

AGRICULTURAL FINANCE



CHARLES B. MOSS

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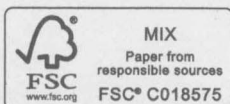
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Agricultural Finance

This textbook integrates financial economics and management in the area of agricultural finance. The presentation of financial economics discusses how the credit needs of farmers/borrowers are met by depositors through commercial banks. The financial management content presents methods used to make farm financial decisions including farm accounting, capital budgeting, and the analysis of risk.

The book begins by developing the farm financial market, focusing primarily on the market for debt. Next, it presents an overview of accounting concepts important for the credit market. The accounting section provides a detailed discussion of the Farm Financial Standards Council's suggestions for agricultural financial statements. Following the financial accounting, the book presents the use of ratio analysis applied to the farm firm. Next, it describes capital budgeting followed by an introduction to risk analysis. Finally, the book presents the effect of debt decisions on the farm firm. In addition to the primary topics, the book includes a discussion of agricultural banking and monetary policy and an analysis of the choice of historical cost and market valued accounting methodologies on the farm debt decision.

The text primarily draws on previously developed concepts, but provides several alternatives for extension. Specifically, Appendix A provides a starting point for the extension of the literature on farm financial capital structure, drawing on the principal/agent model. Similarly, Appendix E, on historical cost versus market valued balance sheets, points to the possibility of analyzing the informational content of each accounting paradigm.

Charles B. Moss is Professor in the Department of Food and Resource Economics at the University of Florida.

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Now, if the learner is to obtain the truth, the teacher must bring it to him, but not only that. Along with it, he must provide him with the condition for understanding it ...

(Kierkegaard, *Philosophical Fragments*,
Princeton University Press, 1983, p. 14)

**To my agricultural finance professors who provided the condition for
understanding**

**Timothy G. Baker,
Harry P. Mapp,
and
James S. Plaxico.**

Preface

The chapters in this book are intended to be the core of a junior/senior level class in agricultural finance. Most of the text emphasizes decisions made by the farm firm; hence, the book is largely developed within the context of a sole proprietorship. However, most of the material is amenable to discussion of the agribusiness firm (i.e., grain elevators, feed and seed distributors). In addition to the material in the text, I recommend the introductory section of Appendix A (definition of firm structure). Depending on the mathematical maturity of students, the instructor may choose to cover the development in Appendix D of the general mathematical formulas for present value analysis. If the class emphasizes the possibility of employment in the agricultural credit section, I recommend Appendix E through section E.2. However, this material will reference the concept of the cumulative normal distribution. In addition, Appendix F explains the effect of including the debt flows as a part of the net present value analysis, the basic valuation model for farmland, and a rudimentary introduction of stochastic net present value in ExcelTM. I would recommend this material for instructors of advanced undergraduate or capstone courses in undergraduate finance. Appendix C may be appropriate if the students have an undergraduate background in money and banking or monetary economics.

If this textbook is used for Master of Agribusiness programs, my suggestion is to read the chapters along with the introductory section of Appendix A and section A.1. Section A.1 develops the concept of the boundaries of the firm (i.e., New Institutional Economics theory). In addition, I suggest covering the material in Appendix E. The remaining appendices are primarily intended to provide a starting point for additional topics for a Master of Science/Ph.D. course in agricultural finance.

Undertaking a textbook from the ground up can be a daunting task. I would like to thank Professor Michael Gunderson who started this project with me, but was unable to complete it due to a move. Mike provided much of the initial material for Chapter 4 and should be thought of as a contributing author for this chapter. I would also like to thank Mark Flannery and Jaclyn Kropp for their comments on an earlier draft of this manuscript. In addition, I would like to thank Robert Langham and Simon Holt at Taylor & Francis for their patience as this project extended beyond its target date.

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1 Introduction

A starting point for any class or study is to define the topic that will be covered. In this text we will study **agricultural finance**, which is usually taught in departments of agricultural economics and agribusiness. The fact that agricultural finance is typically taught in an agricultural economics department while in colleges of business, finance is typically taught by another department raises certain questions. Specifically, how are agricultural economics and finance different from one another; and, how are they different from courses offered in colleges of business? We follow Becker (2008) by defining **economics** as the study of the allocation of scarce resources to meet unlimited and competing human wants and desires. The abstraction of this definition is infamous, but to be fair, Becker has used economic theory to study such factors as marriage, fertility, and even suicide (Becker and Posner, 2004). Agricultural economists typically reduce the scope of their concern to questions of agriculture, natural resources, and the environment. Specifically, agricultural economists focus their efforts on crop production and the possible effects of this production on water quality, specie diversity, and more recently, on the ability of various crops to sequester carbon. **Agricultural economics** tends to be more applied, concerned less with the development of theory and more on the analysis of policy.

Given the definitions of economics and agricultural economics, what is the role of finance in general and agricultural finance in particular? In a significant way, neoclassical theory is sterile. In answering the general question of human action (von Mises, 2007) or choice, the description of economics abstracts away from the particulars. In addition, as described by Hicks (1939), economics is timeless. The production function which represents the transformation of inputs into outputs typically does not reference time. However, many production processes like agricultural crops require time because of their biological nature. In other industries, the complexity is due to the number of inputs required. The production of steel from iron and coke requires an inventory of each input. In its heyday, American steel represented an intricate web of mining, transportation, and smelting operations. Iron was mined in Minnesota's Iron Range and shipped to smelting facilities in places such as Chicago to be joined with coke produced from coal in the Appalachian region. The product, steel, was then shipped to the automobile plants in Detroit. In each case, production requires some stock of past production carried

over from a preceding period to produce a final product. The point of finance is the distribution of that prior period product required for the production of steel, automobiles, or even corn. A major source of previously produced inputs, even to production systems that appear instantaneous, is machinery or equipment. The point of finance is that ownership of these pre-produced inputs, whether operating capital (i.e., iron, coke, or steel) or the equipment used in the production process, matters. As will be discussed in this chapter, these processes require someone to forgo consumption in the short run to gain a larger return in subsequent periods. In addition, by investing in production in the short run, the investor also subjects his consumption to risk and uncertainty.

In the case of agricultural finance, the decision maker may own farmland and machinery, purchase inputs such as seed, fertilizer and fuel, and hire labor to plant a crop in one period to produce output such as corn in a subsequent period. In terms of the preceding discussion, this production process requires time, which implies that ownership is important. This producer had to own or control land and equipment, as well as a medium of exchange (i.e., cash) to purchase inputs and hire labor to carry out the production process. Financial decisions are then defined by the acquisition of these resources. Specifically, why does the producer choose to abstain from consumption to produce corn?

In theory, the producer could rent his land to another farmer and simply consume the cash that would have been used to plant a crop. Clearly the producer has expectations that the additional return from corn will exceed the short run cost of production (i.e., the seed, fertilizer, and labor) and the wear and tear on the machinery. In addition, we expect that this profit will exceed the rent that the producer would have received from renting the land to another farmer. Thus, we have assumed that the profit was sufficient to meet all the input costs including the opportunity cost of land. The question is then whether the producer perceives that an additional return is necessary to undertake the production process. Back to the concept of abstinence; if the revenue simply covered the cost of production, why did the producer forgo consumption?

Building on this example, next we assume that the farmer owns the farmland and equipment but does not have cash to purchase the seed, fertilizer, or fuel or to hire the labor. In this case, we typically say that the farmer lacks **operating capital**. In today's economy, the farmer could acquire the funds to purchase these operating inputs from another individual or institution in three ways. The first method common in agriculture is operating credit obtained by short-term debt – an **operating loan**. In this transaction, a bank provides the cash (or more typically a claim on deposits) to the farmer for a fixed period of time (e.g., 6 months) for a fixed payment (typically principal plus interest). This fixed payment is guaranteed by pledging collateral which would be forfeited upon non-payment. The fixed nature of the repayment classifies this transaction as a debt instrument as opposed to an equity instrument (discussed below). From one point of view, the upper bound on the return on the debt instrument is fixed by the terms of the contract. The lender may earn a smaller return if the borrower fails to pay the loan, but the return can never exceed the stated interest rate.