Why is the forest growth in Sweden decreasing? Attribution of factors affecting the observed decline during recent years

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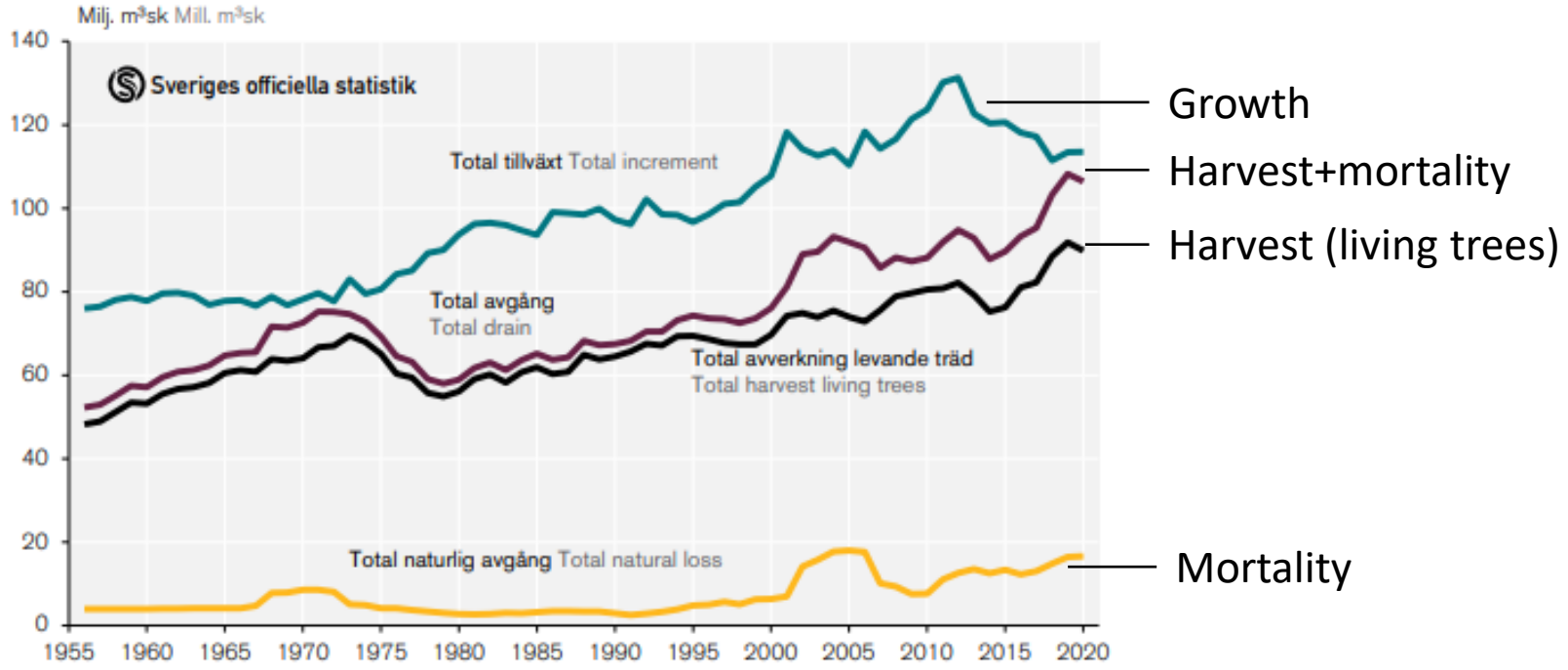
National Forest Inventory

Forest growth, harvest and mortality
-millions of m^3

Official statistics from the NFI:
”Forest statistics 2024”



Figur 1.12 **Total årlig tillväxt (inklusive tillväxt för avverkade träd), total årlig avgång, total årlig avverkning av levande träd och total årlig naturlig avgång. Riksskogstaxeringen 1956–2020.**
Alla ägoslag förutom bebyggd mark. Inklusive fjäll fr.o.m. 2017. Utanför formellt skyddade områden enligt 2022 års gränser. Glidande femårsmedelvärden.

Method

- Growth is estimated by the NFI using
  - Permanent plots
    - Diameter increment, 5-yr inventory interval
  - Temporary plots
    - Five years year rings from sample trees

Why is the forest growth in Sweden decreasing?

- Analysis of the factors
  - Standing volume
    - Higher volume = higher growth
  - Age class distribution
    - Higher proportion of mid-aged forests = higher growth
  - Growth percentage
    - Higher quota growth/standing volume = higher growth
- Data from the NFI

Method

Fridman, J., Westerlund, B. and Appiah Mensah A.

arbetsrapport_540.pdf (in swedish)

$$I_2 - I_1 = \sum_i V_{1i} P_{1i} (A_{2i} - A_{1i}) + \sum_i A_{1i} P_{1i} (V_{2i} - V_{1i}) +$$

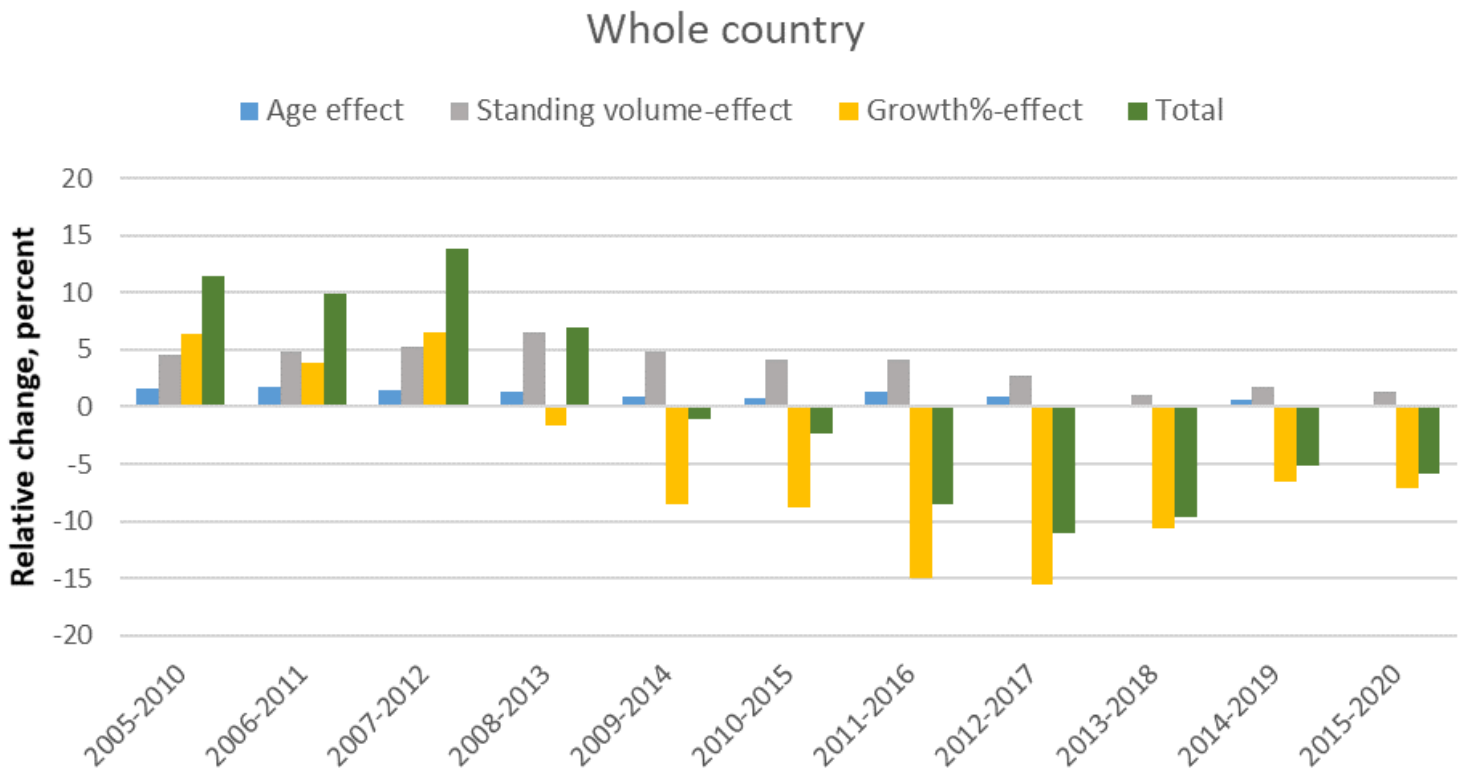
$$\sum_i A_{1i} V_{1i} (P_{2i} - P_{1i}) + V_2 P_2 (A_2 - A_1) + \text{Interaction effect}$$

where:
I=total growth
Ai=area forest land within age class i
Vi=volume/ha within age class i
A=total forest land area
V=volume/ha all forest
P=growth percentage for all forest
1, 2=period 1 and 2

SLU

Results

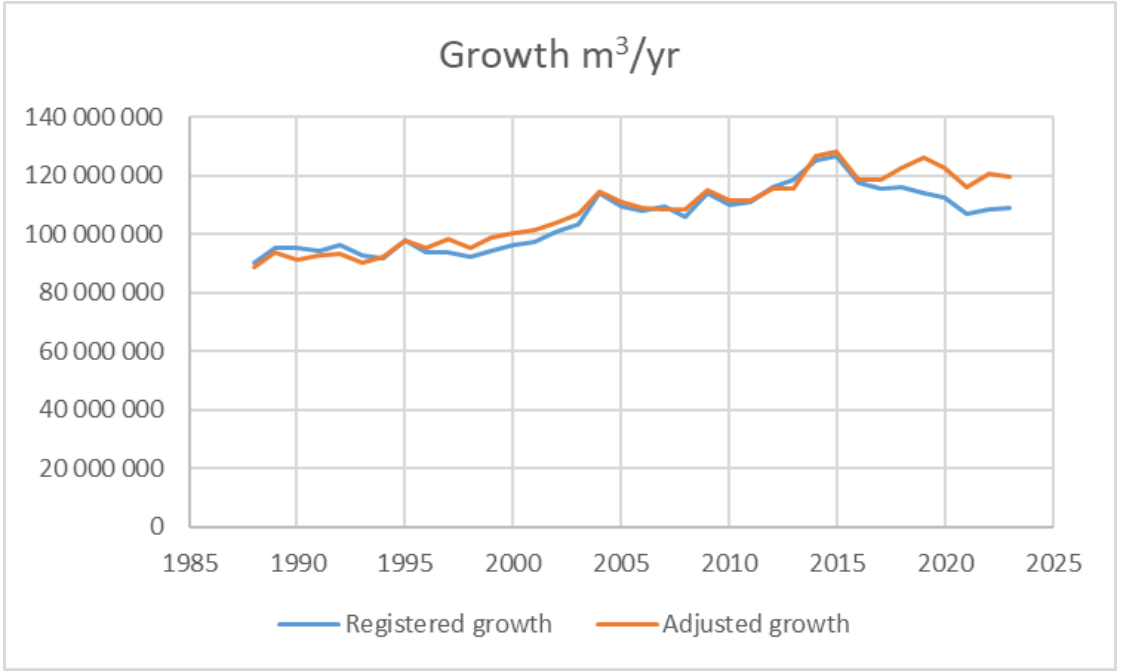
Growth increase in percent per 5-yr period. Divided in main factors.



Results

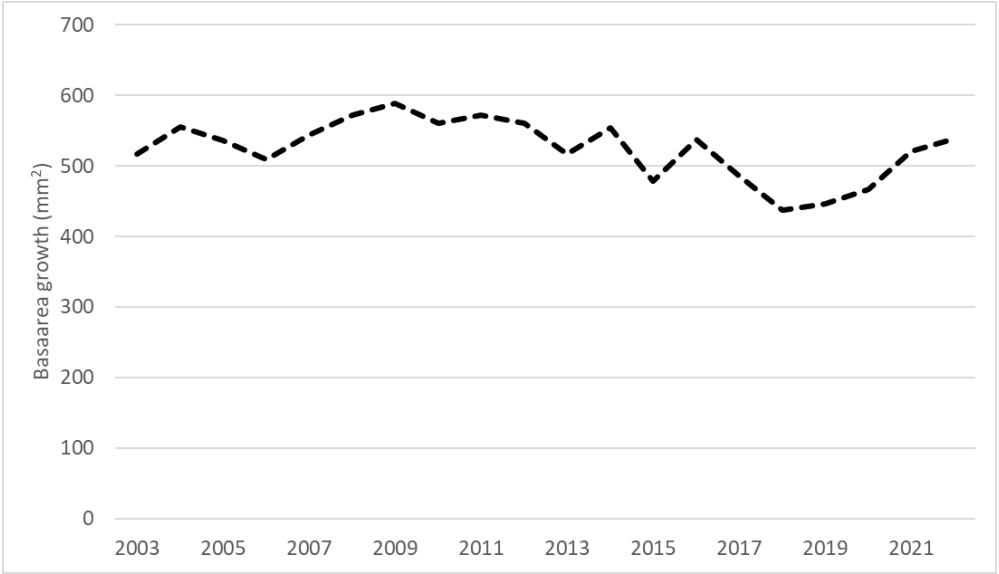
Registered growth= actual growth

Adjusted growth= (weather corrected), what the growth would have been in ”normal” weather, actual growth adjusted by applying mean growth during the latest 60 years.



Discussion

- The results points ut the growth of the individual trees
  - Implying that the reason is weather/climate, not induced by forestry
- Why have the growth of the individual trees declined?
- Drought 2018, especially spruce in the south
- VPD (vapour pressure deficit)?
  - No conclusions yet



Thank you