Further Uses of Faustmann's Formula for Financial Maturity
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Further uses of Faustmann's Formula for Financial Maturity

In finding the correct criterion for financial maturity, we have also found the criterion for solving other questions in forest management. More generally and importantly, we have a criterion for management of all kinds of resources. The criterion is to maximize net rent.

1. We can vary the input at time zero, P, to change the shape and value of the S curve. We can plant more stems per acre, for example, thus raising P in order to raise S and Rn. We can plant better stock. We can thin the stand selectively as it ages, culling out weak trees that take up space. We can fertilize, and even irrigate. All these outlays are either economical or not, depending on the basic criterion, do they raise the annualized rent of the site.
2. We can prescribe public policies like taxation in order to grow the product in more labor-using ways, to the extent that more jobs are needed – and they usually are. Faster, shorter rotations mean more frequent applications of labor, since it is mainly used in logging the old trees and reforesting the land by planting new seedlings. Focusing forestry on the better sites means shorter rotations and thus more labor per acre. We can avoid extending logging roads onto bad sites where each crop grows slower – and the roads themselves tie up capital for long periods at low productivity.
3. We can minimize the need for pesticides by keeping the average age of growing stock down – it is the old trees that have less natural resistance to pesticides.
4. The formula tells us how to change factor proportions when their prices change. Thus, lower wage rates lower P and raise S, thus raising "a". This tells us to shorten (quicken) rotations, using more labor per unit of land and capital. It also tells us that lowering taxes on work (e.g. the payroll tax) will raise demand for labor without lowering after-tax wage rates, and probably raising them.
5. This next point is more subtle, so many analysts miss it. The effect of higher "i" is to shorten rotations. This is clearest in the Fisher-Allen solution. However the effect is also to lower "a", and works to LENGTHEN rotations – the opposite effect. Fisher-Allen misses the second point because it does not use "a" at all. Faustmann shows us this tempering effect, so that raising "i" has much less net effect than Fisher-Allen would have us believe.
6. Faustmann's criterion makes all kinds of land uses yield commensurable rents, because they are all annualized. Thus grazing sheep or growing bamboo, with one-year cycles, can be compared with raising thin scraggly pine on marginal land with 120 year cycles. On good land, forest returns can be compared directly with returns from vacation homes , summer camps, or sporting supply stores.
7. You can treat supplementary inputs in mid-cycle, for example pruning or thinning in the 50th year of a 65 year cycle, by discounting the cost to time zero and adding it to P.
8. Faustmann's use of site rent is subtle and sometimes of small effect in dealing with forests, because its value is low relative to mature timber. However the applications apply to ALL land uses, for example buildings. Timber values grow with age, but building values fall with age, so the question of when to remove and replace an old building depends entirely on the site value.

9. Pursuant to #8, the income-tax question of how much of real estate value is depreciable to deduct from taxable income depends entirely on dividing value between site and building. Faustmann leads us right to the simple rule that site value is "what would remain after a good fire".