Crop Diversity and Income Stability on Farms in Bavaria

Composition of Portfolios Is More Crucial than Pure Quantity of Crops

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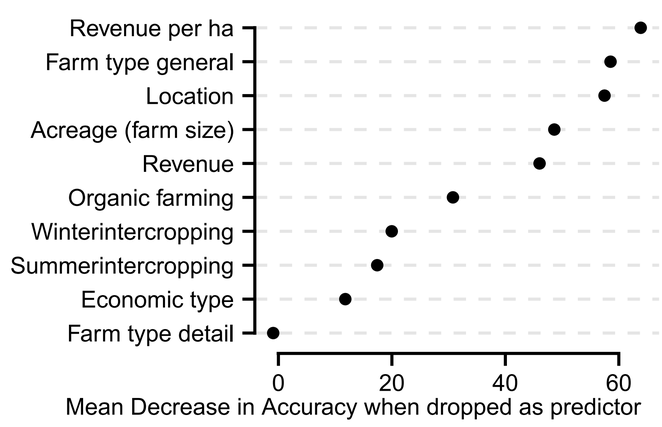
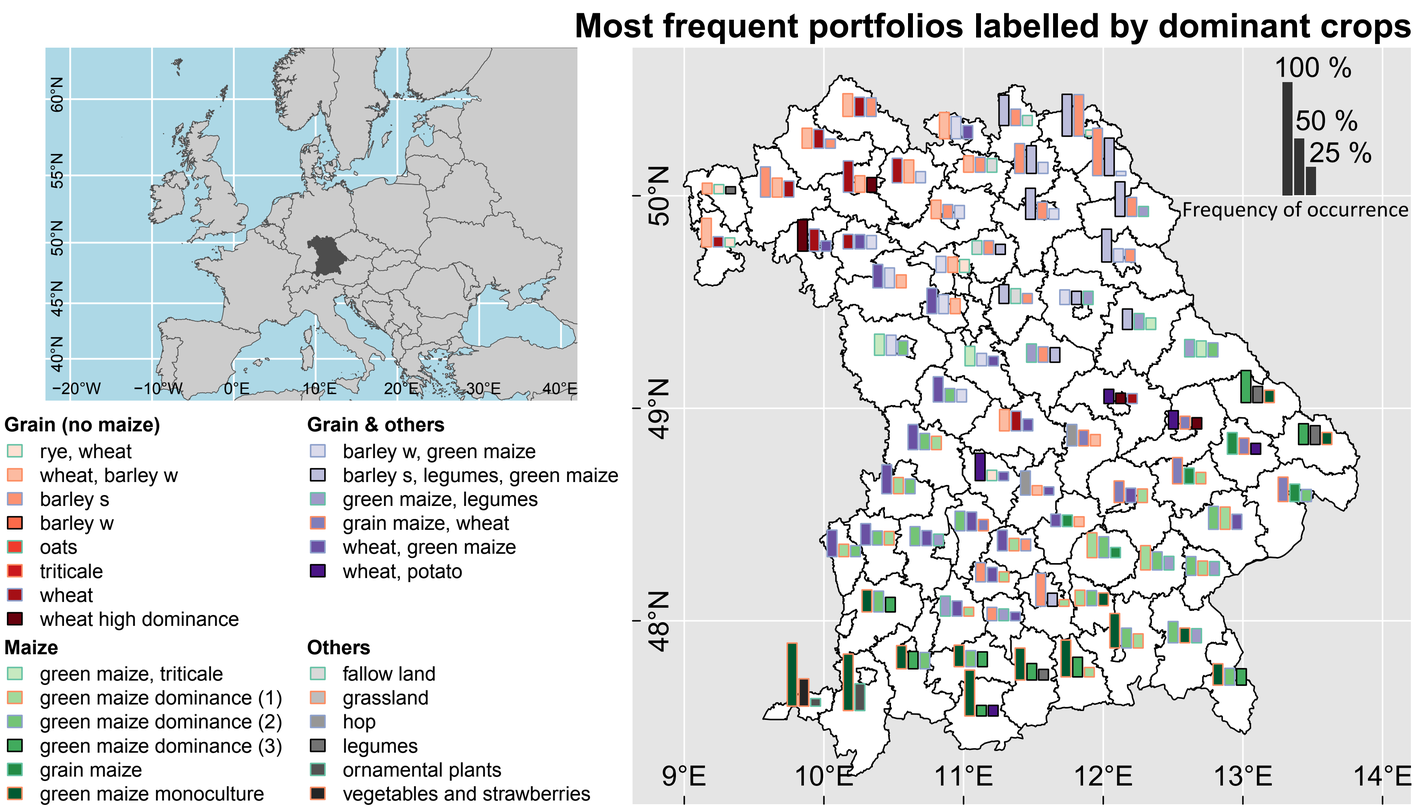
Background

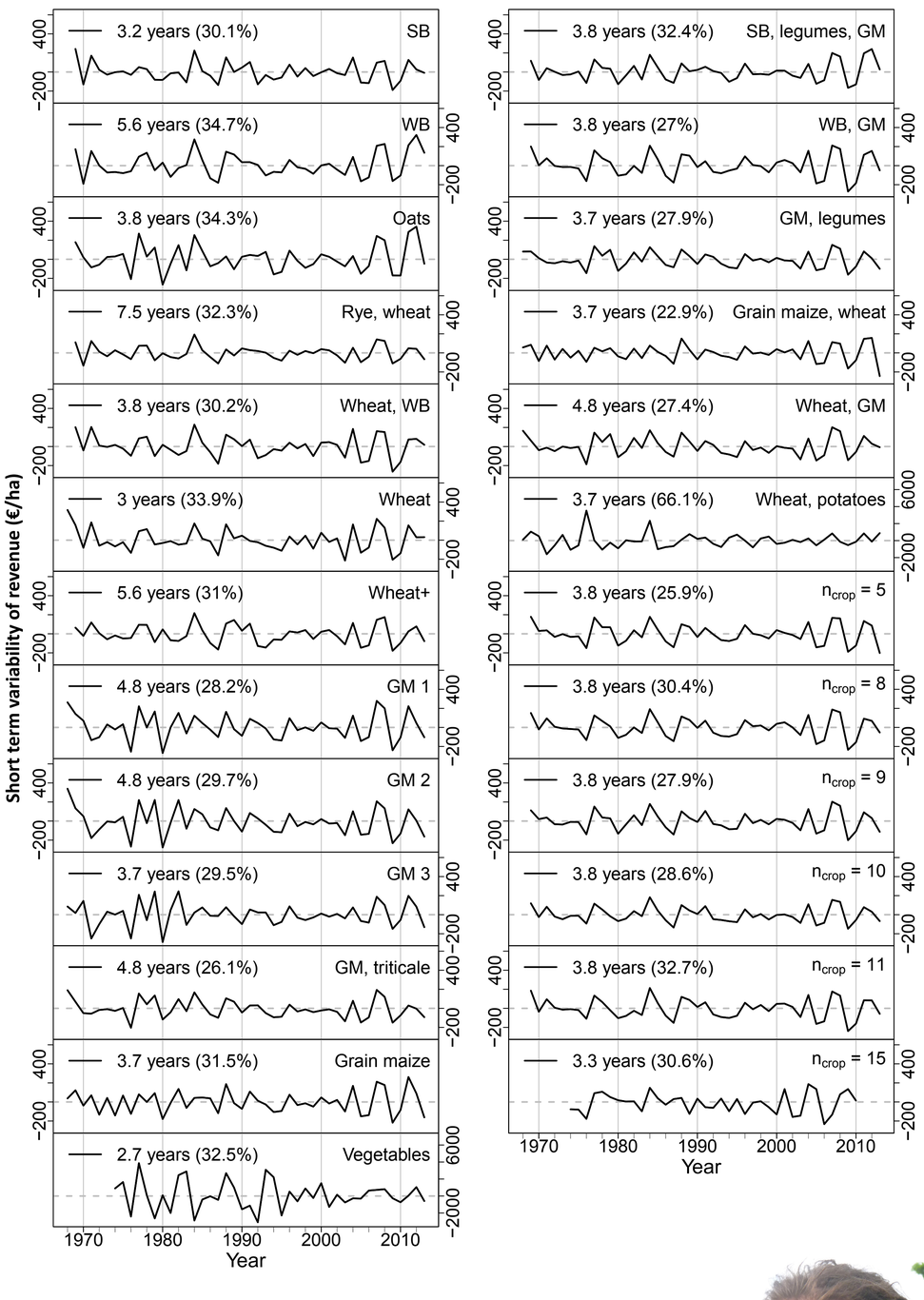
The stability of agricultural productivity is important for economic success at farm level. Portfolio theory applied on arable land, i.e. scattering of risks by a diverse crop portfolio, can mitigate risks for farm income (important in times of decreasing market support in the EU). Besides providing this insurance effect, crop diversity is important for provision of ecosystem services on-site as well as off-site (e.g. food provision, soil organic carbon accumulation, reduction of agro-chemical leaching).

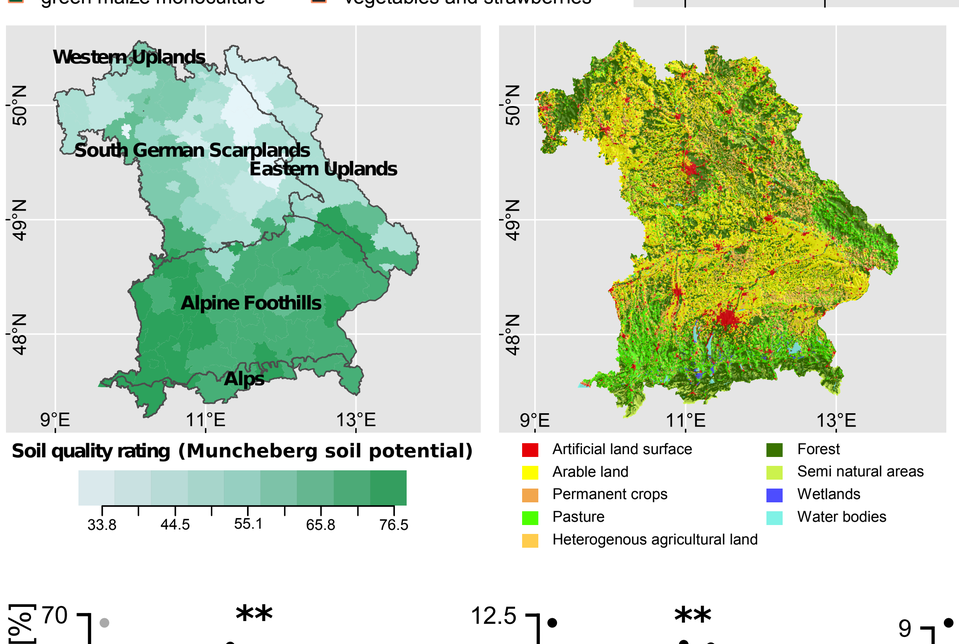
Results

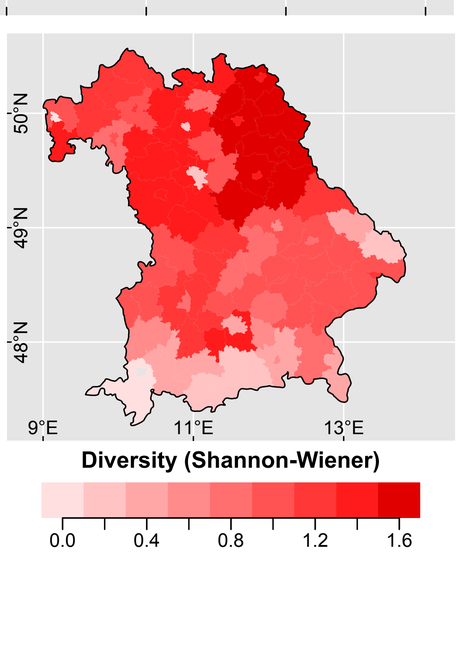
Besides farm characteristics such as whole farm income, farm type, and farm size, location explained portfolio choice. In areas of poorer soil quality, portfolios were more diverse and more risk reducing.

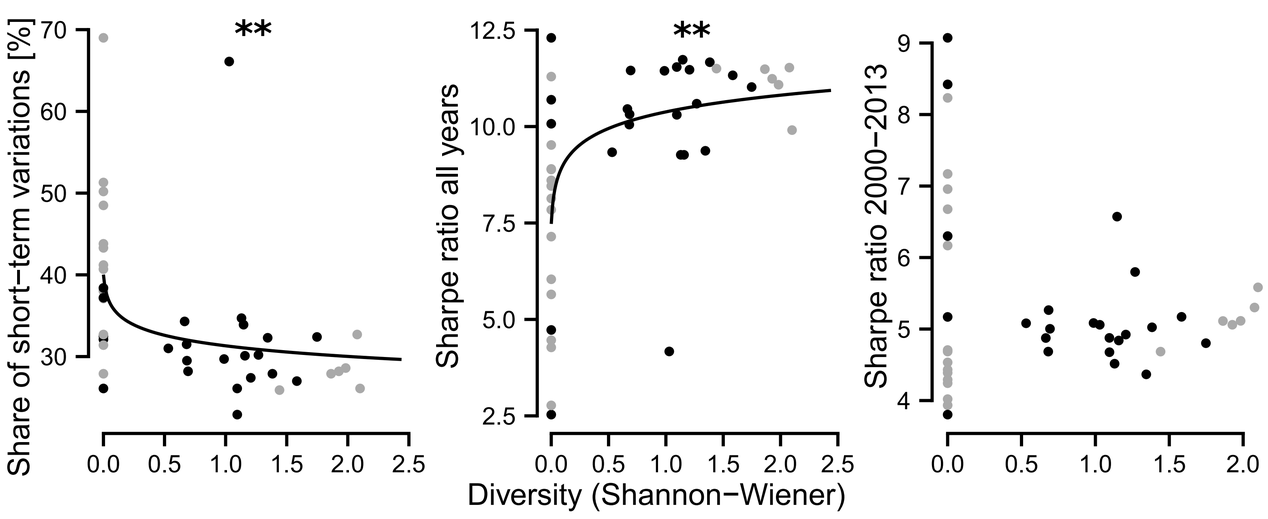












The diversification of portfolios mitigated yield failure and income risk in the long term, but this effect was less pronounced in recent years. High market prices for few specific crops occasionally favour agricultural intensification and simplified portfolios.

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Methods

- *Clustering for large applications* was applied to detect typically cultivated portfolios within the Bavarian agricultural census (all Bavarian farms N = 79 532)
- Time series of yield and revenue were decomposed in trend, multi-annual components, and short-term variability using *singular spectrum analysis* (SSA).
- The relationship of farm characteristics and choice of portfolios was analysed with *random forest* analysis

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