

The Reburying of Martin Faustmann



Faustmann was a German forester of mathematical bent. In 1849 he published a short tract with a long German title that we might freely translate as “When to cut a tree.” Basically, his answer was: “When it stops growing fast enough to earn interest on its own embodied capital, plus rent on the land underneath it.” He showed that this was the way to maximize the annual rent of the land, or *Bodenrente*, and the value of the land in perpetuity (*Bodenerwartungswerte*), through an infinite chain of cycles. He also showed this is the way to maximize the net value of a “going concern,” or “normalized” forest, with ages staggered from one to maturity (a demonstration also found later in Wicksell*, who applied it to wines first, and then to whole economies).

Faustmann’s Formula became a footnote in the forestry literature, where it was generally dismissed as being too mathematical, or too theoretical, or too abstract, or too severe, or too something, anything a forester could use to dismiss it. Professional foresters simply did not like it because it provided a way to show that the use of land

* Knut Wicksell (1851-1926) was a leading Swedish economist of his times, esteemed by both Austrian and Keynesian economists. His famous “grape-juice model” is in his *Lectures on Political Economy* (pp. 172-76 of the English translation by E. Classen, 1938).

in forestry could often not compete with other uses that yielded quicker and more frequent returns, not just in the short run but sustainably over time — infinite time.

Professional economists, wrestling myopically with the same problem, never consulted the forestry literature, and came up with a variety of wrong solutions. Some, like the US Forest Service, said “Aim for the ‘culmination of mean annual increment’ (CMAI), which maximizes the annual return to the land — if one can ignore interest costs.” Others like Irving Fisher and R. G. D. Allen, said “Cut the tree when its growth rate falls below the rate of interest,” — ignoring the cost of holding the land. Austrian economists like Menger, supposedly obsessed with their “period of production” as exemplified by timber, and surrounded by German foresters, never heard of Faustmann or his ideas.

The one economist to take heed was Bertil Ohlin, who derived the solution himself in 1921, but never consulted the forestry literature to discover Faustmann had scooped him by 70 years. Then, like Winston Churchill’s man who stumbled across the truth, Ohlin got up and hurried on as though nothing had happened. Others, like Kenneth Boulding, advised maximizing the internal rate of return on the planting cost — a remarkably banker-like position for a man known as a green conservationist.

There were elegant variations on all these. Friedrich and Vera Smith Lutz said Faustmann’s idea (they had another name for it) was right for individual trees, but wrong for normalized or staggered rotations. Some liked CMAI if you deduct planting costs; others refused to deduct planting costs. Some said that the cost of planting a replacement tree should be treated as part of logging costs, thus letting it be expensed for income tax purposes. Powerful Senators and Congressmen from timberland regions (a third of the United States is timberland) promoted formulae designed to maximize income-tax benefits for timberland owners, have timber declared to be a “capital asset” with a lower tax rate, and consider planting a current expense deductible from ordinary income. In state capitols,

timber interests got timber exempted from property taxes, substituting yield taxes much too low to be revenue-neutral. In several states, standing timber itself is exempt from property taxes, while the land under it is separately assessed using formulas written by the industry, or its cat's-paws in Schools of Forestry, designed to minimize the tax valuation of the land.

The most valid criticisms of Faustmann came from ecologists and the like ("tree-huggers" to the loggers), because Faustmann (like Ronald Reagan later) put little or no value on scenic beauty ("if you've seen one redwood, you've seen 'em all"). Watershed protection is finally getting more recognition as a relevant value. Wildlife habitat is a value. To many people, virgin forests are a religious experience (loggers sneer at these as "Druids"). Forests are also beloved by hunters, whose alliance with "tree-huggers" and "Druids" is an ironic marriage of opposites.

In 1957 this writer took advantage of a Ford grant, arranged by my Chairman Addison Hickman*, to whom I am eternally grateful. I probed into the interesting question of "When to Cut a Tree?" I came up with what seemed to me a correct math solution, and prepared to claim it as my own. Prudentially, I first surveyed the forestry literature and discovered Faustmann had been ahead of me by about 108 years — but had been virtually ignored by foresters, and was totally unknown to economists.

To my delightful surprise, my little monograph, crudely mimeographed as an Ag Experiment Station Bulletin in North Carolina, made a hit. A few economists appreciated it for what I meant it to be, a macro-economic metaphor showing the benefits of faster capital turnover, using forest management simply as an easily expounded example. I slowly learned, though, that its popularity had a different cause, partly a product of the business cycle stage we then were then in. Many forest owners and their bankers were looking for new reasons to log faster, caring little or nothing for the causes I

* He chaired the Economics department at North Carolina State College (now the University of North Carolina - Raleigh).

was pushing (the welfare of society by speeding capital turnover to maximize employment). I had unwittingly played into their hands, giving them a new tool to forward their case. John Walker, CEO of Simpson Timber Company, was especially enthusiastic, and modestly came up with improvements on my exposition.

Next thing I knew, Bill Allen of UCLA, who had greeted my Faustmann idea so warmly in 1967, published a textbook falling back on the Fisher-Allen solution (that was R. G. D. Allen, not Bill) that I had refuted in 1957.* I never asked him why, and this is not the place to speculate. Paul Samuelson, who had written in support of my Faustmann solution, forgot all about it when upholding his end of the Cambridge Controversy, although it could have helped him refute the “Reswitching” model.† The sad fact is that Faustmann, after his *Tod und Verklärung*, was re-killed. Ideas may become chic when the stars are aligned, exploited for what good they might do special interests, then washed away with the trash — especially when they might be used to support raising taxes on land values or other property income.

This writer became *persona non grata* at Resources for the Future, Inc. , in 1972. I was not without fault, but a sea of troubles beset me when it became clear that I was extending my forestry research into forest taxation, and uncovering the shocking undertaxation of American forest holdings, both as property and as

* Allen, R. G. D., 1930. *Mathematical Analysis for Economists*, and Fisher, Irving, 1930. *The Theory of Interest*. Fisher is the better-known of these two, and his authority is often cited — but they both left out land rent. Ironically, Fisher was the mentor of the Georgist economist Harry Gunnison Brown, whose horizons he limited.

† A long debate between economists from Cambridge University, led by Joan Robinson, and American economists led by Paul Samuelson of M.I.T. Since M.I.T. is in Cambridge, Massachusetts; it is now universally called “the Cambridge controversy.” It had to do with the effect of interest rates on financial maturity of things like timber, i.e. “when to cut a tree,” but by the time Samuelson got entangled in this he forgot all about his previous endorsement of Faustmann, and came off poorly.

income-yielding assets. I declined when a charming forest lobbyist offered to wine, dine, and yacht-entertain me, but that was not enough. My then-employer, from that day to this, has listed some giant forest holders among its grantors. Problems overwhelmed me. A leading forest economist from Yale wrote threatening to attack me in scholarly journals if I published my findings. Marion Clawson, a friend and role model to me, used my mathematics to condemn forest managers in the National Forest Service and the Bureau of Land Management, with never a peep against private forest managers. A Lincoln-Foundation grantee from Claremont Men's College attacked me on technical grounds in the *Western Economic Journal*, while the Editor of that Journal, whose office abutted his, refused to publish my reply.

Even more overt have been the recent experiences of Governor Bob Riley of Alabama, and Professor Susan Pace Hamill of the University of Alabama School of Law. Hamill is an activist Christian who also teaches tax law, and became conscientiously aware of how Alabama's highly regressive tax system violates biblical principles of social justice. Alabama is highly churched, so she and Riley joined forces to bring its tax system into line with churchly doctrines. They began with its forest lands, which are vast, and virtually untaxed. Many churches supported a Riley-Hamill Initiative, but many others, with the most money and influence, disappointed them, campaigning actively against and defeating their initiative.

New Hampshire State Legislator Richard Noyes, representing North Salem, was a conservative Republican who even supported the efforts of George H. W. Bush to sunset the capital gains tax, a cause dear to timber owners but not to me. At the state level, however, he pushed for a statewide tax on land values, consistent with his belief in making state governments work better. He did not target timberlands *per se*, and it is doubtful if his proposed tax would in fact have shifted the tax burden from cities and farms and summer resorts to timberlands. He never had a chance to find out, however, because the timber owners of New Hampshire, stirring up

NRA lobbyists and hunters, took the lead in beating down his bills. The same is true in most states that have essayed statewide property taxes. To many moderns such taxes may appear novel and radical, but in fact in 1920 and before they were the mainstay of state-level revenues, not just of local revenues.

Dean Henry Vaux of the California State School of Forestry, Berkeley, in 1958 offered me an Assistant Professorship. I was not to ramble at will through the world of ideas, but to focus narrowly on the value of forest recreation — nothing about taxation. Vaux himself soon drafted California's Timber Preserve Zone (TPZ) Act, preempting forest land assessments from County Assessors and mandating use of a formula he worked out to assess forest land for taxation at about 10% or less of its true market value. Years later, when I had moved to U. C. Riverside, his son, Henry Vaux, Jr. played a key role in maneuvering to eliminate the entire Department of Economics, including my tenure — but not his. Hardly anyone but a few corporate CEO's would even know there was a TPZ, were it not for UCLA Law Professor Donald Hagman, a property tax expert and reformer of renown among urbanists. Hagman's great career was cut short when he fell off a cliff while jogging through Mendocino County, the heart of redwood *terroir*.

One could go on from state to state, but the bottom line is that Faustmann's great contribution to economic analysis, dating from 1849, died for over a century, was transfigured and reborn for a brief career after 1957, only to die again after a second life of about 20 years. When will it be born again? That is a question for present and future generations to answer.



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