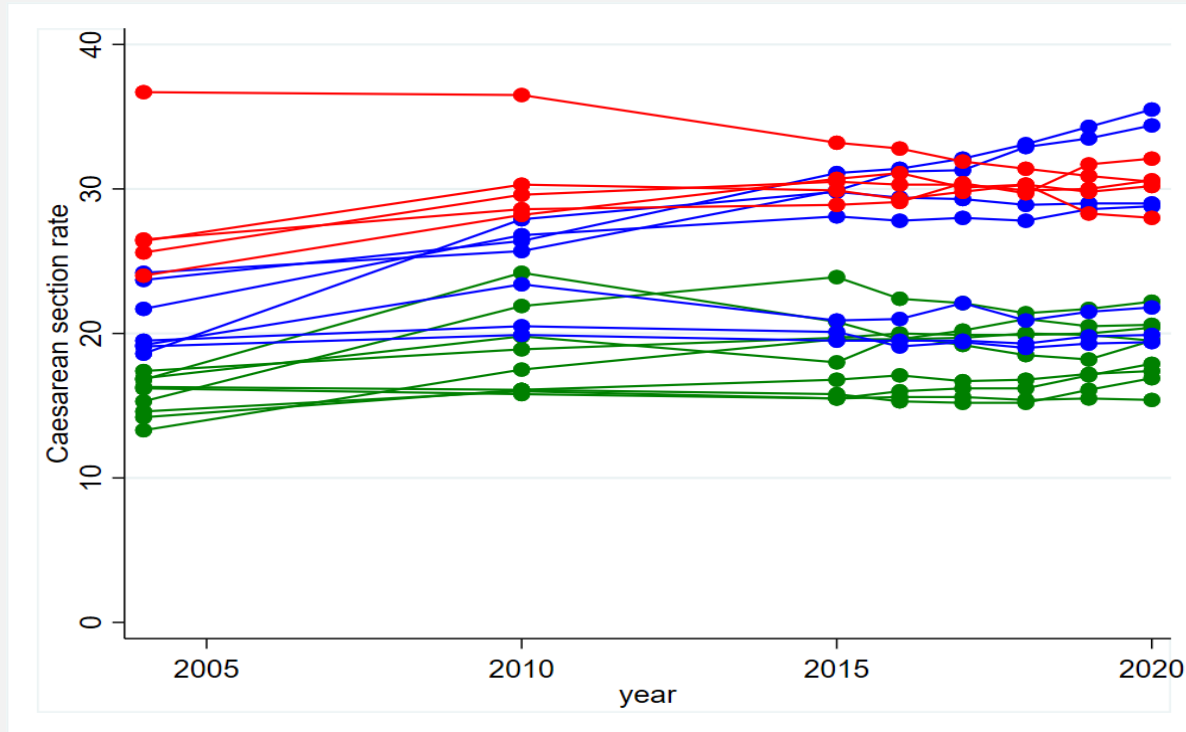


Figure 2: Caesarean section rates for singletons

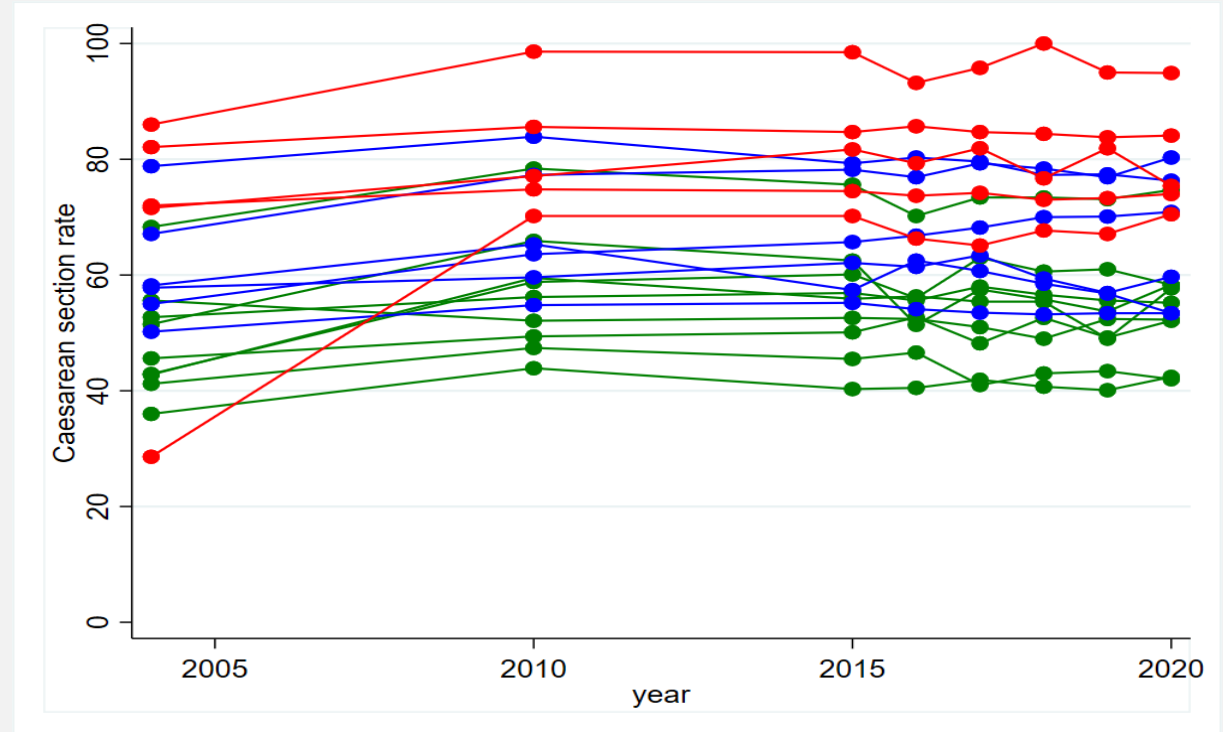


Figure 3: Caesarean section rates for multiples (twins)

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups: by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

By multiplicity

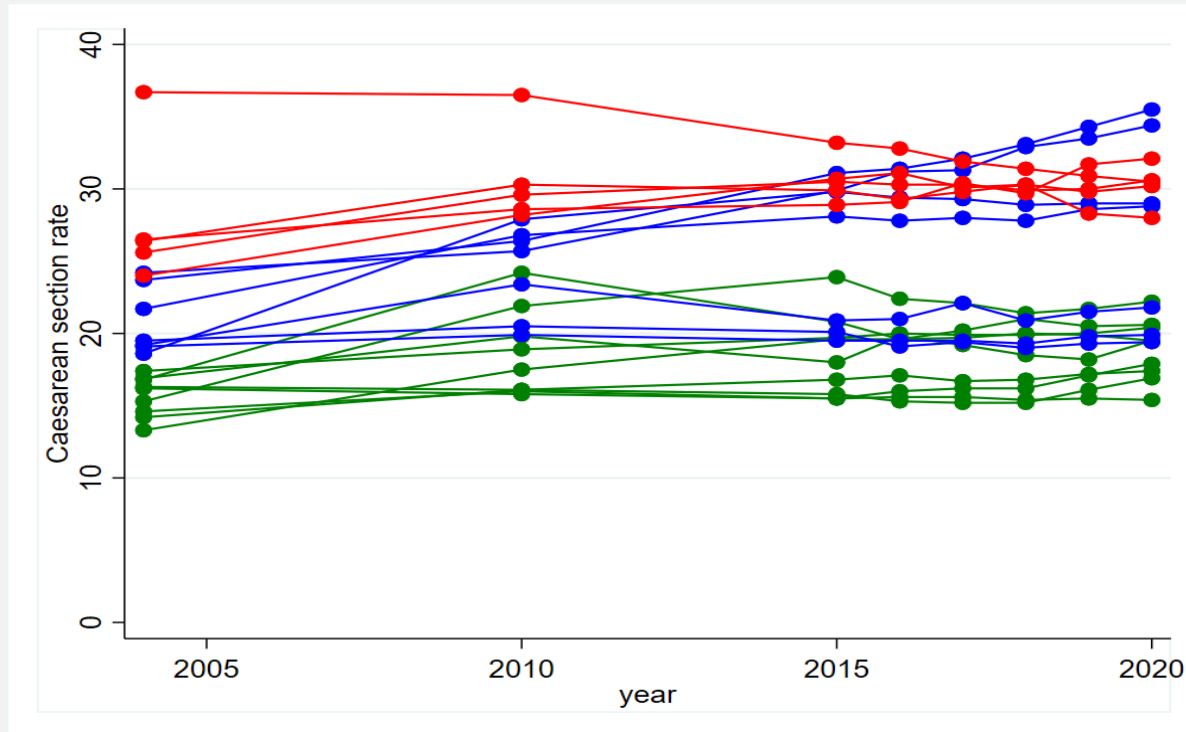


Figure 2: Caesarean section rates for singletons

CS rates for singletons have flat curves (trends) in 1st tercile (green) group, also in 3rd tercile (red) group (with exception of Italy, where CS rates among singletons are decreasing over time, from originally the highest figure in 2004).

Second tercile group (blue) is dividing into two subgroups (similarly to the finding in overall CS rates): 3 countries with flat curves (similar to green groups) and 4 countries with relatively sharp increases (UK: Scotland, Ireland, Slovakia, Austria).

This actually points out the importance of singletons (respectively clinical management and indications in this group) on the overall trends in these countries.

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups: by multiplicity, parity, previous CS, for breeches, preterms, by timing of CS?

By multiplicity

Among twins, the trends are relatively flat in all three tercile groups, with further increase over time in Malta (the highest CS rate among twins at the beginning, reaching 95% in 2020), and with the exception of Ireland with sharp increase of rate among twins from 28.6% in 2004 to 70.2% in 2010 and remaining at that level till 2020.

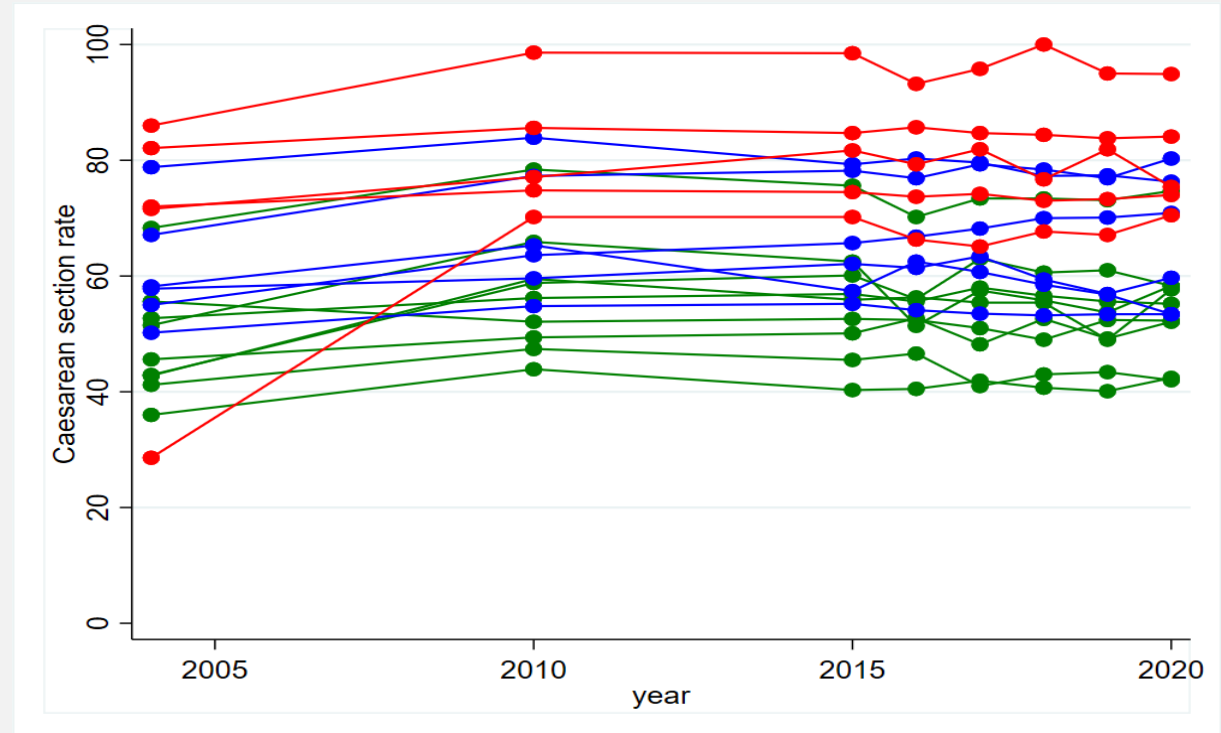


Figure 3: Caesarean section rates for multiples (twins)

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By parity

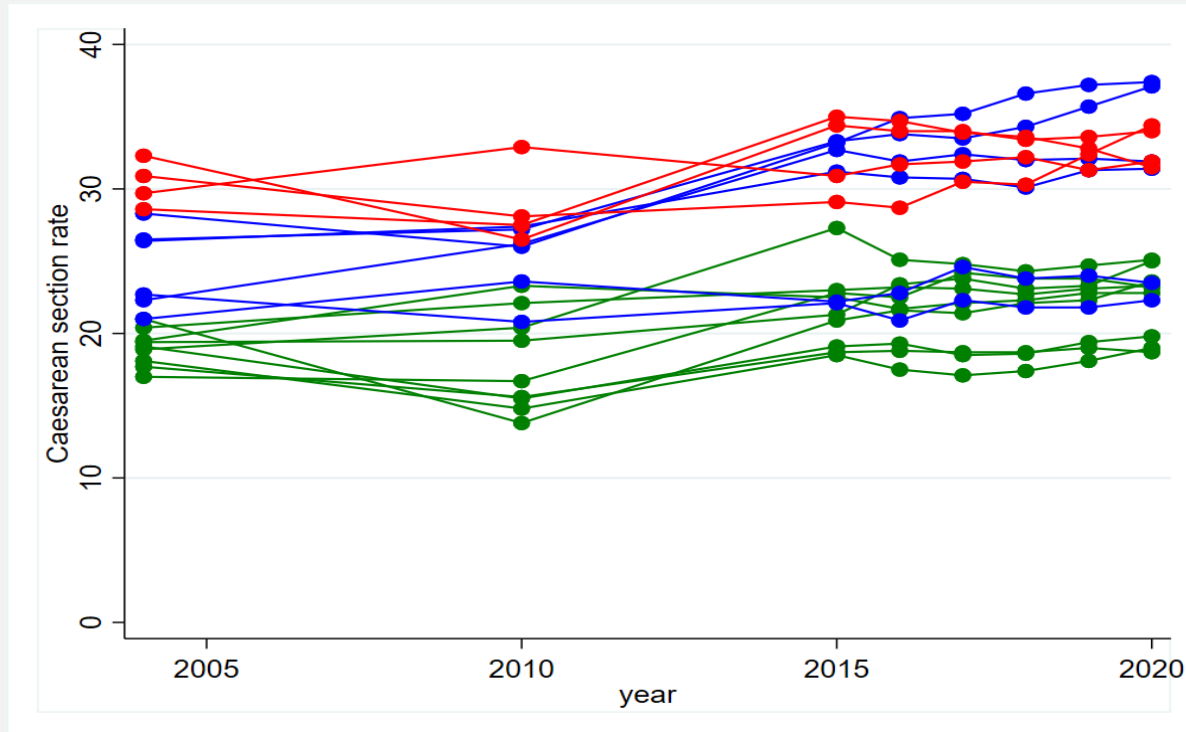


Figure 4: Caesarean section rates for nulliparous

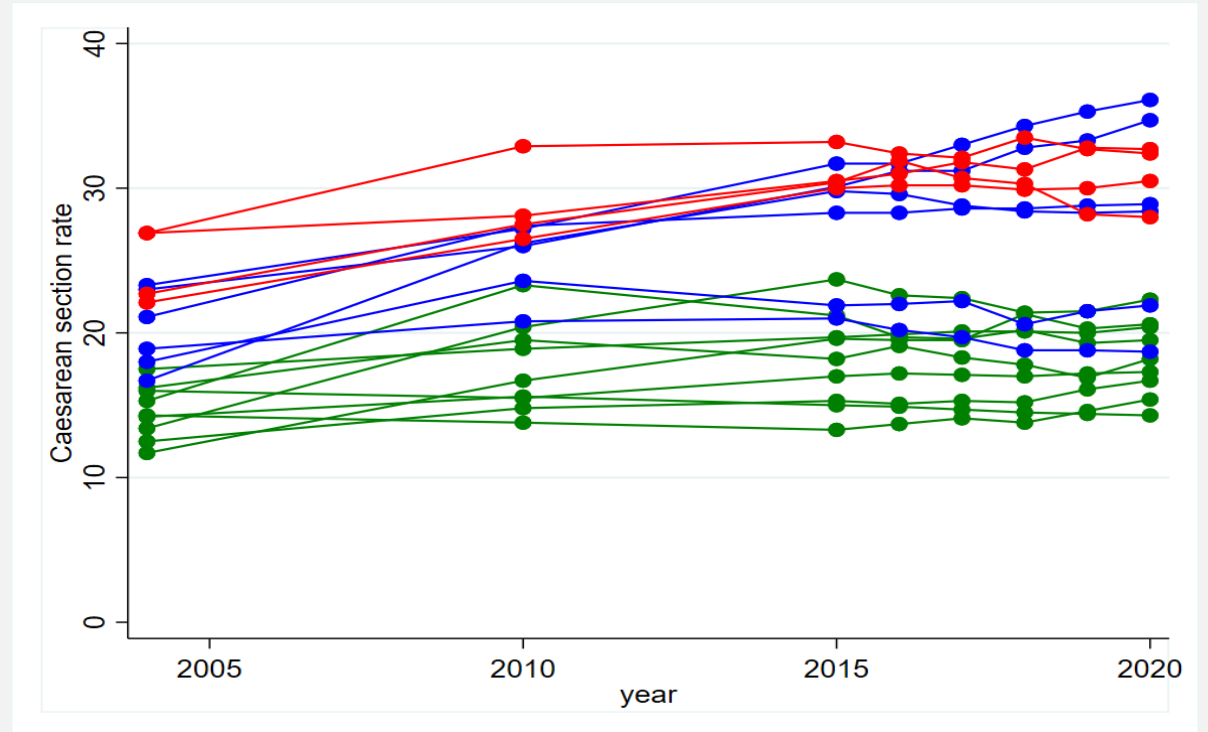


Figure 5: Caesarean section rates for multiparous

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups: by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

By parity

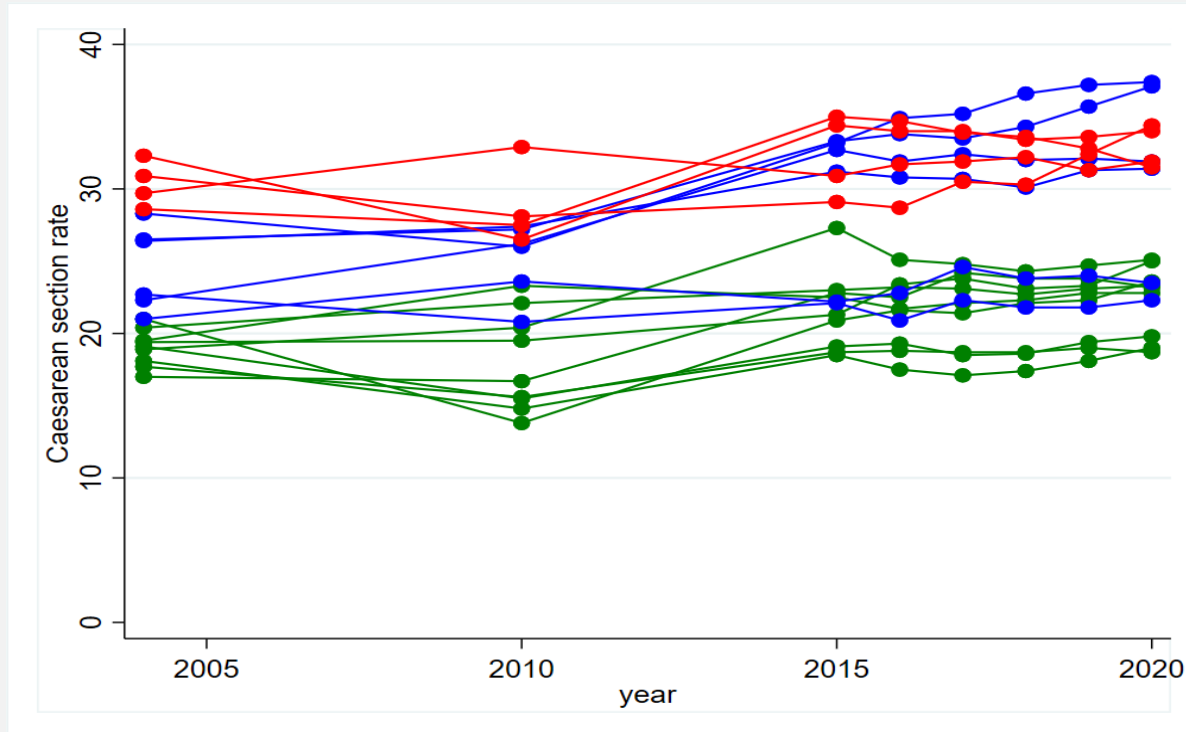


Figure 4: Caesarean section rates for nulliparous

Based on **CS_parity rates**, there are relatively flat rates or mild increases in 1st and 3rd tertile groups (higher rates among nulliparas and lower rates among multiparas).

However, the 2nd tertile group again splits into two subgroups: again 4 countries with sharp increases (same as among singletons - UK:Scotland, Ireland, Slovakia, Austria), and 3 countries in this group with flat curves.

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups: by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

By parity

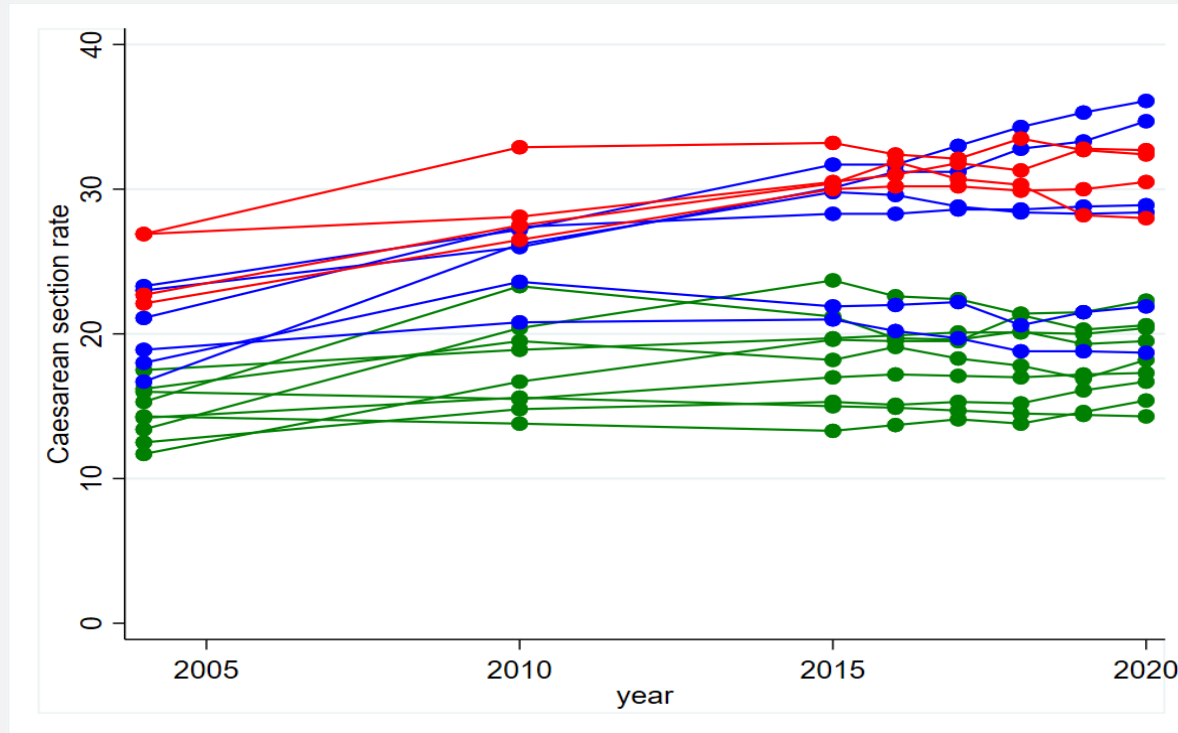


Figure 5: Caesarean section rates for multiparous

Based on **CS_parity rates**, there are relatively flat rates or mild increases in 1st and 3rd tercile groups (higher rates among nulliparas and lower rates among multiparas).

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Are the country-specific trajectories for overall caesarean rates similar for all sub-groups: by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

By previous CS

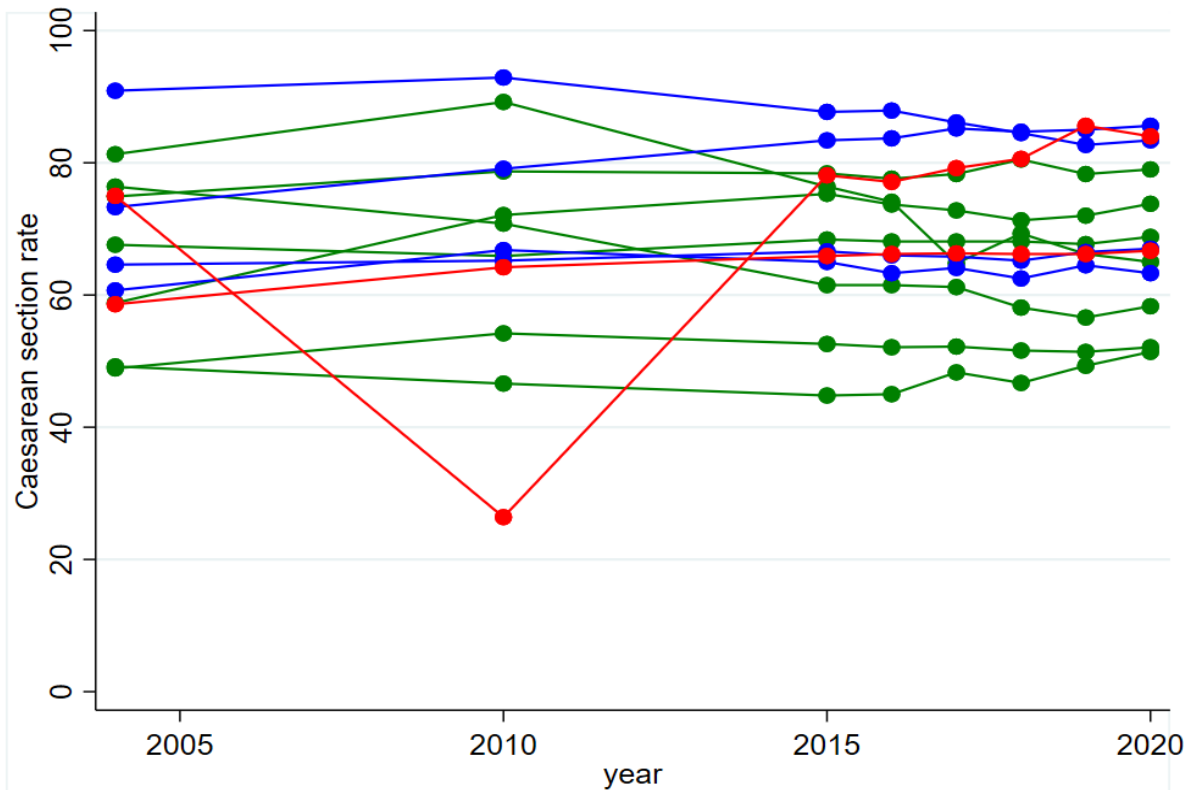


Figure 6: Caesarean section rates for women with previous CS

The situation regarding the slopes and differences among tercile groups is more homogeneous. Trends of rates are stable for 1st tercile and 2nd tercile group (with increase in UK: Scotland and decrease in Latvia).

Third tercile group has higher proportion of countries with missing data. However, with exception of Italy, this group shows increasing trends among women with previous CS (Robson group 5; expected CS rates 50-60%).

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups:
by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

For breeches and preterms

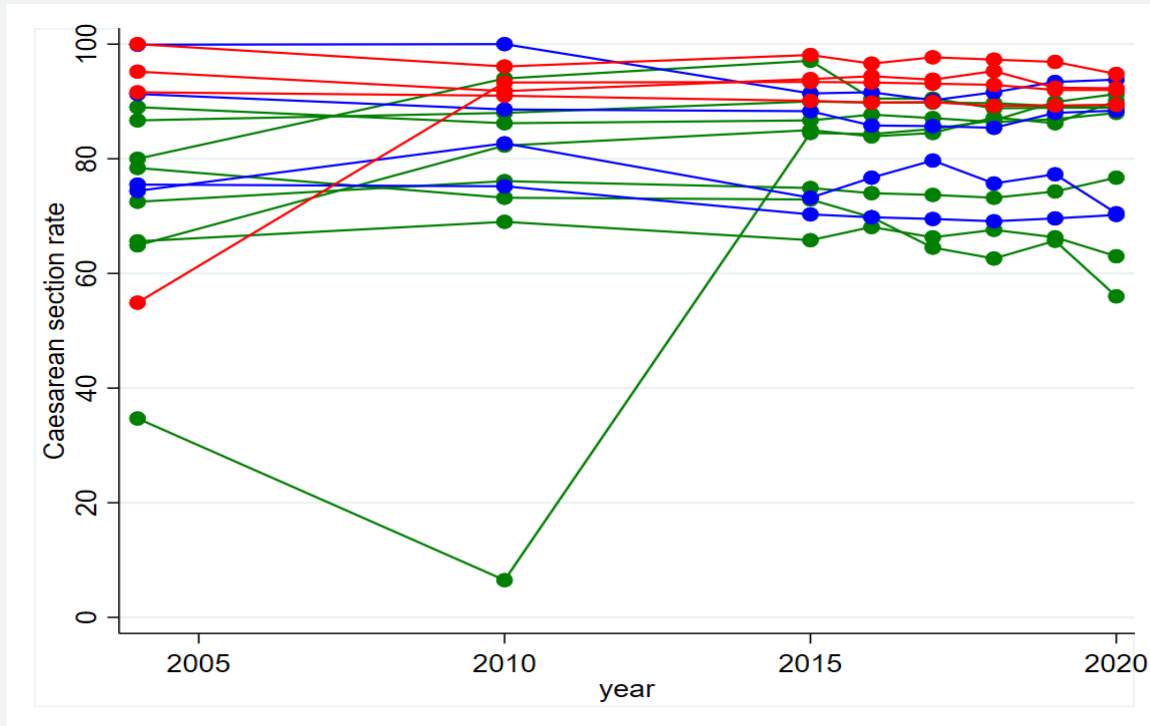


Figure 7: Caesarean section rates for breeches

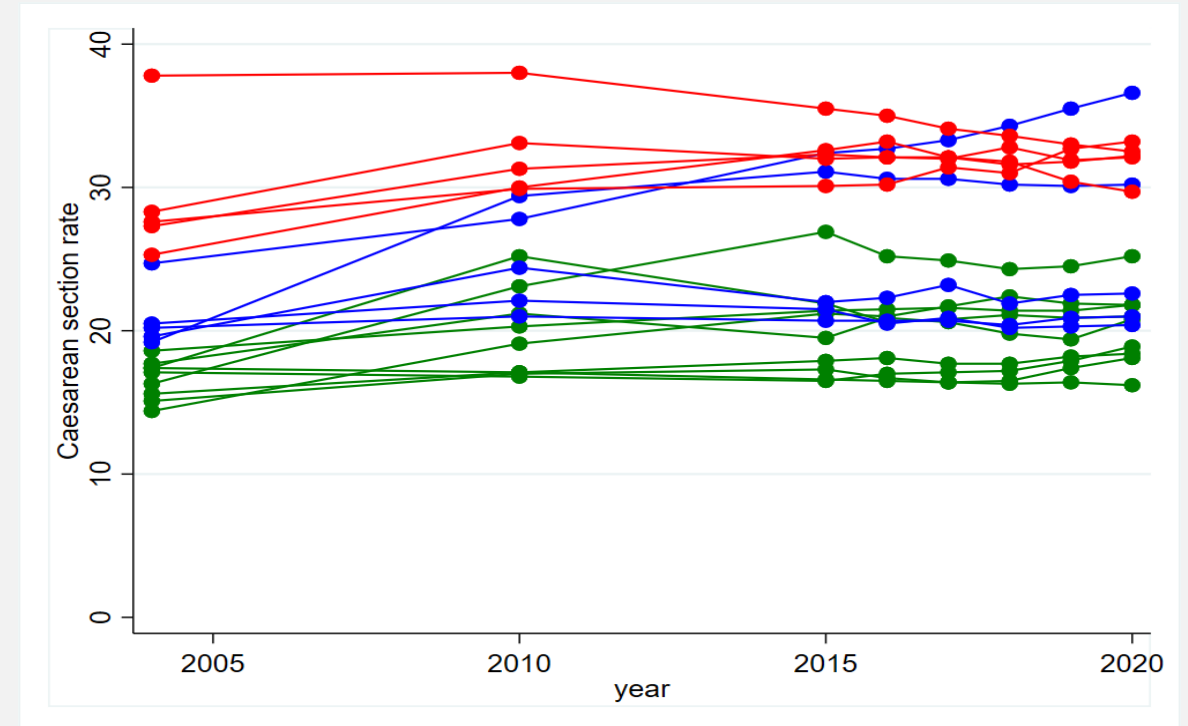


Figure 8: Caesarean section rates for preterms

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups: by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

For breeches

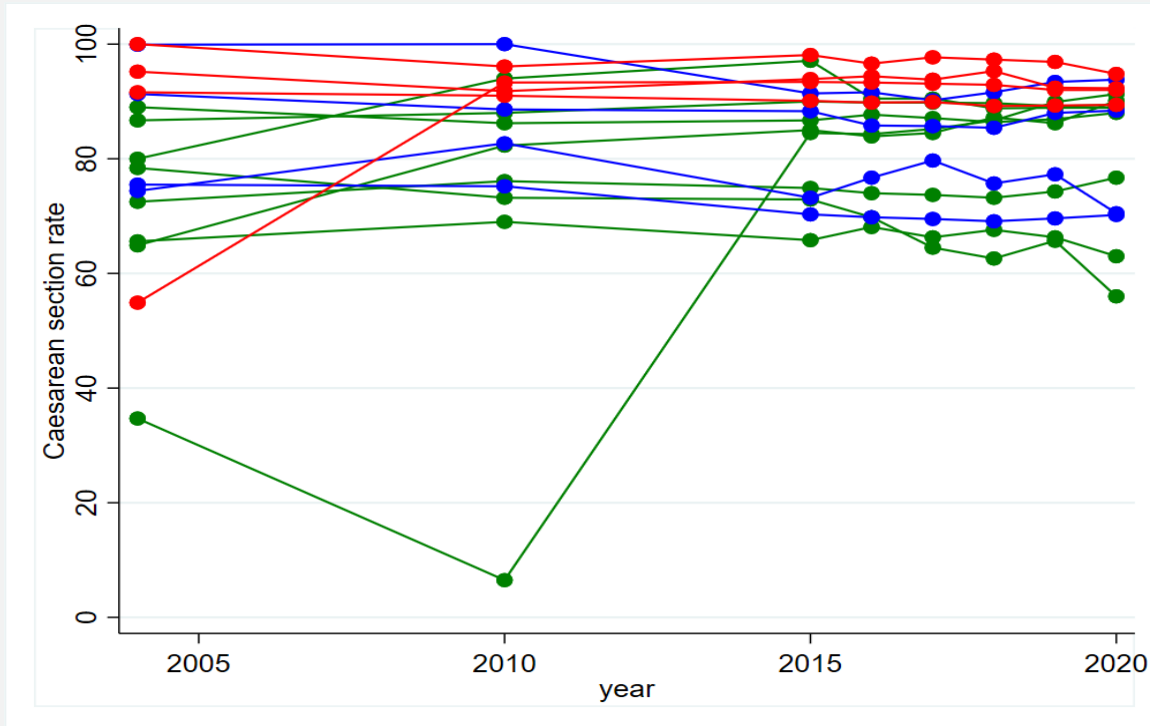


Figure 7: Caesarean section rates for breeches

The CS rates among breeches are high and practically in all tercile groups the trends are flat, rates remain mostly stable or slightly decreasing, depending on the rates at the beginning of the study period.

This probably indicates the stable practices among women with baby in breech position in observed countries.

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups: by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

For preterms

The CS rates among preterm babies are relatively stable over time. The overlaps of tercile groups might suggest different approaches to the management of preterm deliveries in different countries regardless the overall CS rates.

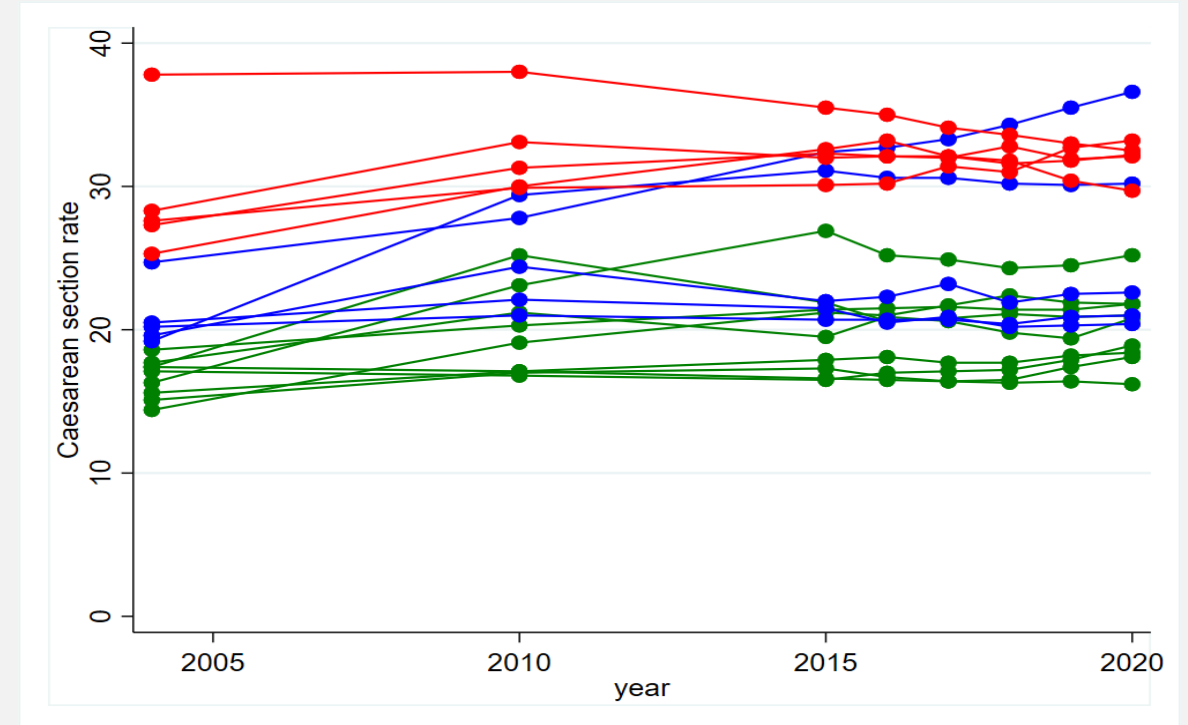


Figure 8: Caesarean section rates for preterms

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups:
by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

For prelabour CS and intrapartum CS

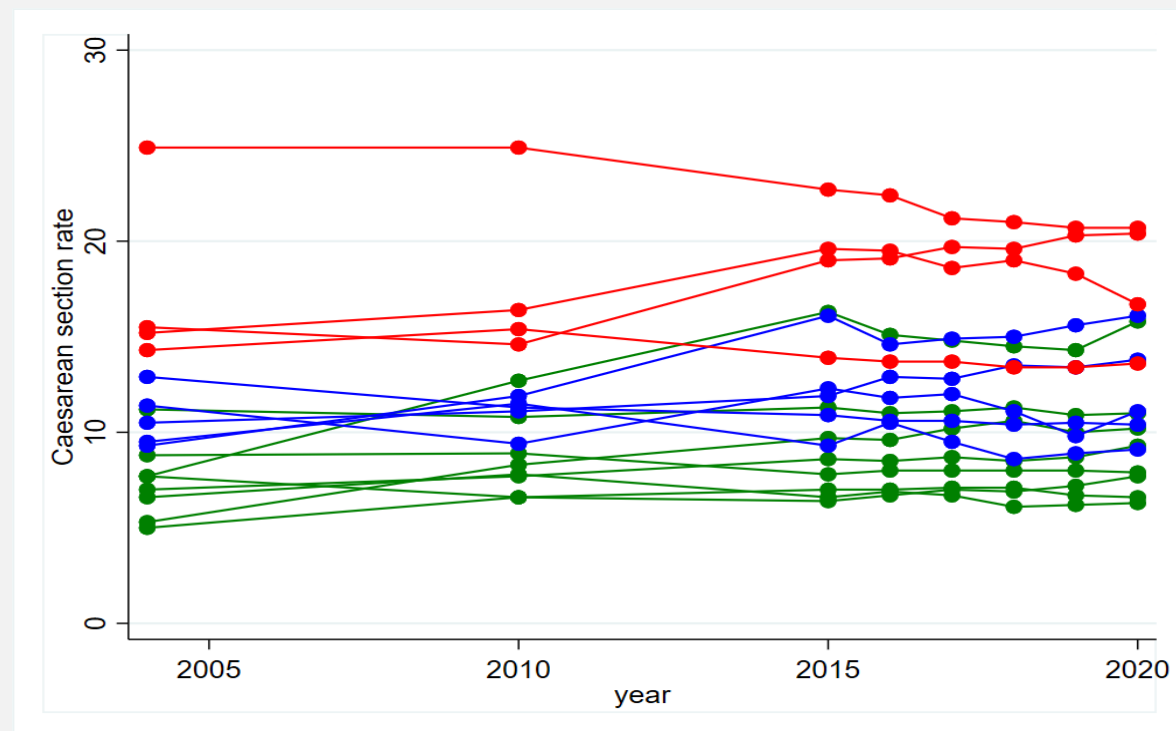


Figure 9: Prelabour caesarean section rates

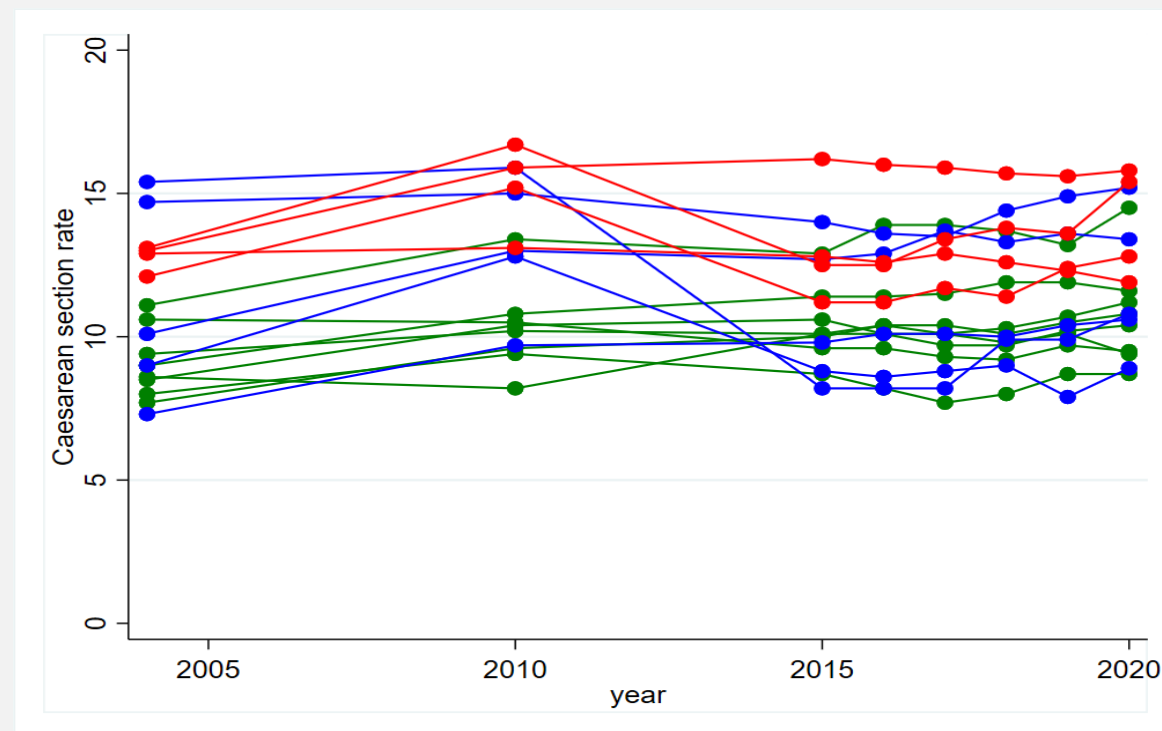


Figure 10: Intrapartum caesarean section rates

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups: by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

For prelabour CS

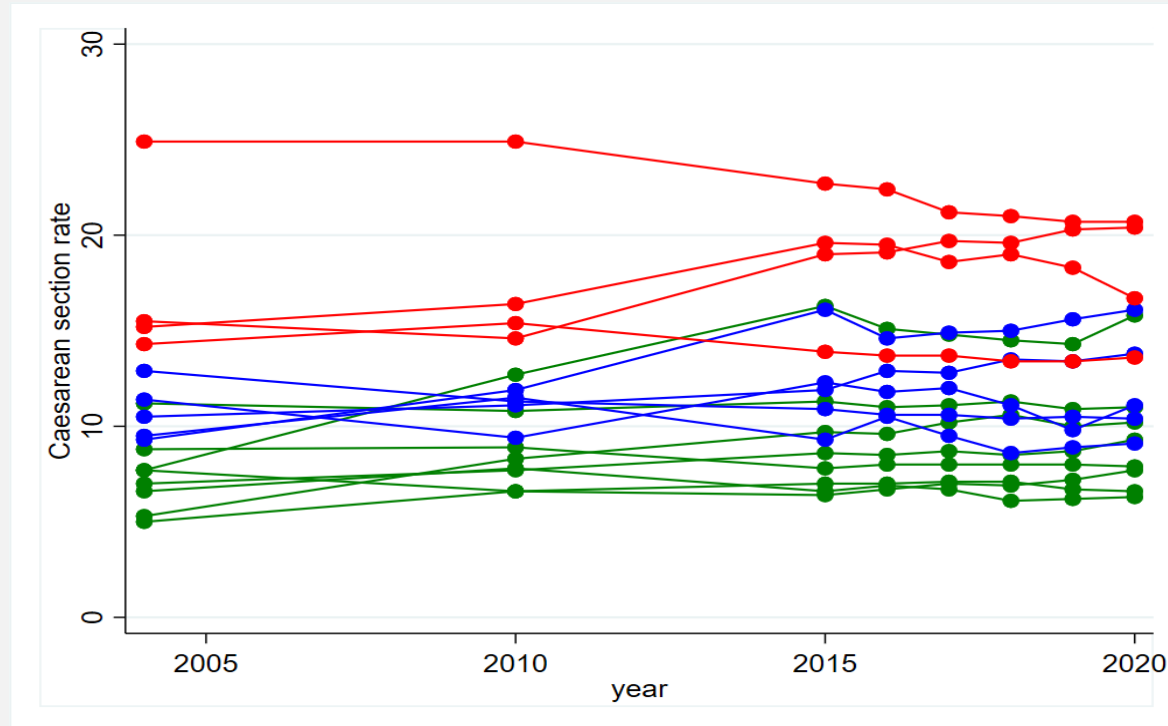


Figure 9: Prelabour caesarean section rates

The rates of CS performed before the onset of labour remained mostly stable over time, with sharper decrease in Italy (from 24.9% to 20.7%) and increase in the UK: Northern Ireland (from 15.5% to 20.4%) in the 3rd tertile group.

In the 1st tertile group the highest increase was noted in the Czech Republic (from 7.7% to 15.8%), and Slovakia had the highest prelabour CS rate in 2020 (23.5%) among all countries. In the 2nd tertile group the highest increases were noted in the UK: Scotland and UK: Wales.

The extent of elective CSs before the onset of labour might be (into some extent) related to the legal environment and role of defensive medicine.

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups: by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

For intrapartum CS

The CS rates intra-partum had increasing trends in countries with originally low SC rates overall and in this subgroup of caesarean deliveries

The decreasing trend was noted in the UK: Scotland (2nd tercile group; from 15.4% to 10.8%; this country though reported one of the highest increases of pre-labour CS rates), and further in Austria, while there was an increasing trend in France and Latvia.

In the 3rd tercile group, there were increasing trends of intra-partum CSs in Germany and Malta.

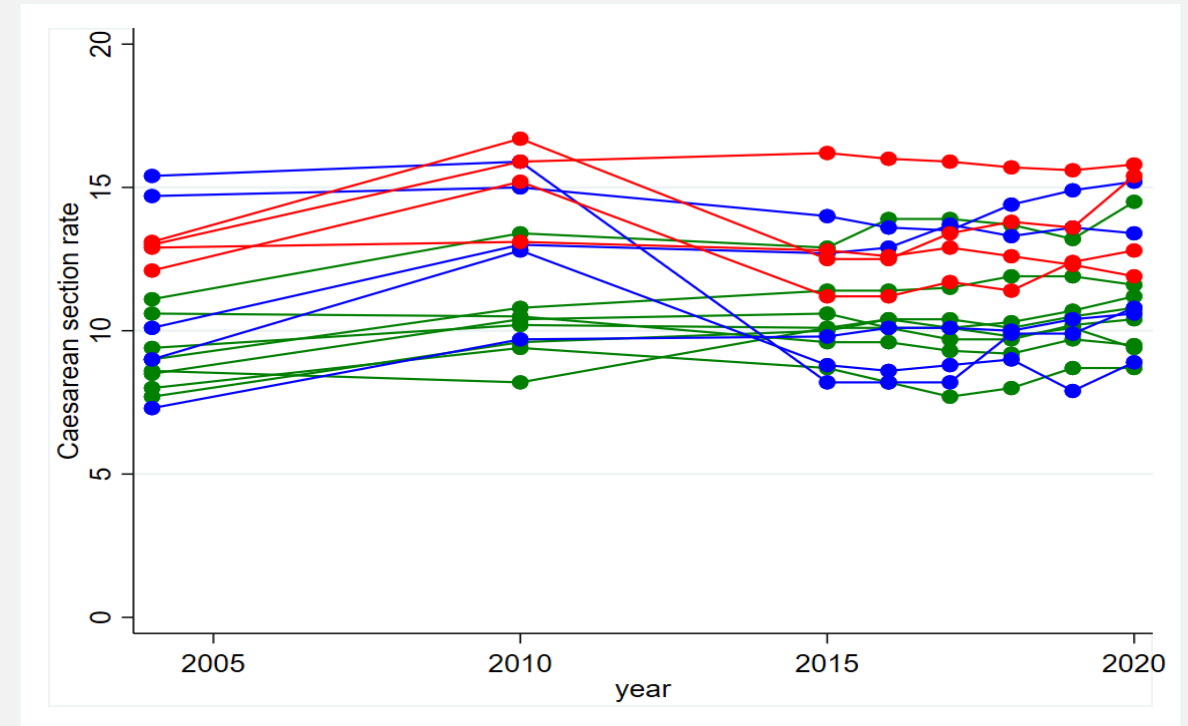


Figure 10: Intrapartum caesarean section rates

Are the country-specific trajectories for overall caesarean rates similar for all sub-groups:
by multiplicity, parity, previous CS, for breechs, preterms, by timing of CS?

By country - example

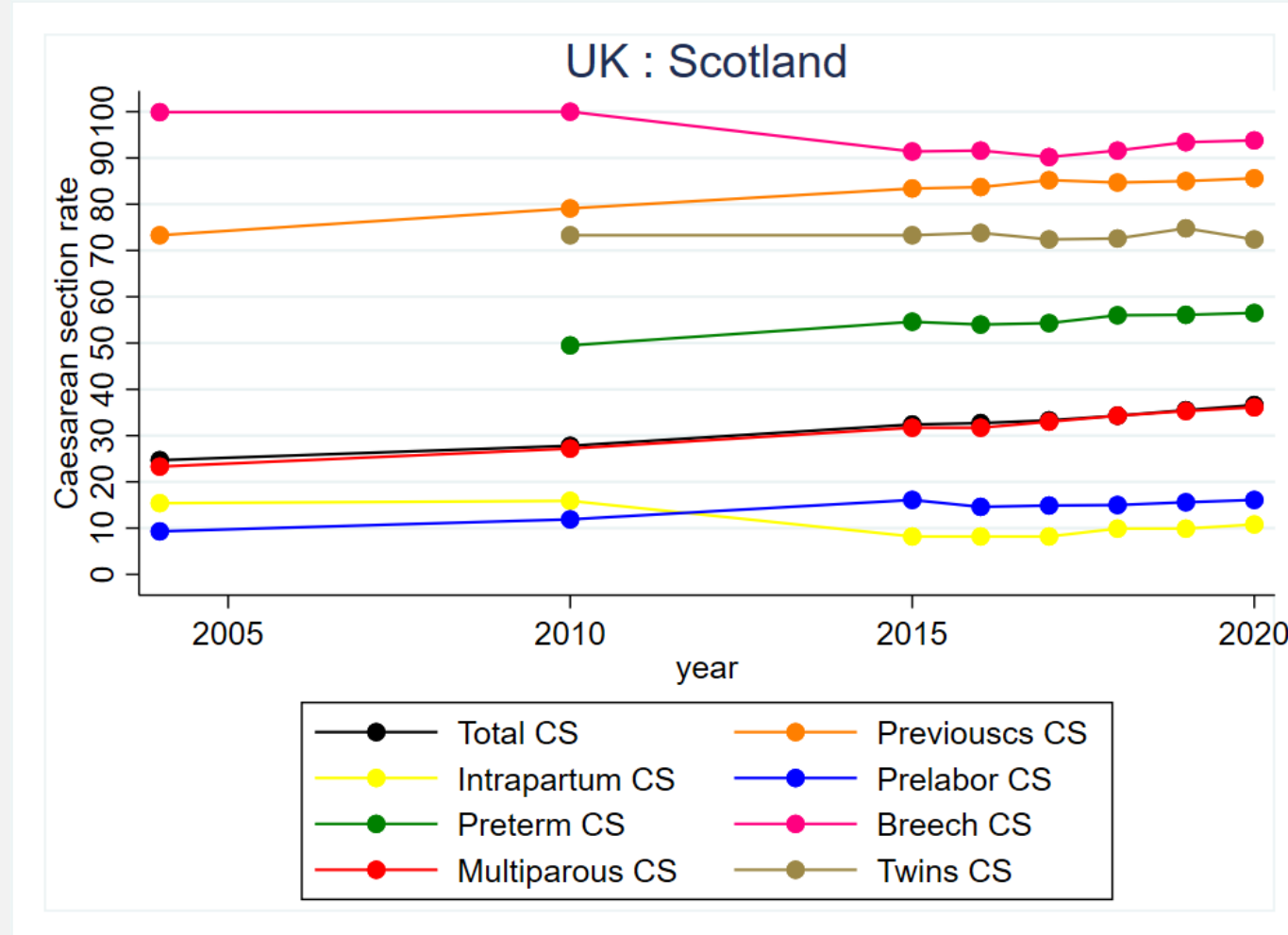
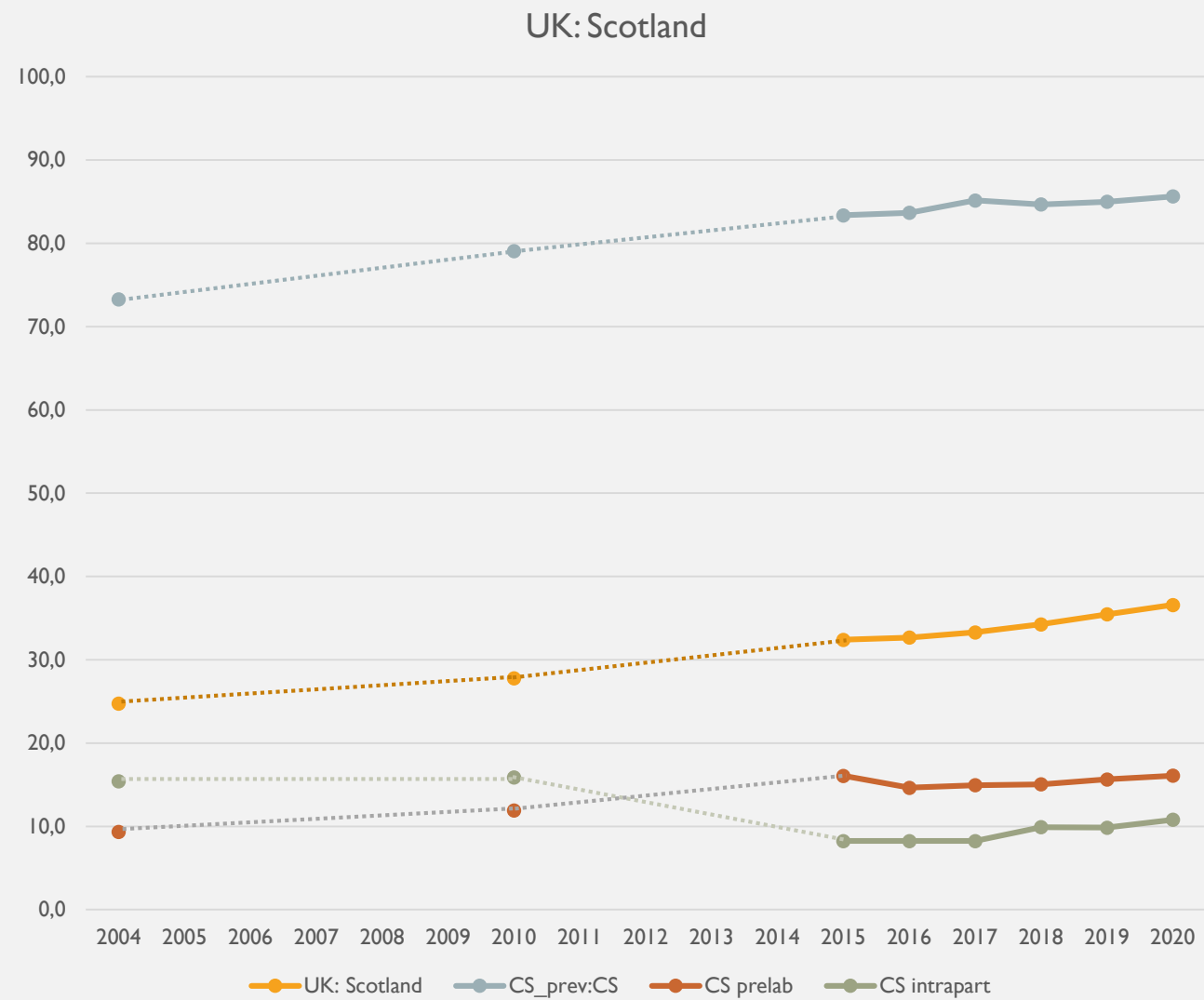
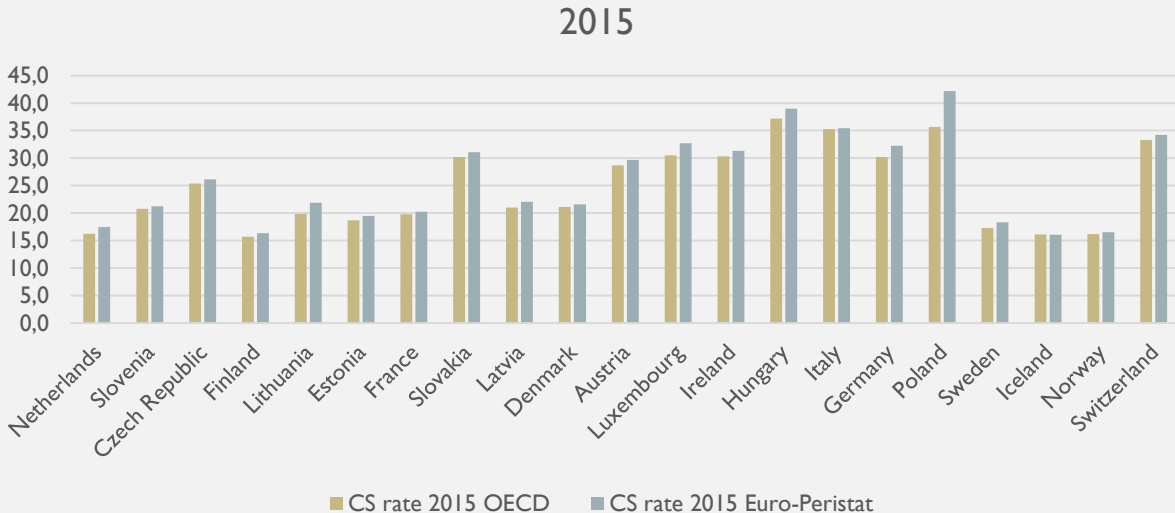
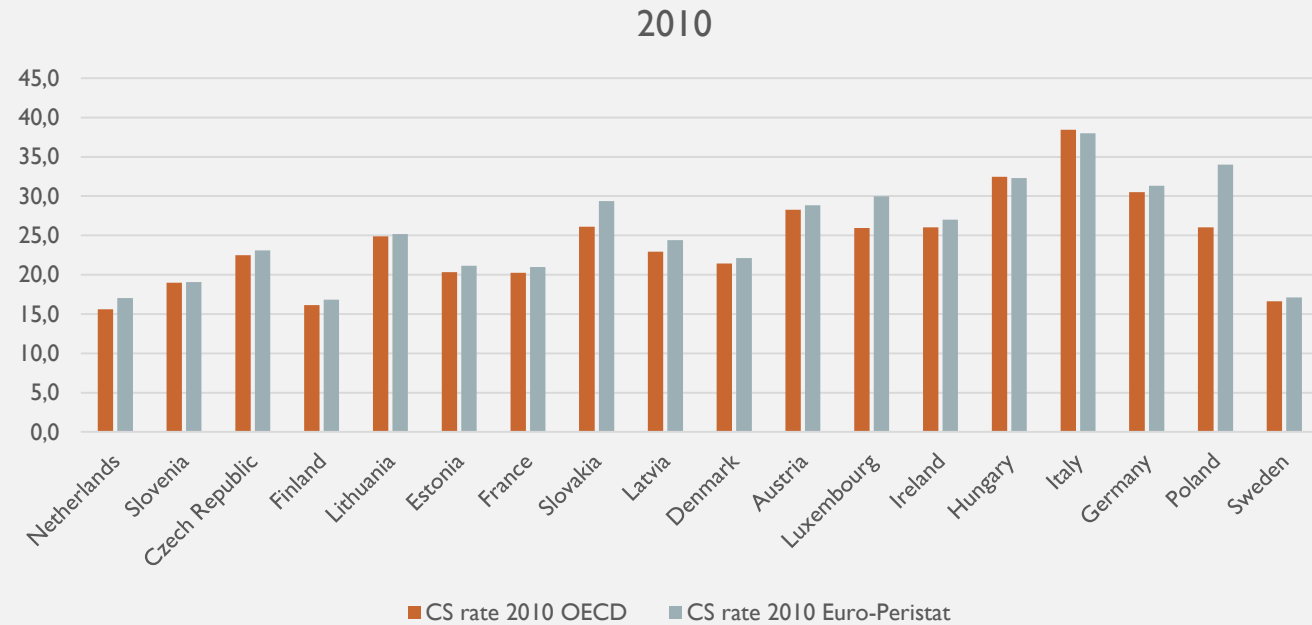
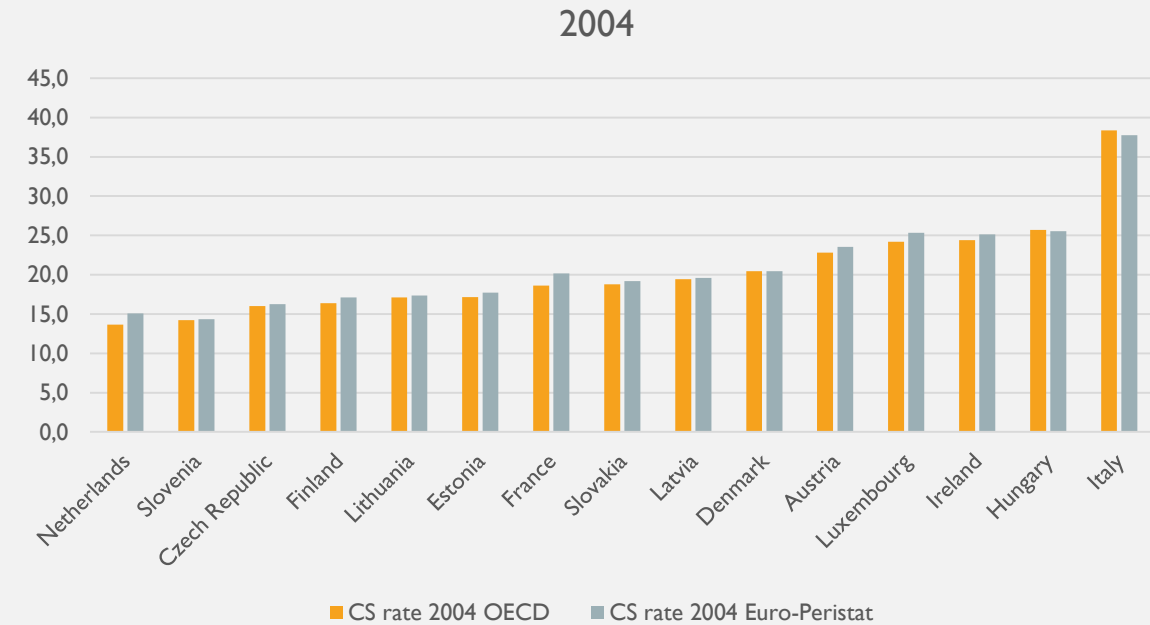


Figure 11: Caesarean section rates by sub-groups in Scotland

Example



Caesarean section rates: OECD and Euro-Peristat data



Denominators used for CS rates:

- OECD : « live births »
- Euro-Peristat: « total births » with a stated mode of delivery

Caesarean section rates: OECD and Euro-Peristat data

- Note that the OECD rates are all calculated with the denominator « live births », whereas in Euro-Peristat they are computed based on total births with a stated mode of delivery.
- Comparing Euro-Peristat with OECD – Euro-Peristat figures rates are either equal or mostly slightly higher in all three time periods 2004, 2010, and 2015.
- This is certainly interesting. Mathematically, if you consider both sources to be complete, then naturally mathematically:
- OECD rates should be higher, because their denominator is smaller.
- Therefore, if the EUROPERISTAT rates are higher, although having greater denominator, then the relative difference is even more important.

Denominators used for CS rates:

- OECD : « live births »
 - Euro-Peristat: « total births »
-
- Czech republic one-year (2022) example:
 - CS rate based on LB = 25,6%,
 - CS based on all births = 24,6, %
 - CS based on delivering women = 25.8% (important to Robson)

2004-2020 DATA AVAILABILITY

[illegible]

		Group CS	Group Total (N)	Relative size of Total/All	Group specific CS rate	Relative size of CS/All CS	Contribution of each group to CS rate	
Ten groups of the Robson classification								Evaluation remarks - questions to consider
		(N)	(N)	(%)	(%)	(%)	(%)	
1	Nullipara, single cephalic, >=37 wks. spontaneous onset	19	113	26,16	16,81	10,44	4,40	strange population
2a	Nullipara, single cephalic, >=37 wks, induced	18	61	14,12	29,51	9,89	4,17	High relative size of group 5
2b	Nullipara, single cephalic, >=37 wks, prelabour CS	24	24	5,56		13,19	5,56	Low size of Group 9_ Expected 0,6-0,7 %
3	Multipara, no CS, single cephalic, >=37 wks. spontaneous onset	4	67	15,51	5,97	2,20	0,93	OK proportion of Groups 1+2+5
4a	Multipara, no CS, single cephalic, >=37 wks, induced	4	34	7,87	11,76	2,20	0,93	High induction and prelabour CS rate in Group 2
4b	Multipara, no CS, single cephalic, >=37 wks, prelabour CS	10	10	2,31		5,49	2,31	Probably too high prelabour CS rate in Group 2
5	Multipara, at least one CS, single cephalic, >=37 wks	49	56	12,96	87,50	26,92	11,34	High CS rate in group 1_ Expected less than 10 %
6	Nullipara, single breech	17	17	3,94	100,00	9,34	3,94	Usual CS rate in Group 2a
7	Multipara, single breech	8	8	1,85	100,00	4,40	1,85	High CS rate in group 3_ Expected not more than 3 %
8	All, multiples	15	15	3,47	100,00	8,24	3,47	High CS rate in Group 4a_ Expected 4-6 %
9	All, single transverse or oblique	1	1	0,23	100,00	0,55	0,23	High CS rate in Group 4_ Expected up to 20 %
10	All, single cephalic, < 37 wks	13	26	6,02	50,00	7,14	3,01	High CS rate in group 5_ Expected 50-60 %
Total number of women delivering by CS (All CS)		182		100,00	42,13	100,00	42,13	
Total number of delivering women (All)			432					

Please, enter the logbook data:

Period (month/year):	V.22
Number of deliveries:	432
Number of CS:	182

NOTE: Evaluation remarks are based on the following publication:
Robson M, Hartigan L, Murphy M (2013) Methods of achieving and maintaining an appropriate caesarean section rate.
Best Pract Res Clin Obstet Gynaecol 27: 297–308.