Accounting rules and circular supply chains

Circular supply chains stand and fall with a decision at the end of the first product lifecycle: is the product taken back, remanufactured or reused and, if so, how intensively, or is it disposed of? The closed-loop supply chain literature on valuing returned products argues that the value of a returned product equals the net profit of its best next disposition. Firms, however, also decide based on figures that their accounting is permitted to recognize. Three rules are particularly relevant. (i) The residual value estimate, which, in German accounting practice, is often set only as a nominal memo value. (ii) The value in use, which excludes cash flows from improving the asset's performance, that is, the benefit of a remanufacturing investment. (iii) The rules on emissions reporting, under which avoided emissions are not netted in a firm's own inventory.

Each of these rules is understandable in isolation as an expression of prudence in valuation. Together, however, they can lead to the benefit of keeping a product in service being recognized systematically lower than the benefit of disposing of it, which is valued at market prices. For circular supply chains, this raises the question of whether and how strongly such recognition rules distort the decision on whether to recover at all and how much to recover, and what this means for the design of products and networks.

The aim of this master's thesis is to identify the arising decision distortions and develop a stylized decision model for the recovery decision at the end of the first lifecycle, in which a firm may recognize benefits only in part; to study the effect of these recognition rules analytically. The analysis should generate insights on how accounting rules on the recognition of benefits (e.g., residual value, reuse value, avoided emissions) distort decisions on remanufacturing and reuse in circular supply chains, and what the consequences for supply chain management and for the design of the rules could be. This thesis contributes by identifying the conditions under which accounting rules sub-optimally prevent circular investments, offering theoretical insights and practical guidelines for internal corporate valuation.

The research design follows a rigorous two-stage approach: First, students independently evaluate and systematically identify the most critical valuation conflicts. In a second step, students select one specific aspect to analyze in depth through the development of a stylized analytical decision model capturing the identified decision-making conflicts. The final focus will then be determined in consultation with the supervisor, based on the student’s initial analysis.

Prerequisites:

- Foundation in analytical modeling
- Recommended: Knowledge of internal and external accounting (Management & Financial Accounting)