

Master thesis ideas, 2018

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Key words

Production economics, microeconomic theory, productivity and efficiency analysis, applied (micro) econometrics, impact evaluation, farm and farm household economics (both in developed and in developing countries)

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Master thesis ideas

1) **Which countries have the most productive agricultural sectors?** You will compare various productivity measures (e.g., land productivity, labour productivity, capital productivity, fertilizer productivity, total factor productivity) of agricultural sectors in countries around the world, investigate the relationships between these productivity measures, and analyse the development of these productivity measures over the past decades (based on country-level data, e.g., using time-series clustering). For selected countries and more recent years, where data on environmental impacts of the agricultural sector are available, you can include positive and negative environment externalities in the productivity measurement.

2) **How do we measure the capital input of firms and farms and what is the optimal amount of investments?** You will compare and assess different approaches for measuring the capital input of firms (e.g., farms), assess the consistency of these approaches with microeconomic theory and theories of business economics (e.g., finance and investment theory), and investigate how these approaches affect estimated efficiency and productivity measures and the (predicted) optimal capital input (i.e., what is the optimal amount of investments), e.g., using data from Danish farms.

3) **How can we analyse how easily firms can replace one input for another?** For instance, how easily can firms invest in robots to reduce the number of employees or invest in advanced environmentally-friendly technologies to reduce the use of energy? You will compare different econometric approaches for analysing the substitutability between inputs, e.g., using Translog, CES, and non-parametric production / distance functions. This can be done, e.g., using data from farms, the industrial sector, or energy production. Please note that this thesis may require a considerable amount of programming in R!

4) **How can we analyse how farmers' participation in 'programmes' such as organic farming or contract farming affects their technical efficiency and productivity?** You will assess and compare different approaches to estimating productivity and technical efficiency when farmers self-select into mutually exclusive groups, e.g., organic vs. conventional farming or contract farming vs. non-contract farming. You can use data, e.g., from Danish dairy farmers, Tanzanian sunflower farmers, Beninese cotton farmers, or other producers. Please note that this thesis will require a large amount of programming in R, e.g., new estimation procedures!

5) **How can we best analyse allocative efficiency?** You will compare and assess existing and new methods for analysing allocative efficiency, e.g. using farm-level data. Please note that this thesis will require a large amount of programming in R, e.g., new estimation procedures!

6) **What are the optimal input quantities in case of non-constant input prices?** You will compare and assess approaches for obtaining the optimal input quantities and estimating allocative efficiency when some (implicit) input prices (i.e., marginal costs of inputs) are not exogenously given but depend on the input quantity. You can use, e.g., data from Danish farmers who experience increasing interest rates with increasing debt-to-asset ratios or data from small-scale farmers in developing countries who face several market imperfections. Please note that this thesis may require a considerable amount of programming in R!

7) **How does climate change affect farm households in Northern Ghana and how can they adapt?** Based on an (existing) extensive farm household data set and an (existing) large data set with results from crop simulation models (obtained under 5 different climate scenarios), you will create a household simulation model and run simulations in order to find out (a) how various future climate scenarios affect different types of farm households in Northern Ghana and (b) how these households can adapt to climate change (e.g., changing the planting time, using more or less inorganic or organic fertilizer, growing different varieties of the same crop, growing different crops, intensifying agricultural or non-agricultural activities, ...).

8) **Sustainability of Cotton Production in Africa.** Assess and compare the economic sustainability or the overall (i.e., environmental, economic, and social) sustainability of different organic and conventional cotton production methods within the SCOPA project (<https://ifro.ku.dk/scopa>).

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