

Economic Sustainability of Steep Slope Cultivating Wine Estates

Larissa Strub

Geisenheim University, Germany
(larissa.strub@hs-gm.de)

Simone Mueller Loose

Geisenheim University, Germany
(simone.loose@hs-gm.de)

Abstract

◦*Purpose* – Historically, steep slope emerged to make use of marginal agricultural land and to overcome climatic limitations. With increasing viticultural mechanisation of flat sites and climate change many historic steep areas are on the decline, despite they are publicly subsidised according their degree of slope. Existing research is limited to the cost of viticulture in steep slope sites, where the limitation in mechanisation was identified as the main cost driver (Strub, Kurth, & Loose, 2021; Strub & Loose, 2021). So far, it is unknown whether steep slope cultivating wine estates can compensate higher costs through higher market prices from consumer appreciation for steep slope wine.

To date there is a lack of empirical research, of how the degree of slope and mechanisation of steep slope sites affect overall business performance and economic sustainability of wine estates. Research that aims to isolate the effect of steep slope viticulture has to take other important drivers of business performance simultaneously into account. Foremost estate size and yield are two important drivers of economies of scale (Perretti, 2020; Sellers-Rubio, 2010; Tudisca, Di Trapani, Sgroi, & Testa, 2013). Because steep slope wine estates with high shares non-mechanised sites are known to be smaller than average, the limiting effect estate size ought to be separated from the impact of slope and mechanisation. This research aims assess the effect of steep slope and its mechanisation on the economic sustainability of wine estates, controlling for the factors of yield and size.

◦*Design/methodology/approach* – The framework to assess wine businesses' economic sustainability suggested by Loose et al. (2021) was utilised to derive five main hypothesis about the effect of steep slopes on inputs and standardised costs, costs per output, output valued at sales price, sales price and profits (Figure 1). Business data from balance sheets, income statements, work force, acreage and yield information of 289 wine estates from different

German wine growing regions was used for analysis. To reduce annual vintage effects data from three business years 2013 to 2015 were modelled by linear regression.

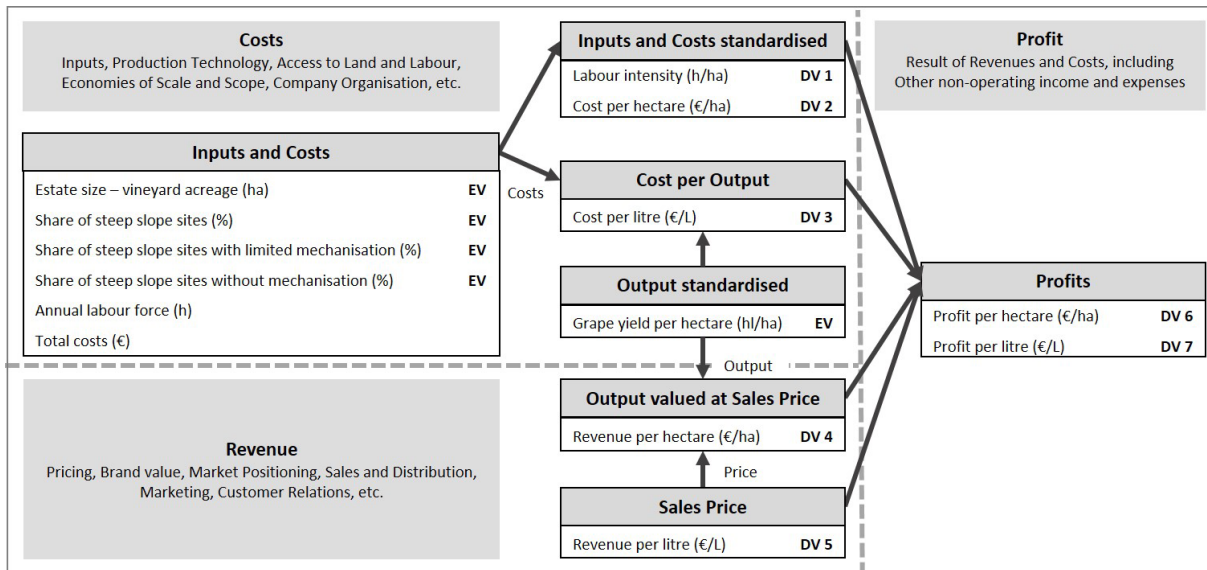


Figure 1: Framework of economic sustainability based on Loose et al. (2021), used for hypothesis and estimation, EV – explanatory variable; DV – dependent variable.

◦Findings – Results for the five hypothesis are summarised in Table 1.

Table 1: Results of analysis for hypothesis

Hypothesis	Dependent variables	Results
H1: The share of steep slope does not affect labour intensity, cost per hectare and cost per litre.	Labour intensity Cost per hectare Cost per litre	Supported Supported Supported
H2: The share of sites with limited or no mechanisation significantly increases labour intensity, cost per hectare and cost per litre.	Labour intensity Cost per hectare Cost per litre	Not supported Partly supported Partly supported
H3: The share of steep slopes does not affect revenue.	Revenue per hectare Price per litre	Partly supported Supported
H4: The share of steep slopes does not affect profits.	Profit per hectare Profit per litre	Supported Supported
H5: The share of limited- or non-mechanised sites significantly decreases profits.	Profit per hectare Profit per litre	Not supported Not supported

On the cost side only the relative share of steep slopes without any mechanisation requiring full manual viticultural management significantly increased cost per hectare and cost per litre. The share of steep slope vineyards classified only by its gradient did not affect labour intensity or costs. Costs were most strongly affected through economies of scale by acreage size and yield.

On the revenue side, the share of non-mechanised sites had a significant positive effect on revenue per hectare but not on revenue per litre. While wine estates suffer from higher costs

from limited mechanisation they do not benefit from higher market prices. The profits were affected neither by the share of steep slopes nor the mechanisation intensity. Higher yield increased revenue per hectare but decreased the market price. Higher size and yields also affected the profits most significantly resulting in higher profits both per litre and per hectare with rising farm sizes and average yields.

◦Practical implications – The study has implications for wine estates' business strategies and for public policy's efficient support to sustain steep slope viticulture. Public subsidies should not be related to slope but to the degree of mechanisation of steep slopes. Mechanisation can help to overcome negative effects of steep slopes on economic sustainability but is related to higher cost of capital (Strub & Loose, 2021; Strub, Stoll, & Loose, 2021). Strategies that permit wine estates to benefit from economies of scale from business size and provide sufficient yield (e.g. irrigation) are most promising in maintaining steep slope areas.

Key words: Business performance, economic sustainability, mechanisation, production costs, profitability, steep slope viticulture, Germany.

REFERENCES

- Loose, S.M., Strub, L. and Kurth, A. (2021), “Economic sustainability of wine estates: First insights and a roadmap for future research”, *Academy of Wine Business Research*, Dijon.
- Perretti, B. (2020). Economic sustainability of quality wine districts in the South of Italy. The case of Vulture. *International Journal of Globalisation and Small Business*, 11(4), 356-372.
- Sellers-Rubio, R. (2010). Evaluating the economic performance of Spanish wineries. *International Journal of Wine Business Research*, 22(1), 73–84. doi:10.1108/17511061011035215
- Strub, L., Kurth, A., & Loose, S. M. (2021). Effects of Viticultural Mechanization on Working Time Requirements and Production Costs. *American Journal of Enology and Viticulture*, 72(1), 46-55.
- Strub, L., & Loose, S. M. (2021). The cost disadvantage of steep slope viticulture and strategies for its preservation. *OENO one*, 55(1), 49-68.
- Strub, L., Stoll, M., & Loose, S. M. (2021). The effects of low-input training systems on viticultural costs on flat terrain and steep slope sites. *OENO one*, 55(2), 415-429.
- Tudisca, S., Di Trapani, A. M., Sgroi, F., & Testa, R. (2013). The cost advantage of Sicilian wine farms. *American Journal of Applied Sciences*, 10(12), 1529.