Partitioning International Genetic Trends by Origin in Holstein bulls

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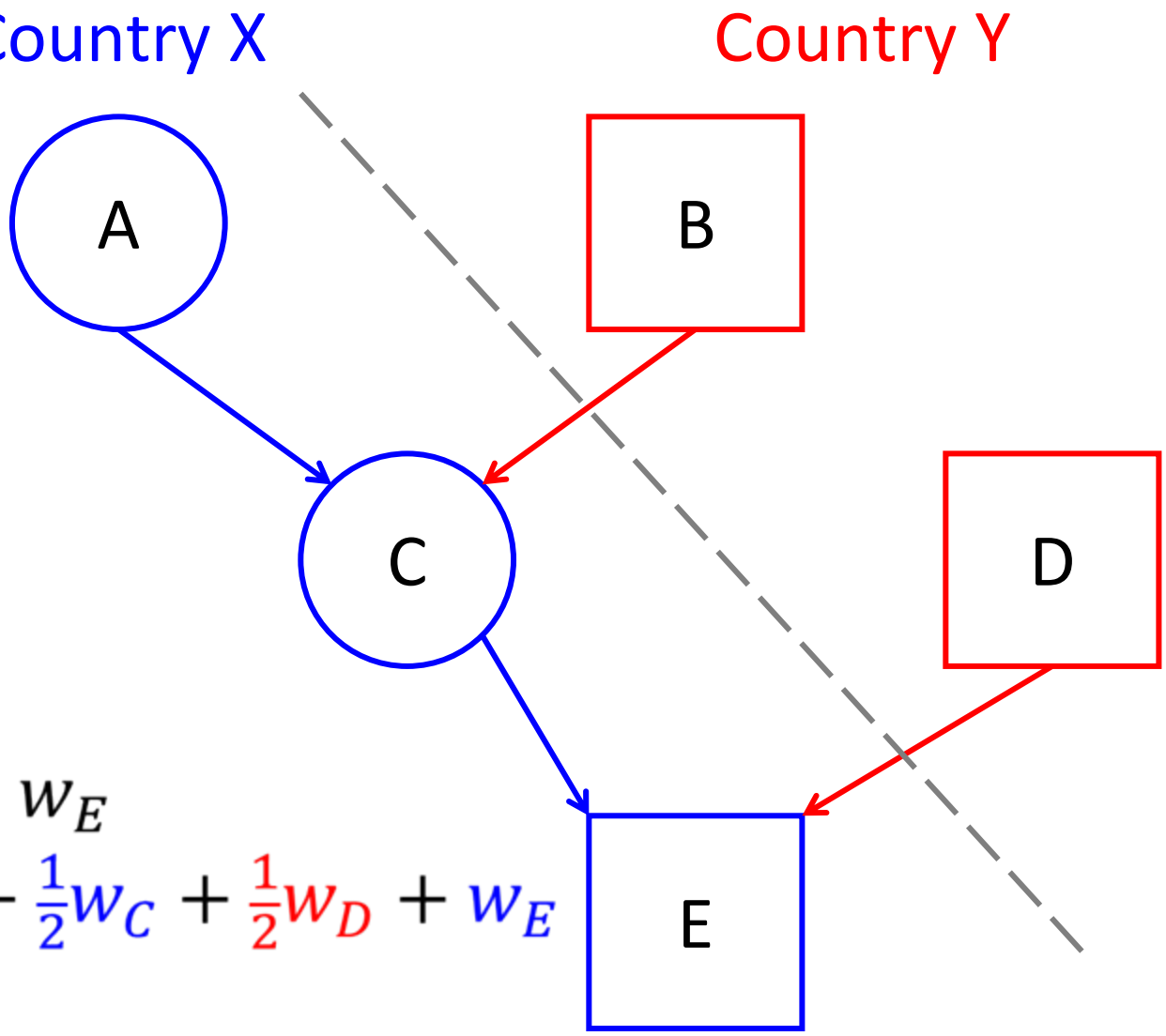
Introduction

- Globalized Holstein breeding
  - domestic selection
  - import of foreign animals/semen/…
    - upgrading population
    - supplementing national selection
    - exclusive reliance on import

- Strategic use of limited resources?!

- AIM: Assessment of country contributions to total merit index trends on <u>global (world-wide)</u> and <u>local (national) scale</u>

Partition EBV by the country of origin



$$a_E = \frac{1}{2}a_C + \frac{1}{2}a_D + w_E$$

$$a_E = \frac{1}{4}w_A + \frac{1}{4}w_B + \frac{1}{2}w_C + \frac{1}{2}w_D + w_E$$

$$a_E = a_{E,X} + a_{E,Y}$$

Material

- Interbull Holstein MACE results
  - USA, GBR, IRL, and NZL scale
  - 37 traits
  - Total merit index (USA, GBR, IRL, and NZL) (145,611 bulls, protein as „reference“)

- Number of daughters per bull (1980-2003)

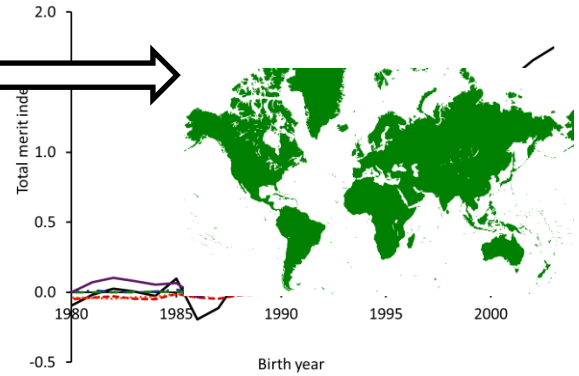
USA	GBR	IRL	NZL
			
21,261	6,529	1,537	4,849

Analysis workflow

Partition

Summarize

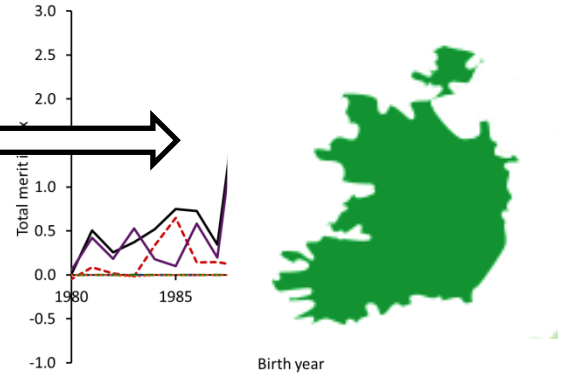
Global



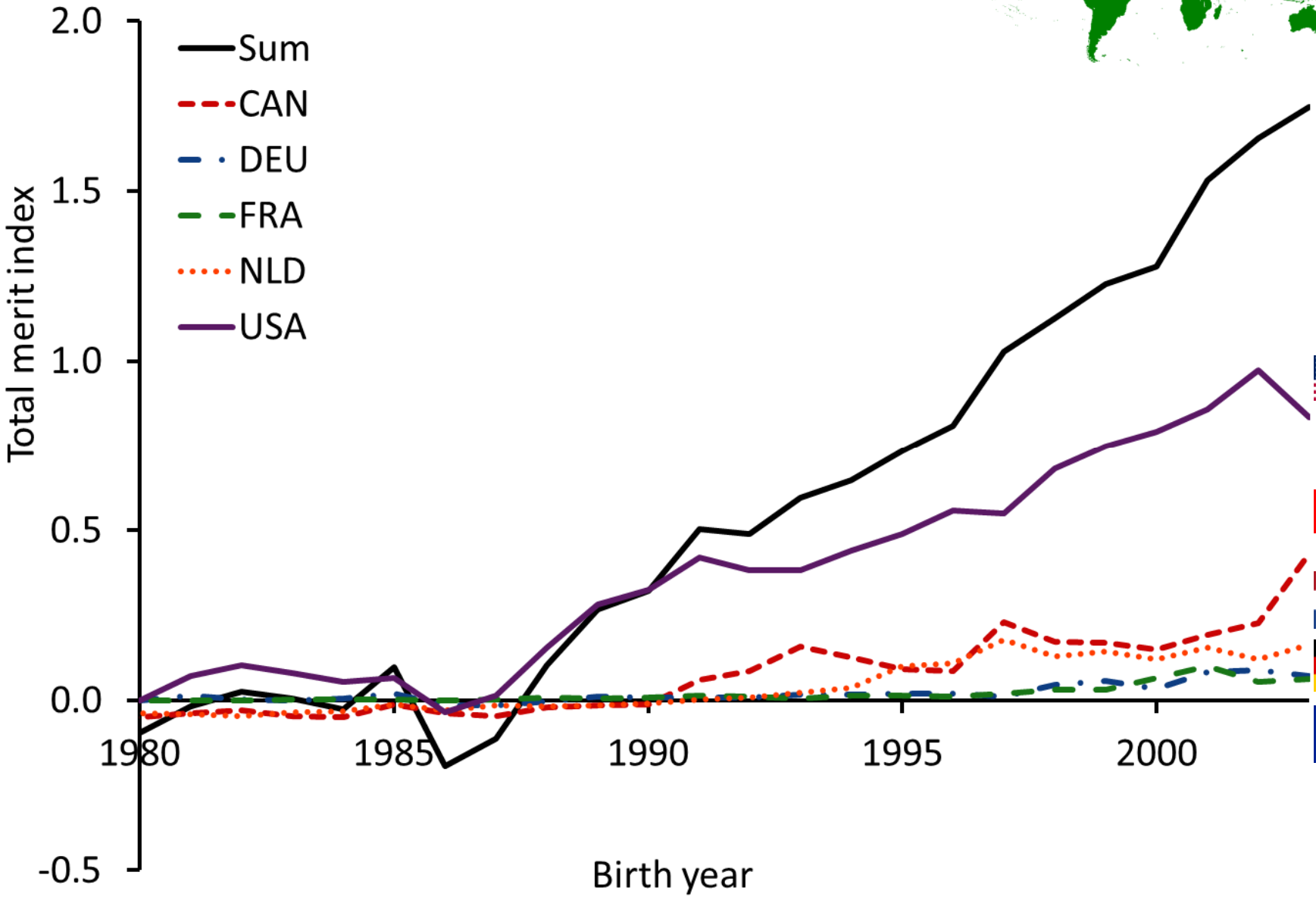
Weight by #daughters in a country

Local

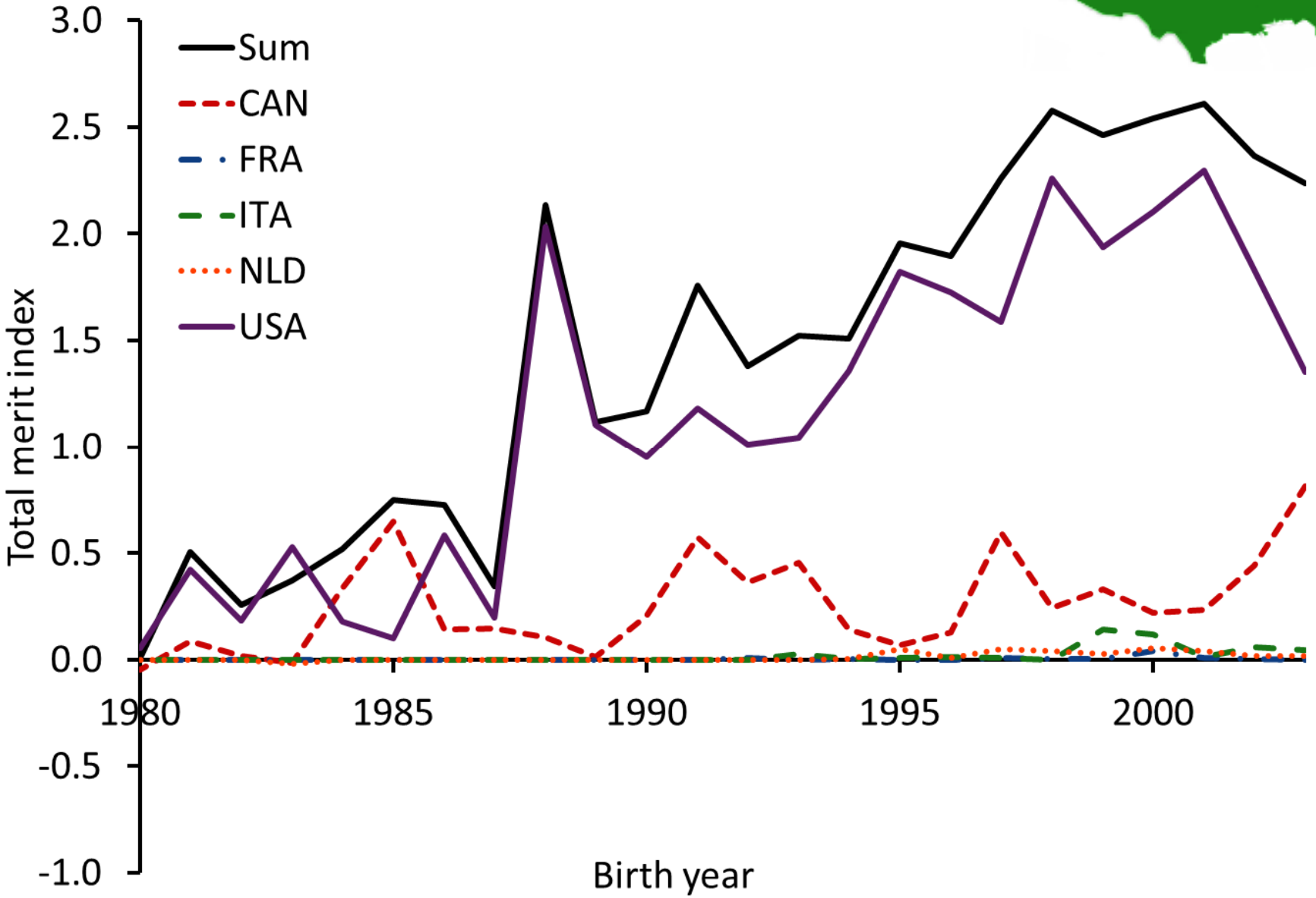
Summarize



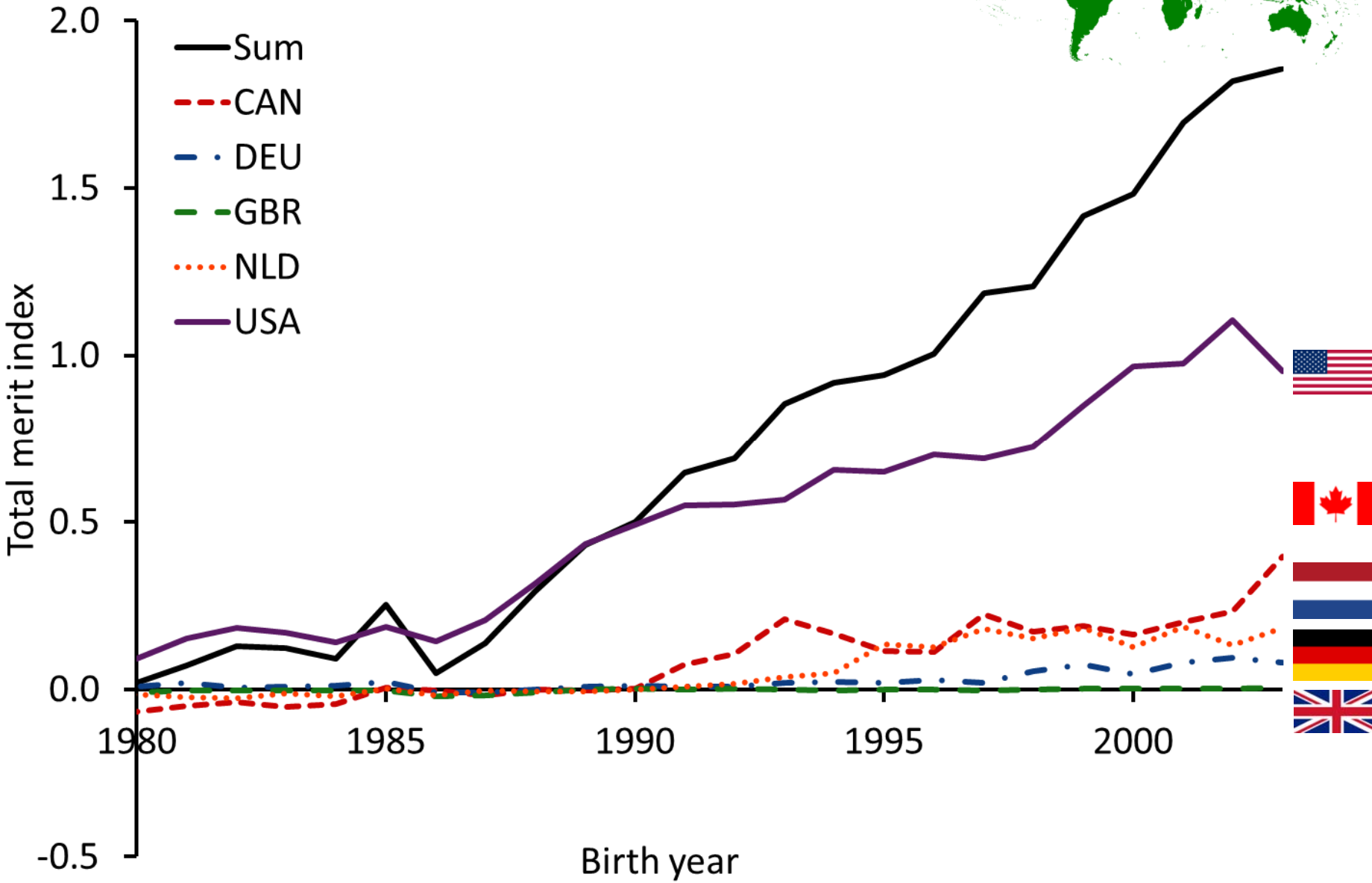
Global USA TMI (NM)



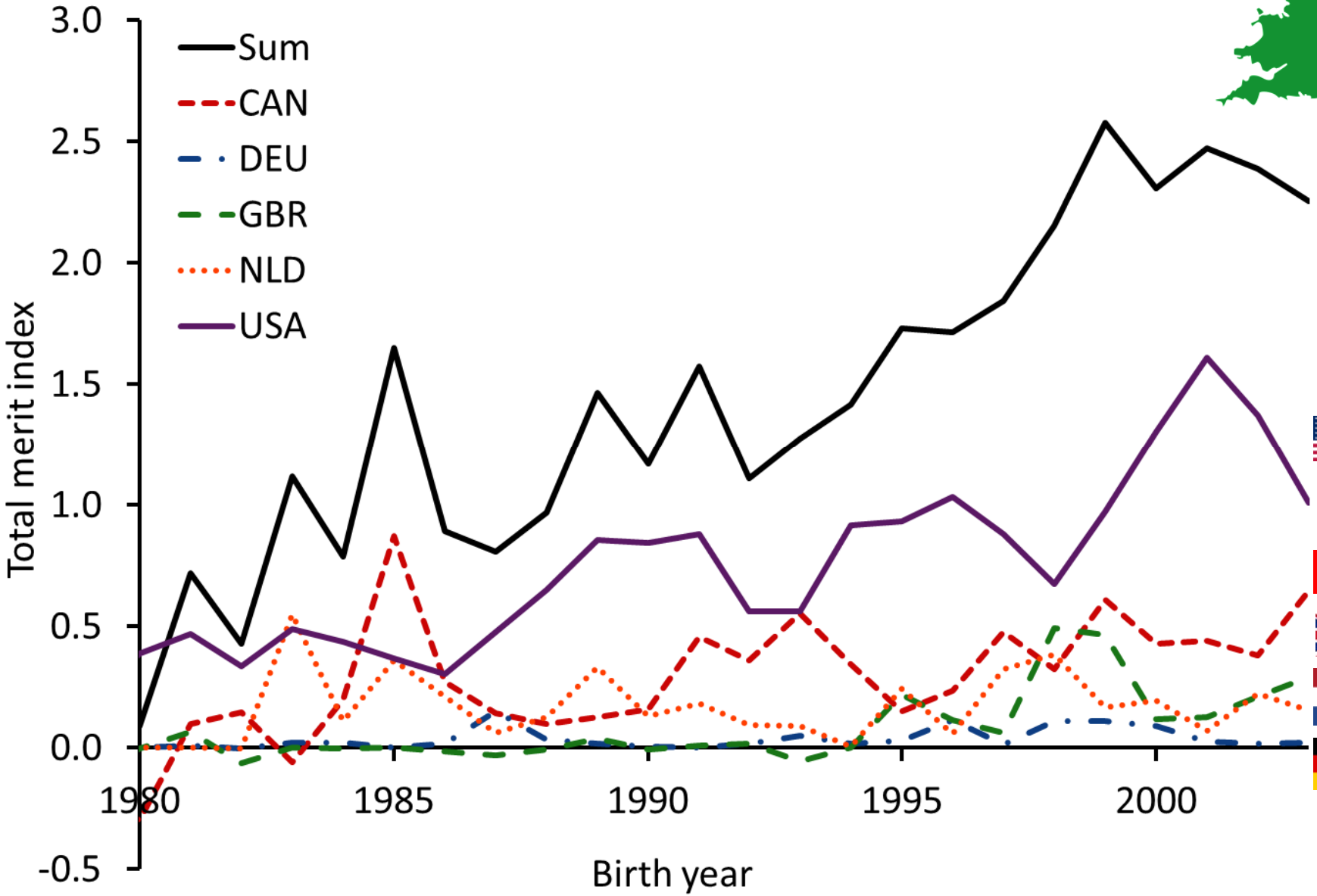
Local USA TMI (NM)



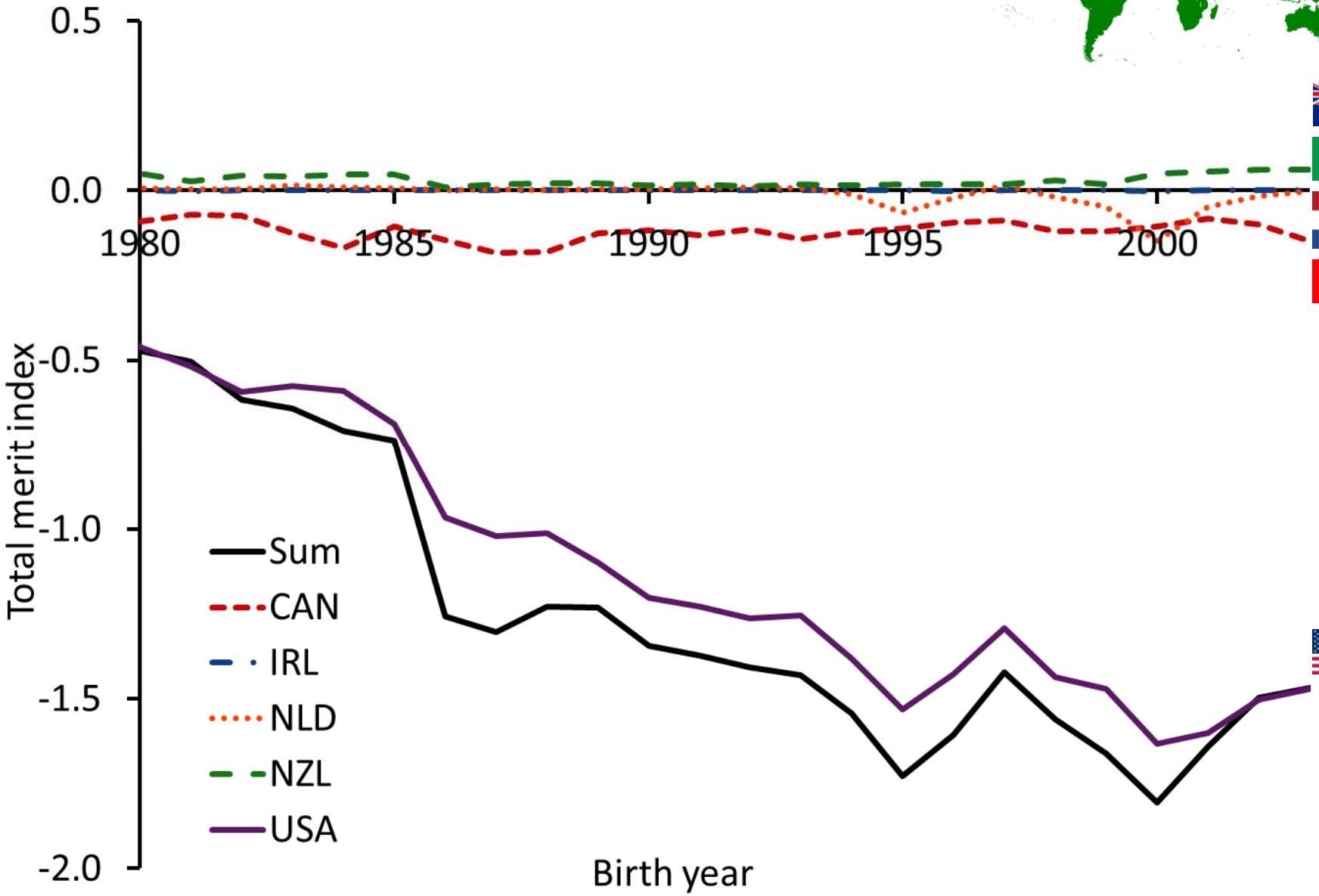
Global GBR TMI (PLI)



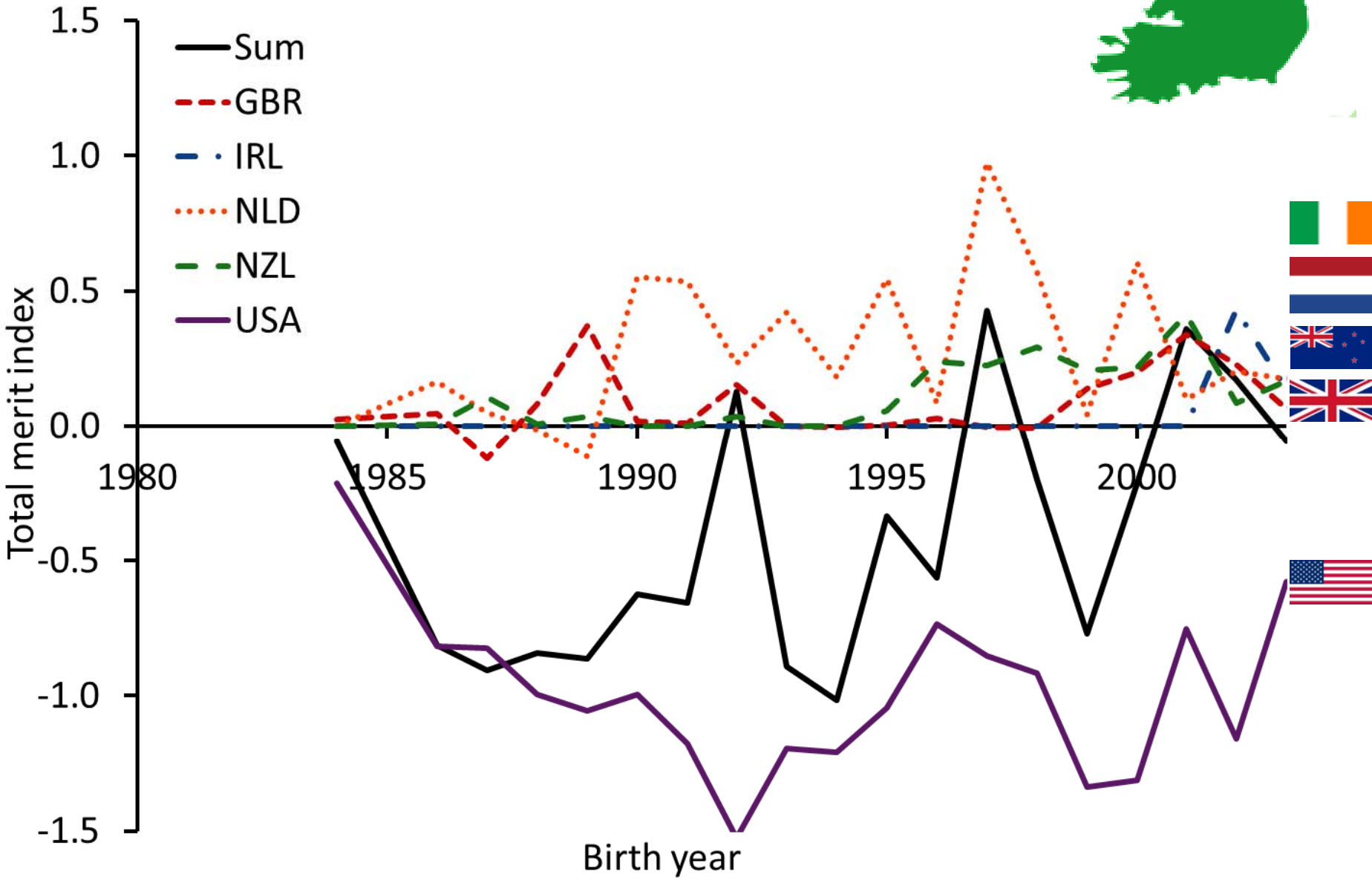
Local GBR TMI (PLI)



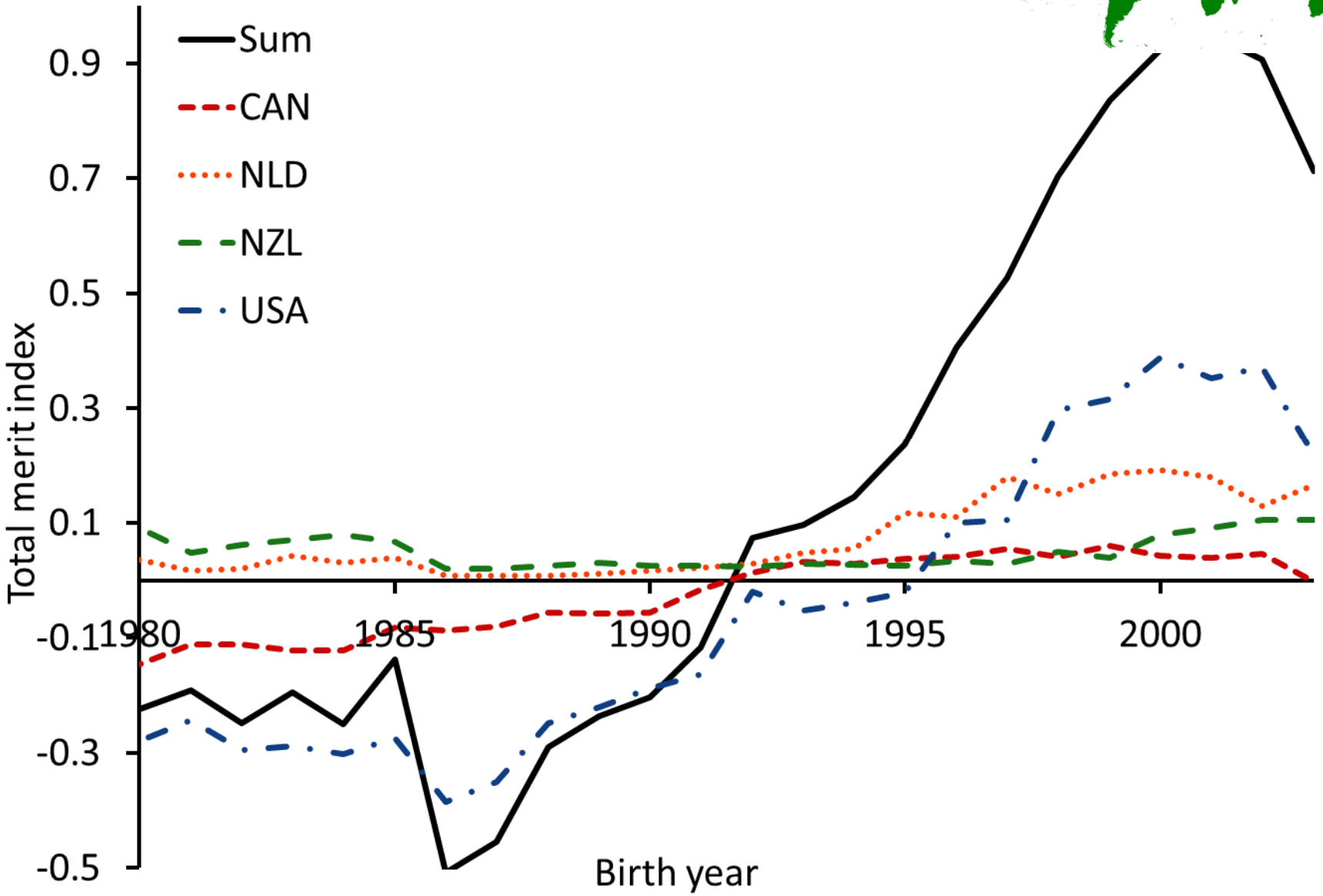
Global IRL TMI (EBI)



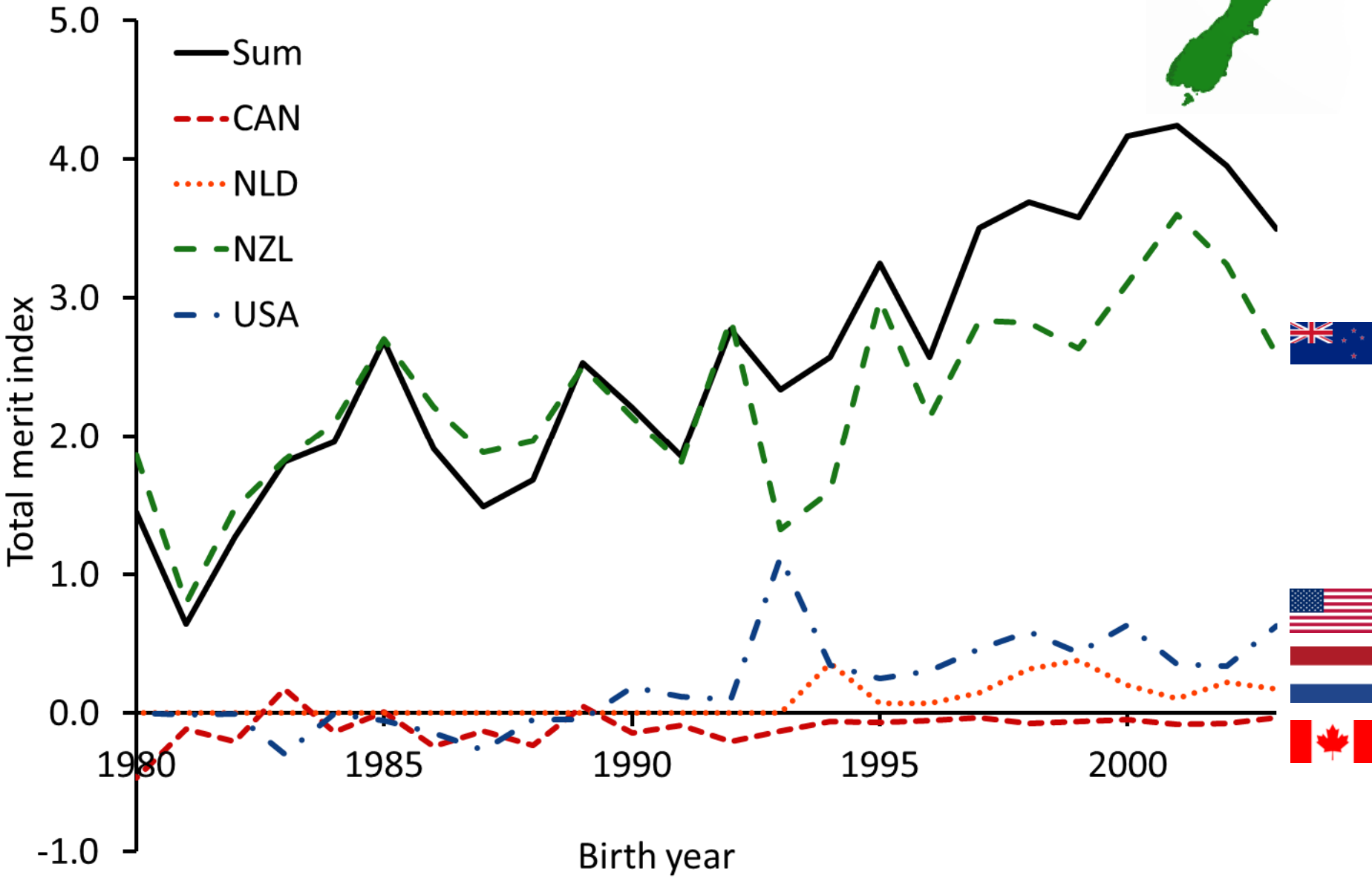
Local IRL TMI (EBI)



Global NZL TMI (BW)



Local NZL TMI (BW)



Conclusions

- Major influence of USA on global scale (in „decline“)
- GBR – faster improvement locally in comparison to the global trend
- NZL & IRL – different trait emphasis!
  - NZL capitalized on their domestic infrastructure
  - IRL lost opportunity, fast recovery on the way

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