

Haramaya University
School of Agricultural Economics and Agribusiness

Module on Agricultural Marketing and Price Analysis

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ABOUT THE COURSE

AgEc 541: Agricultural Marketing and Price Analysis (CAEE 5131)

The course is classified as **elective with 3 Credit Hours** in the six accredited CMAAE member universities: Bunda College of Agriculture (Malawi), Department of Agricultural Economics (University of Nairobi, Kenya), Department of Agricultural Economics and Agribusiness Management (Egerton University, Kenya), Department of Agricultural Economics (University of Zimbabwe, Zimbabwe), Department of Agricultural Economics, Extension and Rural Development (University of Pretoria, South Africa), and Department of Agricultural Economics and Agribusiness (Mekere University, Uganda).

However, the course is **a compulsory with 3 Credit Hours** in the Department of Agricultural Economics (Haramaya University, Ethiopia) and most other non-accredited CMAAE member universities.

The course is offered in **semester I** in all CMAAE accredited universities and in most non-accredited universities including Haramaya University.

Objective of the Course

The objective of this course is to provide students with a theoretical and empirical basis for valuating agricultural marketing organization and actors for market performance and public policy decision, and to enable them develop and use the tools of economic theory to analyze issues related to the marketing of agricultural commodities.

Expected Output

After completing this course, the students should:

- Apply economic theory to problems of agricultural marketing;
- Design strategies for effective market performance;
- Use marketing concepts for analyzing market structure and performance in agriculture and formulate effective agricultural marketing policy;
- Apply theoretical models of imperfect market structures to inform public policy;
- Appreciate organizational forms unique to agricultural industries; and
- Understand price discovery mechanisms under different market structures.

No prerequisite course is required in Haramaya University. But under the CMAAE program, the course is offered after students have completed the core courses in one of the six CMAAE accredited Departments. Thus, a student is required to complete the following core courses before it registers for the course:

Compulsory Core Courses

CAEC 501: Micro-Economics
CAEC 502: Mathematics for Economists
CAEC 503: Statistics for Economists
CAEC 504: Issues in Agricultural & Applied Economics
CAEC 505: Production Economics
CAEC 506: Macro-Economics
CAEC 507: Econometrics

CAEC 508: Research Methods, Management & Thesis
Compulsory Non-Core Course
CAEC 510: Institutional and Behavioral Economics

Compulsory Non-Core Course

CAEC 510: Institutional and Behavioral Economics

Thematic Plan

| No. | Topic | Contact hours | | | Indep. study | Total workload |
|-----|---|---------------|----------|-----------|--------------|----------------|
| | | Lect. | Sem | Sub-tot | | |
| 1 | Review on economic role of prices and approaches to the study of agricultural market organization and performance | 4 | 1 | 5 | 15 | 20 |
| 2 | Theoretical models of market structure and performance | 8 | 1 | 9 | 27 | 36 |
| 3 | Spatial and inter-temporal analysis of agricultural markets for policy | 9 | 2 | 11 | 33 | 44 |
| 4 | Horizontal and vertical integration of agricultural industries | 9 | 1 | 10 | 30 | 40 |
| 5 | Market organizational forms unique to agriculture | 9 | 1 | 10 | 30 | 40 |
| | Total | 39 | 6 | 45 | 135 | 180 |

Course Description

Topic 1: Review of the Economic Role of Prices and Approaches to the Study of Agricultural Market Organization, Conduct and Performance

- Economic role of prices
 - Distributive and allocative functions
 - Equilibrating functions with the market
- Approaches to the study of agricultural market organization and performance
 - The function approach.
 - The commodity approach.
 - The institutional approach
 - The managerial approach
 - Structure-conduct-performance paradigm

Topic 2: Theoretical Models of Market Structure and Performance

- Perfectly competitive markets
- Imperfectly competitive markets
 - Monopoly, bilateral monopoly, and monopsony
 - Oligopoly
 - Joint profit maximization
 - Quantity-setting model
 - Price-setting model
 - Conjectural variation
 - Monopolistic competition
 - Price discrimination
 - Monopsony and oligopsony models of agricultural product markets
 - Conditions for monopsony and oligopsony

- Price and output determination under different market structures
- Game theory and oligopoly

Topic 3: Spatial and Intertemporal Market Linkages

- Intertemporal market linkages cobweb cycle, seasonal patterns and secular trends, futures markets and forward contracting
- Spatial market linkages
- Transaction costs: types and dimensions
- Spatial Market Integration Models
- Spatial Equilibrium Models

Topic 4: Horizontal and Vertical Integration of Agricultural Industries

- Determinants of horizontal and vertical integration
- Imperfect competition models
- Backward integration by a monopsony
- Market Integration and Product differentiation
- Policy implications

Topic 5: Market Organizational Forms Unique to Agriculture

- Farmer cooperatives.
 - Model of a marketing/processing cooperative
 - Competitive effect of cooperatives on imperfect markets
- Farmer bargaining associations
 - Bilateral monopoly model
 - Other theoretical models

Mode of Delivery

Lectures, reading assignments and term paper presentations

Assessment Methods

The student is expected to demonstrate competency level in the following areas:

- Know and apply the alternative concepts and theories for analyzing market structure, conduct and performance in agriculture.
- Design market strategies for effective market performance
- Formulate effective agricultural marketing policies
- Analyze the functioning of rural/agricultural markets
 - Continuous assessment (assignments, quizzes) 20%
 - Term/issues paper 30%
 - Final exam 50%

Text Books

For Topic 1 of the course, the text book is this Module

For Topics 2 - 5 of the course, the following two alternative text books are selected for the student:

John N. (1998) Agricultural Prices and Commodity Market Analysis. Boston: WCB McGraw-Hill.

Padberg, D.I., Ritson, C., Albisu, L.M. (1997). Agro-Food Marketing. New York: CAB International

Further Reading Materials

In addition to the reading materials provided, a student can consult the following further reading materials:

In addition to the Text Books provided in this module, a student is advised to consult the following further readings for Topic 2-5 of the course:

- Adam, S. (1776). *The Wealth of Nations*. London: Methuen and Co., Ltd. Pub.
- Aiyagari, U S. R. and M. Gertler (1999). “Overreaction” of Asset Prices in General Equilibrium. *Review of Economic Dynamics*, (2): 3-35.
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- Bain, J. (1956). *Barriers to New Competition*. Harvard, Cambridge MA.
- Barney, J.B. (1989). What is Performance? Texas A&M University, Department of Management Strategic Management Working Paper series #89-002.
- Barney, J.B. and R. Hoskisson (1990). Strategic Groups: Untested Assertions and Research Proposals. *Managerial and Decision Economics*, 11: 187-198.
- Barney, J.B., McWilliams, A. and T. Turk (1989). On the Relevance of the Concept of Entry Barriers in the Theory of Competitive Strategy. Paper Presented at the Annual Meeting of the Strategic Management Society, San Francisco.
- Bertrand, J. (1883). Book Review of *Théorie Mathématique de la Richesse Sociale* and *Recherches sur les Principes Mathématique de la Théorie des Richesses*. *Journal des Savants*, 499–508.
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- Debertin, D. L. (1986). *Agricultural Production Economics*. New York, NY: Macmillan Publishing Company.
- Demsetz, H. (1974). Industry Structure, Market Rivalry and Public Policy. *The Journal of Law and Economics*, 16: 1–9.
- Davies, S., B. Lyons, H. Dixon and P. Geroski (1992). *Economics of Industrial Organization*. 2nd Edn., Longman London and, New York.
- Dolan, E.G. (1986). *Economics*. Chicago IL: The Dryden Press, 4th edition.
- Edgeworth, F. Y. (1925, 1897). *The Pure Theory of Monopoly*, in *Papers Relating to Political Economy*, pp. 111–42. Royal Economic Society, London.
- Ferguson, P. (1994). *Industrial Economics: Issues and Perspectives*. 2nd Edn., MacMillan, London.
- Fisher, F.M., McGowan, J.J. and Greenwood, J.E. (1983). *Folded, Spindled and Mutilated*. Cambridge: MIT Press.
- Fourie, F.C.V.N. and M.R. Smit (1989). Trends in Economic Concentration in South Africa. *The South African Journal of Economics*, 57(3): 241-256.
- Geoff, R. (2005). *AQA AS Economics Module 1&2 Digital Textbook*. Published by Tutor2u Limited
- Grossman S., 1989. *The Informational Role of Prices*. Cambridge, MA: MIT Press.
- Hamel, G. and Prahalad, C.K. (1989). Strategic Intent. *Harvard Business Review*, May-June: 63-76.
- Hayek, F. A. (1945). The Use of Knowledge in Society. *American Economic Review*, 35(4) 519-30.

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- Henderson, B.D. (1989). The Origin of Strategy. Harvard Business Review, Nov-Dec: 139-143.
- Hill, C.W., Hitt, M.A. and R.E. Hoskisson (1988). Declining U.S. Competitiveness: Innovation, the M-form Structure and the Capital Markets. Academy of Management Executive, 2: 51-60
- Hitt, M.A., Hoskisson, R.E., and J.S. Harrison (1991). Strategic Competitiveness in the 1990s: Challenges and Opportunities for U.S. Executives. Academy of Management Executive, 5(2):7-22.
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- Hotelling, H. (1929). Stability in Competition. Economic Journal, 39:41-57.
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- Johansen, L. (1972). Production Functions. Amsterdam, The Netherlands: North-Holland Publishing Company.
- John S. B. and J. Whalley (1992). Applying General Equilibrium, Cambridge: Cambridge University Press
- Kirzner, I.M. (1973). Competition and Entrepreneurship. Chicago: University of Chicago Press.
- Leach, D.F. (1992). Absolute vs. Relative Concentration in Manufacturing Industry, 1972-1985. The South African Journal of Economics, 60(4): 386-399.
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- Parish, R. (undated). Methods of Allocation. Unpublished Manuscript, Monash University.
- Porter, M. E. (1980). Competitive Strategy: Techniques for Analyzing Industries and Competitors. New York: Free Press.
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- Prahalad, C.K. and G. Hamel (1990). The Core Competence of the Corporation. Harvard Business Review, May-June: 79-91.
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- Simon, H. and C. Bonini (1958). The Size Distribution of Business Firms. American Economic Review, 48: 607-17.
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- Sleuwaegen, L.E. and W.V. Dehandschutter, 1986. The Herfindahl Index and Concentration Ratios Revisited. *Antitrust Bulletin*, 34: 625-640.
- Tirole, J. (1989). *The Theory of Industrial Organisation*. 3rd edition, The MIT Press.
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- Waud, R. N. (1980). *Economics*. New York: Harper and Row Publishers.

MODULE INTRODUCTION

This course book is prepared by Haramaya University, Department of Agricultural Economics. It is prepared by a project called *AgShare Pilot Project*. The project was initiated by Michigan State University (MSU) and funded by Bill-Melinda Gates Foundation. The project was implemented in collaboration with various institutions, namely Michigan State University (MSU), Collaborative Masters Program in Agricultural and Applied Economics (CMAAE), South African Institute of Distance Education (SAIDE), Open Education Resources (OER), and CMAAE member-universities (Haramaya University, Moi University, Makerere University).

It is quite obvious that in developing countries, the education sector suffers from serious shortage of teaching materials. Yet, the available materials virtually reflect just the context of developed countries. The assumption is that it is possible to adopt textbooks and other teaching materials prepared in developed countries and build them into the context of developing countries. Nevertheless, this tradition of relying on materials prepared elsewhere, however well-designed, has never improved effective learning simply because real, effective teaching-learning cannot take place under a decontextualized situation.

Cognizant of this fact, the participants of this project prepared this course book in order to demonstrate that it is possible to prepare teaching materials that foster learning and teaching in context, particularly that of Sub-Saharan African countries--chiefly Eastern, Central, and Southern Africa. Each module of the course attempts to customize theories and concepts in a way that it would reflect the context of these developing countries. It is intended to help graduate students of agricultural economics and the related fields. The underlying premise is that such teaching materials enable graduate students to analyze and solve practical problems and, hence, reconstruct knowledge in its context.

In general, this module is prepared for the course *Agricultural Marketing and Price Analysis*. This course is currently being offered in Master's programs of both Haramaya University School of Agricultural Economics and Agribusiness and Moi University Department of Agricultural Marketing and Cooperatives. In this module there are about six topics. (AgEc541), focus will be made on two case-studies conducted on a selected commodity in order to explore the real context of agricultural marketing in a developing country.

The first topic of this module is: *The Economic Role of Prices and Approaches to the Study of Agricultural Market Organization*. Here the allocative, rationing and distributive roles of prices the different approaches to the study of agricultural marketing are presented and discussed. In addition, case study reports and video footages that demonstrate coffee marketing in Ethiopia are included.

The second topic deals with: *Theoretical Models of Market Structure and Performance*. It covers the different types of market structure including perfect competition, monopoly, monopolistic competition and oligopoly. The third topic deals with: *Spatial and Intertemporal Market Linkages*. The fourth Topic presents: *Horizontal and Vertical Integration of Agricultural Industries*. The fifth topic presents: *Market Organizational Forms Unique to Agriculture*.

| | |
|--|------------|
| ABOUT THE COURSE | i |
| MODULE INTRODUCTION | vii |
| TOPIC 1 REVIEW OF THE ECONOMIC ROLE OF PRICES AND APPROACHES TO THE STUDY OF AGRICULTURAL MARKET ORGANIZATION | 7 |
| Introduction..... | 7 |
| Topic objectives | 7 |
| Thematic plan for Topic 1..... | 7 |
| SubTopic 1 Economic Role of Prices..... | 8 |
| Introduction..... | 8 |
| Objectives | 8 |
| Thematic plan..... | 9 |
| 1.1.1 Prices..... | 9 |
| 1.1.2 The Market System | 10 |
| 1.1.3 The Role of Prices in Market-based Economy | 11 |
| 1.1.3.1 Equilibrating process | 11 |
| 1.1.3.2 Rationing and allocative role of prices | 13 |
| 1.1.3.3 Limitations of the price mechanism – Market failures | 16 |
| 1.1.4 The Role of Prices in a Mixed Economy | 18 |
| Summary | 20 |
| Exercises | 21 |
| References..... | 22 |
| SUB TOPIC 2: Approaches to the Study of Agricultural Marketing..... | 23 |
| Introduction..... | 23 |
| Objectives | 23 |
| Thematic plan..... | 23 |
| 1.2.1 The Functional Approach | 23 |
| 1.2.1.1 The exchange functions | 24 |
| 1.2.1.2 Physical functions | 24 |
| 1.2.1.3 Facilitating functions | 26 |
| 1.2.2 Institutional Approach | 27 |
| 1.2.2.1 Merchant middlemen | 28 |
| 1.2.2.2 Agent middlemen..... | 28 |
| 1.2.2.3 Speculative middlemen..... | 29 |
| 1.2.2.4 Facilitative organizations | 31 |
| 1.2.3 The Commodity Approach | 32 |
| 1.2.4 Behavioral Systems Approach..... | 32 |
| 1.2.4.1 The input-output system | 33 |
| 1.2.4.2 The power system | 33 |

| | |
|---|-----------|
| 1.2.4.3 Communication systems | 33 |
| 1.2.4.4 Adapting to internal and external changes | 33 |
| 1.2.5 The Structure-Conduct-Performance (S-C-P) Approach..... | 33 |
| 1.2.5.1 Elements of S-C-P..... | 34 |
| 1.2.5.2 The S-C-P paradigm | 40 |
| 1.2.5.3 Criticisms of the S-C-P paradigm | 41 |
| Summary | 42 |
| References..... | 45 |
| TOPIC 2 THEORETICAL MODELS OF MARKET STRUCTURE AND PERFORMANCE | 46 |
| Introduction..... | 46 |
| Topic Objectives | 46 |
| Thematic plan for Topic 2..... | 46 |
| SUBTOPIC 2.1 PERFECTLY COMPETITIVE MARKETS..... | 47 |
| Introduction..... | 47 |
| Objectives | 47 |
| Thematic plan..... | 47 |
| 2.1.1 Definition of Perfectly Competitive Market | 47 |
| 2.1.2 Characteristics of a Perfectly Competitive Market | 48 |
| 2.1.3 Benefits of Perfectly Competitive Markets..... | 48 |
| Summary | 52 |
| Exercises | 52 |
| References..... | 53 |
| SUBTOPIC 2.2 IMPERFECTLY COMPETITIVE MARKETS | 53 |
| Introduction..... | 53 |
| Objectives | 54 |
| 2.2.1 Definition of Imperfectly Competitive Markets | 54 |
| 2.2.2 Monopoly | 55 |
| 2.2.2.1 Characteristics of monopoly | 55 |
| 2.2.2.2 Why do monopolies arise?..... | 55 |
| 2.2.2.3 Pricing under monopoly..... | 56 |
| 2.2.3 Price Discrimination | 58 |
| 2.2.3.1 When is price discrimination possible? | 59 |
| 2.2.3.2 Types of price discrimination | 59 |
| 2.2.3.3 Consequences of price discrimination | 61 |
| 2.2.4 Monopolistic Competition | 61 |
| 2.2.4.1 Characteristics of monopolistic competition | 61 |
| 2.2.4.2 Product differentiation | 62 |

| | |
|--|-----------|
| Summary | 72 |
| Exercises | 72 |
| References | 73 |
| SUBTOPIC 2.3 GAME THEORY AND OLIGOPOLY | 74 |
| Introduction..... | 74 |
| Objectives | 74 |
| 2.3.1 Representation of Games | 74 |
| 2.3.1.1 Extensive form | 74 |
| 2.3.1.2 Normal form..... | 75 |
| 2.3.2 Application of Game Theory to Economics | 75 |
| 2.3.3 Types of Games | 76 |
| 2.3.3.1 Symmetric and asymmetric games | 76 |
| 2.3.3.2 Zero-sum games | 76 |
| 2.3.3.3 Simultaneous and sequential games..... | 77 |
| 2.3.3.4 Perfect information and imperfect information | 77 |
| 2.3.3.5 Infinitely long games | 77 |
| 2.3.3.6 Discrete and continuous games..... | 77 |
| Summary | 78 |
| Exercises | 78 |
| References | 79 |
| TOPIC 3 SPATIAL AND INTER-TEMPORAL MARKET LINKAGES..... | 80 |
| Introduction..... | 80 |
| Objectives | 80 |
| SUBTOPIC 3.1 INTER-TEMPORAL MARKET LINKAGES..... | 80 |
| Introduction..... | 80 |
| Objectives | 80 |
| 3.1.1 Cobweb Cycles | 81 |
| 3.1.2 Seasonality and Secular Trend..... | 83 |
| 3.1.2.1 Seasonal patterns..... | 83 |
| 3.1.2.2 Secular trend | 85 |
| 3.1.2 Forward and Futures Contracts..... | 89 |
| 3.1.3.1 Forward contracts..... | 90 |
| 3.1.3.2 Futures contracts | 91 |
| Summary | 92 |
| Exercises | 92 |
| References | 93 |
| SUBTOPIC 3.2 SPATIAL MARKET INTEGRATION..... | 93 |
| Introduction..... | 93 |

| | |
|---|------------|
| Objectives | 93 |
| 3.2.1 Spatial Market Integration and Price Transmission..... | 94 |
| 3.2.2 Why Is Spatial Market Integration Analysis Important? | 94 |
| 3.2.3 Determinants of Spatial Market Integration | 95 |
| Summary | 95 |
| Exercises | 96 |
| References..... | 96 |
| SUBTOPIC 3.3 TRANSACTION COSTS | 97 |
| Introduction..... | 97 |
| Objectives | 97 |
| 3.3.1 Transaction Costs Defined | 97 |
| 3.3.2 Types of Transaction Costs..... | 98 |
| 3.3.3 Determinants of Transaction Costs | 98 |
| 3.3.4 Transaction Cost Economics..... | 100 |
| Summary | 101 |
| Exercises | 101 |
| References..... | 102 |
| SUBTOPIC 3.4 MARKET INTEGRATION MODELS | 102 |
| Introduction..... | 102 |
| Objectives | 102 |
| 3.4.1 Static Correlation and Regression Models..... | 102 |
| 3.4.2 Dynamic Models | 103 |
| 3.4.2.1 Granger causality tests | 103 |
| 3.4.2.2 Ravallion's model of market integration | 104 |
| 3.4.2.2 Timmer model..... | 104 |
| 3.4.3 Co-integration Models | 105 |
| 3.4.4 Switching Regime Regression Models (SRM) | 105 |
| 3.4.4.1 The Error Correction models (ECM)..... | 105 |
| 3.4.4.2 Threshold Autoregressive (TAR) models | 105 |
| 3.4.4.3 Parity Bound Models (PBM) | 106 |
| 3.4.4.4 Markov Switching Models (MSM)..... | 106 |
| Exercises | 106 |
| References..... | 107 |
| SUBTOPIC 3.5 SPATIAL EQUILIBRIUM MODELS | 107 |
| Introduction..... | 107 |
| Objectives | 107 |
| 3.5.1 Perfect Competition Model..... | 107 |
| 3.5.2 Spatial Monopoly Model | 108 |

| | |
|---|------------|
| 3.5.3 Spatial Nash Non-cooperative Equilibrium Model..... | 109 |
| 3.5.4 Spatial Oligopoly Equilibrium Model | 109 |
| Summary | 109 |
| Exercises | 110 |
| References..... | 110 |
| TOPIC 4 HORIZONTAL AND VERTICAL INTEGRATION OF AGRICULTURAL INDUSTRIES | 111 |
| Introduction..... | 111 |
| Objectives | 111 |
| SUBTOPIC 4.1 HORIZONTAL AND VERTICAL INTEGRATION..... | 112 |
| Introduction..... | 112 |
| Objectives | 112 |
| 4.1.1 Horizontal Integration..... | 112 |
| 4.1.1.1 Why do firms integrate horizontally? | 113 |
| 4.1.1.2 Problems with horizontal integration..... | 113 |
| 4.1.2 Vertical Integration | 113 |
| 4.1.2.1 Types of vertical integration | 114 |
| 4.1.2.2 Why do firms vertically integrate? | 114 |
| 4.1.3 Determinants of Horizontal and Vertical Integration and their Consequences | 116 |
| Summary | 116 |
| Exercises | 117 |
| References..... | 117 |
| SUBTOPIC 4.2 COMPETITIVE EFFECTS OF BACKWARD VERTICAL INTEGRATION..... | 117 |
| Introduction..... | 117 |
| Objectives | 118 |
| 4.2.1 Why Do Firms Integrate Backward? | 118 |
| 4.2.2 Competitive Effects of Backward Vertical Integration | 118 |
| Summary | 119 |
| Exercises | 120 |
| References..... | 120 |
| SUBTOPIC 4.3 VERTICAL INTEGRATION AND PRODUCT DIFFERENTIATION... | 120 |
| Introduction..... | 120 |
| Objectives | 120 |
| 4.3.1. Outsourcing..... | 121 |
| 4.3.2. Theory of Comparative and Competitive Advantages..... | 121 |
| 4.3.3. Generic Strategy: Differentiation..... | 122 |
| 4.3.4. Differentiation and Vertical Integration..... | 122 |
| Summary | 122 |

| | |
|---|------------|
| Exercises | 122 |
| References | 123 |
| SUBTOPIC 4.4 POLICY IMPLICATIONS | 123 |
| Introduction..... | 123 |
| Objectives | 123 |
| 4.4.1 Policy Implications of Horizontal and Vertical Integration..... | 123 |
| Summary | 126 |
| References..... | 127 |
| TOPIC 5 MARKET ORGANIZATIONAL FORMS UNIQUE TO AGRICULTURE | 128 |
| Introduction..... | 128 |
| Objectives | 128 |
| SUBTOPIC 5.1 FARMERS COOPERATIVES | 128 |
| Introduction..... | 128 |
| Objectives | 129 |
| 5.1.1 What are Agricultural Cooperatives?..... | 129 |
| 5.1.2 Benefits of Agricultural Cooperatives | 129 |
| 5.1.3 Potential Problems of Agricultural Cooperatives | 131 |
| 5.1.4 Competitive Effects of Cooperatives | 132 |
| 5.1.5 Models of Marketing Cooperatives | 133 |
| Summary | 134 |
| Exercises | 134 |
| References..... | 134 |
| SUBTOPIC 5.2 FARMERS BARGAINING ASSOCIATIONS..... | 135 |
| Introduction..... | 135 |
| Objectives | 135 |
| 5.2.1 What is Bargaining?..... | 136 |
| 5.2.3 Bilateral Monopoly Model..... | 137 |
| 5.2.4 General Bargaining Model..... | 139 |
| Summary | 141 |
| Exercises | 141 |
| References..... | 142 |

TOPIC 1 REVIEW OF THE ECONOMIC ROLE OF PRICES AND APPROACHES TO THE STUDY OF AGRICULTURAL MARKET ORGANIZATION

Introduction

This topic focuses on the economic role of prices and approaches to the study of agricultural market organization. Economic theory provides a wide range of models and concepts for analyzing markets and prices that generates insights on how the market economy operates. In today's world, a successful business practitioner has to be familiar with the economic way of thinking about markets using economic models and principles. It is the aim of this module to introduce the economic theory of role of prices and the different approaches to agricultural marketing analysis to enable students to independently apply the theory to practical agricultural marketing issues.

In addition, case study report and video footage that demonstrate coffee marketing in Ethiopia are also included. The video footage demonstrates the various marketing activities carried out by various institutions at each stage along the coffee marketing chain in Ethiopia. It clearly demonstrates the numerous marketing activities carried out and how huge value additions are made as coffee goes along the various channels beginning from producer until eventually reaches in the hands of domestic consumers at one end of the market and exported to foreign market at the other end of the market. You are strongly advised to watch this impressive video footage to improve your understanding of the different marketing activities performed in the coffee marketing chains in Ethiopia.

In addition, a case study report that describes coffee marketing in eastern Ethiopia is also linked to this module and serves you as a lesson on how to study agricultural marketing in developing country.

Topic objectives

After going through this module, you will be able to:

- Explore the role that prices play in an economy;
- Understand and apply the different approaches to analyzing agricultural markets;
- Understand the different activities performed in the markets, the role of agents and institutions in agricultural products marketing;
- Recognize the links between the structure, conduct and performance of markets;
- Apply Structure-Conduct-Performance(S-C-P) approach for analyzing the performance of markets;
- Identify the weaknesses of the S-C-P paradigm.

Thematic plan for Topic 1

| No. | Topic | Contact hours | | | Indep. study | Total workload |
|-----|---|---------------|----------|----------|--------------|----------------|
| | | Lect. | Sem | Sub-tot | | |
| 1 | Sub-Topic 1 Economic role of prices | 1 | 1 | 2 | 5 | 7 |
| 2 | Sub-Topic 2 Approaches to the Study of Agricultural Marketing | 3 | 1 | 4 | 10 | 14 |
| | Total | 4 | 2 | 6 | 15 | 21 |

SUBTOPIC 1 ECONOMIC ROLE OF PRICES

Introduction

In an economy, the allocation of resources having alternative uses is the major concern. The allocation of scarce resources depends on the prevailing economic system. In both command and communist systems, it is the government which decides what to do and where the resources should go. However, this is not the case for a market economy. It is the price which determines how much of each resource is used where. How is this role of price understood by the public and politicians? Is price an obstacle to get what you wanted? What is the reason why all people in a country did not own a car? Is it because of the high prices of car? The answer is no. The reality is that we do not have enough resources to manufacture or import cars for all the people in a country. No policies or some other political or institutional arrangements can do this. It is the price that conveys this fundamental reality. What if the government put ‘caps’ on the prices of cars? Would this enable all the people in a country to buy cars? It is not possible because of the high ratio of people to the available resources. Hence, it should be the price itself which ration the available resources to those who demand them and are able to buy.

In a market economy, a change in market forces (supply and demand) changes the market price. Price change also affects incentives and incorporates information for market participants. For instance, increase in price of a good in the market offers producers an incentive to produce more. Since increase in price, given other prices constant, increases profits of producers. Thus producers try to take advantage of higher prices by producing more. But this increase in prices will also inform consumers and consumers try to respond to this higher price by purchasing less. The reverse is expected to happen if price of the good declines. Higher prices raise farm income which enables farmers to buy other items and farm inputs. This means that prices play an important role in efficiently distributing resources and signaling shortages and surpluses which help farmers to respond to changing market conditions. So, the following questions are very important in an economy: What role do prices play in an economic system? How do prices affect the distribution of income? What is the signaling and incentive role that prices play in an economy? How do they impact incentives and competition? How do agricultural price changes affect income distribution among farm households?

Objectives

At the end of this Subtopic the students are able to:

- Distinguish between market system and command system;
- Explain how prices left to itself plays an equilibrating role;
- Explain why prices can be a way of efficiently distributing resources among consumers;
- Explain why prices can be a way of efficiently allocating resources;
- Discuss the consequences of government-set prices; and
- Explain the difference between price set through market mechanism and government.

Before we look into the role that prices play in an economy, we introduce some important concepts such as price, market system and equilibrium price.

Thematic plan

| No. | Topic | Contact hours | | | Indep. study | Total workload |
|-----|--------------------------------------|---------------|----------|----------|--------------|----------------|
| | | Lect. | Sem | Sub-tot | | |
| 1 | Prices | 5 min | 5 min | 10 min | 30 min | 0.7 |
| 2 | Market system | 10 min | 10 min | 20 min | 1 | 1.4 |
| 3 | The role of prices in market economy | 25 min | 25 min | 1 | 2.5 | 3.5 |
| 4 | The role of prices in mixed economy | 10 min | 10 min | 20 min | 1 | 1.4 |
| | Total | 1 | 1 | 2 | 5 | 7 |

1.1.1 Prices

Prices are an important feature of a market. Webster's define price as: "The price of a good or service is what it costs the buyer to acquire it from the seller; the same price is what the seller rewards for giving up its property rights on the good or service". In the modern world, prices represent acceptable exchange ratios for goods. Among varied goods, currency is the standard unit in terms of which the exchange values of all other goods can be quoted. Technically, price is the value expressed in terms of some exchanged commodity. This definition shows that there can be but one price in a market. This is a somewhat intangible but an important economic premise. Commonly, different people within the same market place may offer different prices for the same good. However, within a group of buyers and sellers where competition is nearly perfect, price is predetermined with some degree of precision.

Prices can be found everywhere. Particular classes of goods or services have explicit price-name, e.g. wage as the price of labor, interest rate as the price of capital, discount rate as the price of time, risk premium as the price of uncertainty, etc. Some argue that everything has its price, if not explicit than implicit, because in our societies all can be, and mostly is, traded against priced goods. This argument is the basis for assessing monetary prices for all values that are not tagged with explicit prices in some market place, e.g. natural amenities, social relationships, cultural values, and also human life.

Prices are important to market participants, a decisive factor in agent decisions, since they simplify evaluation of complex transactions, and hence contribute to greater efficiency in their maximization of utility. They also represent a very compact way of summarizing information about demand/supply conditions for efficient communication.

Prices allow producers to make a profit per unit produced/sold. They allow consumers to decide if they wish to spend more than a certain amount for a specific good or service. It is the place where sellers are charging as much as they can and buyers are buying as much as they can afford, at that particular price, that we call an equilibrium price. Economic theory suggests that it is this price which maximizes the overall welfare of a society. In the next section we will see the role that prices play in equilibrating quantity demanded with quantity supplied in a market economy.

It is important to note here that the price we usually observe include all the effects and biases induced by authoritarian policy interventions. The price of oil is burdened with rents to oil companies and to well owners. This in turn shows that most prices in an economy are affected by the price of oil and thus by its embodied political and distributive character. In addition, many prices are directly affected by policy interventions, such as taxes, subsidies, regulatory prescriptions, market structuring, etc. Attention should be focused on where, how and to what degree prescriptive intervention should affect observed prices.

1.1.2 The Market System

A market economy is a mechanism for unconscious of people, activities and businesses through the system of prices and markets. So long as the fundamental economic problems-how to produce, what to produce, and for whom to produce are concerned; in a market economy you may be surprised to learn that no individual or organization is consciously concerned with the triad of economic problems. Rather millions of businesses and consumers interact through markets to set price and outputs. It is the mechanism of demand and supply that will provide the solutions to the stated problems.

In such economic system, there is no visible hand (government or any other body) that makes economic decisions to answer these economic questions. Rather, the economy is derived by producers and consumers in the economy that makes the decisions. One of the Founding Fathers of economics, Adam Smith (1776), described this ‘the invisible or hidden hand’ of the market operated in a *competitive environment* through the pursuit of self-interest to allocate resources in society’s best interest. The principle of the “invisible hand” holds that every individual in selfishly pursuing only her/his personal good, is led, as if by an invisible hand, to achieve the best good for all. Every individual endeavour’s to employ her capital so that its produce may be of great value. She/he generally neither intends to promote the public interest, nor knows how much she/he is promoting it. She/he intends only her own gain.

The argument in favor of market-based economy is based on the assumption that the market is free and competitive. A competitive market is a market in which there are many buyers and many sellers so that each has negligible impact on the market price. In a free and competitive market-based economy, it is the price mechanism that works out the interests of all individual producers and consumers. It was proposed that the responsibilities of government should be confined to the traditional functions – the administration of justice, social statistical reporting, national defense and money supply with only little interference in the economy. This has been known as the “laissez-faire” doctrine.

Though the free market advocators argue that market-based system leads to socially optimal outcome, later on, it was found out that the market mechanism, with its imperfection, has had its own failures and it does not always lead to the most efficient outcome as stressed by its proponents. Before we discuss the market failures and their implication to SSA countries, let us turn to the alternative economic system.

The other alternative economic system to market-based system is the command economy or the planned economic system (such as those under communism). In this system, alternative to using the price mechanism, it is government’s planning and directives that coordinates the production, consumption, and distribution decisions. In a state run command economy, the price mechanism plays little or no active role in coordinating economic activities. Instead government planning directs resources to where the state thinks there is greatest need. The setting of goals, the conception of means, and the conduct of plans, which override any particular unit or units in a country, can be done by government alone. Planning, being a consciously directed activity, falls inevitably within the domain of government or any public authority constituted for the purpose.

The reality is that state planning has more or less failed as a means of deciding what to produce, how much to produce, how to produce and for whom. Following the collapse of communism in the late 1980s and early 1990s, the market-based economy is now the

dominant economic system – even though we are increasingly aware of imperfections in the operation of the market – i.e. the causes and consequences of market failure.

In reality, no economy in the world seems to have been purely market-based economy or purely command economy and thus nearly all countries use a mixture of both market forces and government intervention. Indeed, the relative roles of market or government differ from country to country. In some countries the market plays the dominant role in coordinating the economic decisions, while in others it is the government.

The need for government intervention has been explicitly and implicitly accepted in the developing world although there have been different approaches to the choices involved in resource utilization in the form of planning. In some industrial countries, state planning is considered to be wasteful by some and infinitely worse than the free market mechanism because it imposes value system and priorities that do not properly reflect the whole of the community. Government intervention is believed to have been responsible for the alleged anarchy in the market. Implicit in this argument is the fear that state planning may be equivalent to government coercion and keeping socialism. However, one can note from history that the great depression of the 1930's called for a government intervention. Similarly, in recent times because of the credit crunch (credit crises) - a reduction in the general availability of loans - that hit the global economy, particularly, the economy of the United States of America, governments are highly intervening in the economy to correct the failure.

Economic planning for development involves several choices on the relative role of public and private sector, on the place of agriculture in the economy, or the relative importance of import substitution and export promotion, on the approach to population control or its unrestricted growth, between economic stability and growth, and between growth and distribution. These choices are generally of political nature. While economic forces are important, they are not necessarily the final determinants of choice. A combination of these approaches is used to formulate development strategy. The importance of development strategy needs to be recognized, however, the failure or success of planning efforts is due equally to the strategy adapted and the technical or institutional factors.

What are the roles of prices in these two economic systems? What are the roles of prices particularly in SSA countries? The next section explains the various roles of prices in these economic systems: the market-based economy and the mixed economy.

1.1.3 The Role of Prices in Market-based Economy

Price in a market economy plays three important roles: Equilibrating, allocative and rationing (distributive). We will discuss each of this role one by one.

1.1.3.1 Equilibrating process

Before we discuss the equilibrating role of prices in market-based economy, let us first see the meaning and the mechanics of equilibrium prices. Understanding how equilibrium prices are attained in a given market helps to evaluate whether that price is socially desirable or not. The dictionary defines the word *equilibrium* as a situation in which many forces are in balance – this also describes a market's equilibrium. An economic equilibrium can be regarded as an artificial construct that allows one to examine the properties on the model in a situation where every agent's choices and activities that are consistent with each other and no

agent would have an incentive to change its choice or activities. An equilibrium price is a point at which the quantity of goods that buyers are willing and able to buy exactly balances the quantity that sellers are willing and able to sell. The equilibrium price is sometimes called *the market clearing price* because, at this price, everyone in the market has been satisfied: buyers have bought all they want to buy and sellers have sold all they want to sell. The price for coffee that prevailed in a particular day at a given market place could be considered as an *equilibrium price*. The next question is how does market clear?

Markets coordinate economic activities and changes in prices signal buyers and sellers that changes have occurred within particular markets. For example consider two substitute goods A and B. Assume that the demand for A has increased. This will increase the price of A, the profitability of A, the quantity supplied of A, the demand for the inputs used to produce A, and the prices of these inputs. Since consumer's income is limited, the demand for B will decrease followed by all the changes that will arise in response to the decrease in the demand of B. All of these adjustment processes toward reaching the new equilibrium prices and quantities in both products elucidate how resources move from B to A. This demonstrates the equilibrating role of prices in a market-based economy.

Once market forces have exerted enough pressure to establish the equilibrium price, this price will continue until something happens in the market (a change occurs in one or more of the exogenous factors) to cause either the demand curve or the supply curve or both to shift. This stability in equilibrium price occurs because of its uniqueness in being the only price at which the quantity demanded by consumers is exactly the same as the quantity that suppliers are willing and able to offer in the market. Because of this unique balance in quantity demanded and quantity supplied, there are no internal pressures for either to change.

If there are no external interventions, the competition among buyers and sellers in the market sets off the equilibrating process. Buyers competing with one another for goods in short supply bid up price to try to capture some of the good. As price rises, quantity demanded falls and quantity supplied rises. The process continues until price equals the market clearing price and quantity supplied equals quantity demanded. In a barrier-free and competitive market, it is price that plays the key role in the *equilibrating process*.

A market price which is different from the equilibrium price affects the quantity and price of the good or service being exchanged in the market. These changes in price and quantity will continue until the market reaches the equilibrium. In equilibrium, the forces of supply and demand are balanced; buyers are not frustrated by shortages and the inability to purchase all they wish and suppliers are not frustrated by surpluses and the inability to sell all they wish. As a consequence, the equilibrium point will be relatively stable.

Any market, irrespective of its competitiveness, can attain equilibrium price if it is left to the forces of demand and supply. However, whether this equilibrium price is socially optimum and desirable or not depends on the extent that the market is close to perfectly competitive. This is because, when it is viewed from the perspective of society as a whole, perfectly competitive market is considered as an ideal market. Due to this, economists consider perfectly competitive market as a benchmark against which they evaluate all other types of imperfect markets.

1.1.3.2 Rationing and allocative role of prices

The rationing (distributive) role of prices in a free market economy is concerned with the *for-whom* question. For whom are the goods and services produced? It is concerned with the distribution of a given amount of goods or services among competing users. Why do we ration? We ration because resources are scarce. Available resources must be rationed out to competing uses because wants and needs are unlimited, but resources are limited. Markets ration resources by limiting the purchase only to those buyers willing and able to pay the price. Rationing through prices is usually an effective and efficient method of allocating resources, because commodities are allocated to those buyers willing to pay the highest price and receive the greatest satisfaction.

To formally see how prices in a free market economy leads to an efficient distribution of goods among consumers, let us see how two consumers A and B faced with goods X and Y having prices P_x and P_y , reaches equilibrium or maximizes their utility. From economic theory we know that given price and budget the consumer maximizes her utility by equating the marginal rate of substitution of the two goods to the price ratio of goods. Hence, the condition for consumer equilibrium is:

$$MRS_{x,y} = \frac{P_x}{P_y} \quad (1)$$

In perfectly competitive markets, both consumers are faced with the identical prices. Hence, the condition for joint or general equilibrium for both consumers is:

$$MRS_{x,y}^A = MRS_{x,y}^B = \frac{P_x}{P_y} \quad (2)$$

The ratio of prices of the products is the measure of the budget constraint of the consumer. Equation (1) shows that given the prices of X and Y, the consumer equates the slope of the budget line (P_x/P_y) with the marginal rates of substitution of X for Y ($MRS_{x,y}$). As shown in Figure1, this holds true at point Q. Equation (2) implies that both A and B are in equilibrium at this point. Hence, optimal allocation of goods depends on the relative prices of these goods. This *efficiency in distribution* implies optimal allocation of the goods among consumers. This indicates that prices in a free market apportion more commodities to the individuals who value it the most in economic terms.

Allocation is a question of how society decides what and how to produce. Should it produce a lot of cereals or a lot of coffee? Should it produce more for use now and ignore the future, or

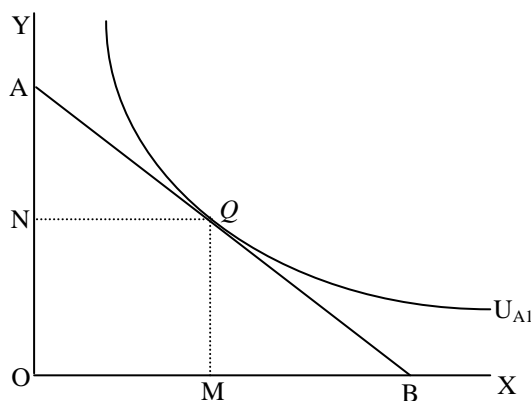


Figure 1 Equilibrium of consumption by consumer A

should it forgo consumption now and invest so that more will be available in the future? Where should it use its inputs? How much of the inputs to use? Note that in all these questions of distribution and allocation the implicit assumption is *scarcity*. Why is resource allocation an issue? It is an issue because resources are limited while human needs are not. Moreover, any given resource can have many alternative uses. This means that we cannot do everything we want, but should choose some at the expense of others.

Markets generate utility in terms of transportation (place utility), storage (time utility) and processing (form utility) as well as in transacting goods and determining prices. The difficult question is the level where price signals induce resource allocation that maximizes welfare of a society. Hence the trader, or in a wider sense most of agribusiness, serves agriculture, through the transaction of goods and a simultaneous determination of prices by inducing a corresponding allocation for optimal utilization of resources.

The price mechanism works best when all markets in the economy are allowed to freely operate by market forces. If a shock occurs in any one market, the market adjusts itself towards equilibrium. A shock in any one market will be transmitted into many other markets and the situation will settle when all markets in the economy simultaneously attain equilibrium.

Suppose the demand for beef has increased due to a holiday event by the majority of people. A change in demand for beef initially affects the beef market and the beef market enters into disequilibrium. In the very short run, it is not only the beef market that enter into disequilibrium, but other markets too. This is because; given fixed income of consumers, increase in demand for beef can be possible only if consumers give up or postpone the consumptions of other goods and services. Hence, the demand for other goods declines and hence these markets enter into disequilibrium as well. These disequilibrium conditions in the beef and other markets set off adjustment processes toward equilibrium. In the process, the excess demand in the beef market bids up the price of beef and excess supplies in other markets depress their prices. The beef market attains its equilibrium at a price higher while others markets attain equilibrium at lower prices. The situation will not stop here. In the long run, further adjustments will also occur in these and other markets too.

The rise in price of beef and the decline in prices of other commodities affect the relative prices of each commodity. Given these changes in relative prices, in the long run consumers tend to adjust their consumptions. They tend to substitute those goods whose prices have become relatively lower than the price of the commodities under considerations. In the long run, not only consumers, but producers also make adjustments in their production and supply. In the absence of excess capacity, firms can make such long run adjustments by employing or reducing the factors such as labor, land and capital. This will further affect the factor market and they also enter into disequilibrium and consequently the prices of factors differ from industry to industry. These variations provide incentive to factor owners to shift their resources from industry whose price decreased to that industry whose price has increased.

If all markets are left to market forces, the situation will eventually settle when all markets and all agents simultaneously have no more incentive to change prices and quantities i.e. when quantity demanded and quantity supplied of goods and services and factors are equal at the new equilibrium prices. The interest of all firms, consumers and factor owners simultaneously match at the new equilibrium prices and quantities.

In all these adjustment processes, it is *the price mechanism* that coordinates actions of economic agents. There is no any *visible hand* (such as government) which is responsible in making the various adjustments in accordance with the interests of all economic agents. It is the *invisible hand* of markets or price mechanism that does the complex job. The price mechanism does this job by informing economic agents (signaling), by encouraging agents to change their decisions (incentive), and by allocating scarce resources and goods and services into where they would be most efficient (rationing).

Prices constrain behavior by affecting the costs and benefits of acts. It is believed that “the invisible hand” theory is the driving force for allocating resources in the free market economic system. Under this theory, the allocation of resources is created through the self interest, competition and supply and demand in the market. Agents distribute resources through self regulation by using only the goods they need and selling away their leftover. It is through this allocation of resources that the market grows and expands as more agents have access to resources.

On the producer side, consider a farmer that produces two goods; say maize (y) and coffee (z). To remain in production, the farmer needs to have revenues that exceed its production costs. The farmer maximizes his revenues given the cost constraints. That is:

$$\text{Max}_{y,z} p_y y + p_z z \text{ s.t. } C(y, z) \leq \bar{C} \quad (3)$$

If the cost constraint is binding, the first-order conditions are:

$$p_y - \lambda C_y = 0, \quad p_z - \lambda C_z = 0 \text{ and } \bar{C} - C(y, z) = 0 \quad (4)$$

where λ is the Lagrange multiplier and C_y and C_z are the partial derivatives of the joint cost function, $C(y, z)$, with respect to y and z , respectively. With standard assumptions on the second-order conditions, the solution to equation (4) gives the well-known expression for the marginal rate of product transformation between y and z :

$$MRPT = -\frac{p_y}{p_z} \quad (5)$$

This means that the optimal allocation of y and z is determined by their relative prices. Figure 2 provides a graphical illustration.

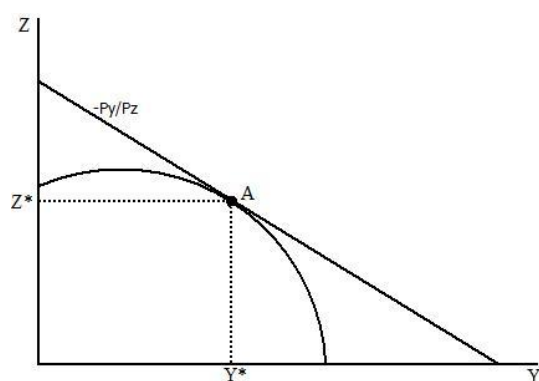


Figure 2 The production possibility frontier and the optimal allocation

In conclusion, the interaction of buyers and sellers in free markets enables goods, services, and resources to be allocated by prices. Relative prices, and changes in price, reflect the forces of demand and supply and help solve the economic problems of a society. Resources move towards where they are in the shortest supply, relative to demand, and away from where they are least demanded.

1.1.3.3 Limitations of the price mechanism – Market failures

In reality, even in those industrialized and ‘market-based economies’, there exist various forms of market failures. Market failure refers to those situations in which the conditions necessary to achieve the efficient market solution fail to exist or contravened in one way or another. Market failures are an extremely important feature of observed markets. The argument is that any economy, left to the market forces, is unlikely to operate efficiently. There will be a tendency for it to produce too much of some goods and an insufficient amount of others. In the extreme case, markets fail to exist, so that certain goods will not be produced at all. In general, these are some of the market failures:

1. *Market imperfections*: For many reasons most markets fail to be competitive and some degree of imperfections exist in the market. In extreme cases, the market could be monopolized by only single firm.
2. *Public goods*: There are some goods that will not be supplied by the market or if supplied, will be supplied in insufficient quantity. Suitable examples to the agricultural sector of SSA countries are services such as research on agricultural technologies, agricultural extension services, road, large scale irrigation schemes, vaccine services for epidemic diseases, etc. These *public goods*, if they are left to be supplied by the market, the market may not supply them at all or it may not supply them in sufficient quantity. Since public goods are non-rival and non-excludable by nature, the market fails to supply enough of them. However, these goods are also critical to the development of the agricultural sector and an economy as a whole and need to be supplied in any way.
3. *Externalities*: Some goods, when left to market forces alone, tend to impose external costs and benefits on the society. Some goods may impose costs on society (negative externality) and others may generate benefit to the society (positive externality). When they are produced by private firms and when they are left to the forces of demand and supply, quantities and prices tend to be different from what is considered to be socially optimum levels.¹
4. *Incomplete markets*: In some cases, even though the cost of providing a good is less than what individuals are willing to pay for it, markets may not exist for some goods. We call such market failures as incomplete markets (a complete market would provide all goods and services for which the cost of provision is less than what individuals are willing to pay). The markets for some services such as insurance and micro farm credits are usually constrained by *moral hazard* and *adverse selection* which are outcomes of information asymmetry. The absence of adequate private insurance and small farm credit markets may provide the political justification for public insurance programs. Provision of farm subsidy is another explanation in the face of large risks associated with price fluctuations, crop failures, etc. Government programs to stabilize the prices received by farmers reduce these risks.
5. *Information asymmetry*: It is a condition that exists in a transaction between two parties in which one party knows the material fact that the other party does not. A number of government activities are motivated by imperfect information on the part of consumers, and the belief that the market, by itself, will supply too little information. In this case, the most informed party may exploit the less informed party. Such opportunistic behavior due to asymmetric information leads to market failure, destroying many of the desirable properties of competitive markets. In the presence of information asymmetry, the lemon can drive out the quality-good. In such condition, the assumption of perfect information that characterizes a perfectly competitive market is ruled out and in effect erodes the desirable welfare outcomes of free market. Governments use regulations such as standardization, certification, labeling,

¹ In the case of negative externality, price tends to be lower and quantity tends to be higher than the socially optimum level while in case of positive externality, both prices and quantities tend to be lower than the socially optimum level.

guaranteeing, etc. to limit the opportunistic behaviors of sellers or consumers that arise from such market failures.

6. *Inflation, unemployment and economic instability*: Perhaps the most widely recognized symptoms of “market failure” from wider macroeconomic point are the presence of periodic episodes of high unemployment, inflation and overall economic instability.
7. *Inequality*: Opponents of the free market also argue that the distribution of income in a market-based economy tends to be unjust and income inequality increases.
8. *Wastage on advertizing*: In a market-based economy, a great amount of resources are spent for advertizing. Some consider advertizing as non-value-adding activity and it is wastage of resources from societal point of view and still others consider as providing important information to consumers.

The extent and type of the aforementioned market failures vary from economy to economy. Especially in SSA countries where the markets are poorly organized, the extents of market failures are considerable. Likewise, the extents of market failures also differ from market to market. In most agricultural commodities, due the presence of many buyers and sellers and the ‘homogeneity’ of the products, the extent of imperfections are relatively lower than other goods. Yet, the agricultural sector has also its own unique features vis-à-vis other industrial sector.

Markets in developing countries are preempted by imperfections both in structure and operation. Commodity and factor markets are poorly organized and fail to provide the necessary information to permit consumers and producers to act in a way that is conducive to efficient production and distribution.

Developing countries in general and sub-Saharan African countries in particular suffer from such market failures. Such assumptions as the presence of large number of buyers and sellers, perfect information, perfect mobility of factors, and others that characterize perfectly competitive market are rarely fulfilled in SSA countries. For many reasons, agricultural markets in SSA countries are constrained by many of the market failures such as *imperfections, information asymmetry, incompleteness, and externalities*. Due to these market failures and the subsequent government interventions, equilibrium price levels differ from the levels that would otherwise exist in a perfectly competitive market.

In most developing countries, markets for key services or goods such as road, electricity, education, research, health services, which are crucial for their development, are missing. When they exist, most of them are poorly organized, dominated by few sellers, and are constrained by entry barriers. Thus, they are less free and less competitive. Most of the markets for goods and services that should preferably be supplied by private sector are even not well developed. These situations are even worse especially in sub-Sahara African countries.

In sub-Sahara African countries, the communication system, the road network, the production structure, etc are poorly organized and hence the markets for many key services are entirely missing. The labor markets are also nearly missing. Moreover, the agricultural production systems are traditional and most of the productions are primarily for home consumption and not for market. Thus, the roles of government in these countries is twofold in that it has to provide key public services and at the same time has to pave the road for the market to flourish.

The theoretical role of prices as equilibrating, allocating scarce resources and rationing through signaling and providing incentive to economic agents have to be interpreted cautiously in the context of economic system prevailing in sub-Sahara African countries. These roles of prices also vary from markets to markets. The markets for most agricultural products are relatively poorly organized vis-à-vis other manufactured product markets. Besides, the markets for most agricultural inputs are also poorly organized, less competitive and in some cases missing.

1.1.4 The Role of Prices in a Mixed Economy

In a pure command economic system, the decisions on key economic questions are decided by the government. The questions of *what to produce*, *how to produce* and *for whom* to produce are answered by government planning. In this case, private firms and the markets have no or little role. In a command economy, the price mechanism plays little or no active role in the allocation of resources. Instead the main mechanism is state planning – directing resources to where the state thinks there is greatest need.

In a mixed economy, however, both markets (price mechanism and government) have important roles. In such economy, the government uses different interventions to correct the various market failures and at the same time works in laying the ground for the market to flourish. The government then uses various mechanisms to direct the competitive outcomes of prices towards some desired objectives.

Governments can also distribute commodities through what can be termed as regulatory distribution. That is, governments pass laws that determine who receives what. Any number of criteria can be set for regulatory distribution. For example, each person might receive an equal share or some might receive more based on some criteria.

Regulatory distribution is often used when governments decide that price distribution does not work properly. In particular, a government might deem that the sudden price increase of an essential good like food or gasoline creates undue hardships for the poor. As such, they might establish a system for distributing the commodity using coupons, price ceilings, or some other mechanism that does not involve higher prices. For instance, intended to reverse the undesirable effects of rising food prices, recently the government of Ethiopia has set ceiling prices of some food items such as sugar, edible oil and beef.

There have been many cases throughout history in which governments have been unwilling to let markets adjust to market-clearing prices. Instead, they have established either price ceilings, which are prices above which it is illegal to buy or sell, or price floors, which are prices below which it is illegal to buy or sell.

If a price ceiling is placed below the market-clearing price, as P_c is in Figure 1, the market-clearing price P_e becomes illegal. At the ceiling price, buyers want to buy more than what sellers will make available. In Figure 1, buyers would like to buy amount Q_d at price P_c , but sellers will sell only Q_s . Because they cannot buy as much as they would like at the legal price, buyers will be out of equilibrium. The normal adjustment that this disequilibrium would set into motion in a free market, an increase in price, is illegal; and buyers or sellers or both will be penalized if transactions take place above P_c . Buyers are faced with the problem that they want to buy more than is available.

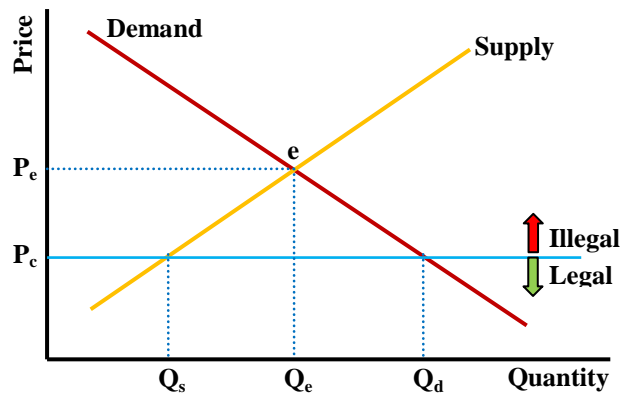


Figure 3 Price ceiling

One of the problems of such distribution is that it would generate under-supply or shortage of commodities. An example of price ceiling is the recent policy measure taken by the government of Ethiopia on some agricultural products such as sugar, meat, edible oil, etc.

Price ceilings are not the only sort of price controls governments impose. There have also been many laws that establish *minimum* prices, or price floors. Figure 2 illustrates a price floor, P_f . At this price, buyers are in equilibrium, but sellers are not. They would like to sell quantity Q_s , but buyers are only willing to take Q_d . Whether the actual supply of producer will be Q_d or Q_s depends on how the price floor is implemented. The government can use some mechanism, within the market system, to prevent the adjustment process from causing price to fall. One way of such mechanism common in agricultural market is the establishment of *buffer stock*. Buffer stock is a mechanism where government absorbs the excess supply $Q_d - Q_s$ by purchasing at the floor price P_f . The total supply in the market would then be Q_s and what consumers are willing to buy is Q_d . The difference is bought and stored by the government.

If, on the contrary, the government does not buy the surplus and just prevents the market adjustment process by enforces the floor price, then suppliers would have no option other than adjusting their supply to the level only demanded by buyers. Because there is no one else to absorb the surplus, sellers will supply an amount equal to Q_d not Q_s . *Minimum wage legislation* is another example in the factor market. The government sets a minimum wage equal to P_f and the amount of labor demanded and employed by firms will be equal to Q_d . Since the minimum wage set as a floor by the legislation is higher than the market clearing wage rate, workers will be willing to supply more labor. That is, either more workers will be willing to be employed at that higher wage rate (P_f) or the existing workers will be willing to work more hours. In either case, the total supply of labor will be higher than the clearing level (Q_e). But, since firms will be penalized if they hire workers below the minimum wage, they will be willing to hire only Q_d level. As in the product market, this would also generate unemployment. While some workers are still willing to supply their labor service at wage rate lower than P_f and at the same time firms are also willing to hire more labor, the legislation prevents both workers and firms to transact below the minimum wage. To avoid such unemployment, the government can encourage firms to employ Q_s level by providing them subsidy.

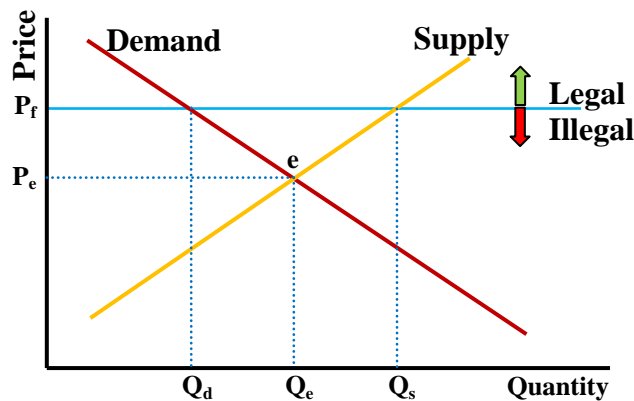


Figure 4 Price floor

Case study 1.1:

In a move to halt runaway prices of basic commodities and also curb double digit inflation in Ethiopia, the Horn of Africa country's **government moved to set a price ceiling** for 18 types of basic commodities in the first week of January, 2011. The Ministry of Trade and Industry (MoT) of Ethiopia has categorized 20 domestic items that will be covered in the controlling mechanism. From these are: edible oil, bread, pasta and macaroni, meat, sugar, tea leaf, bananas, oranges, and wheat flour are some of the main processed and unprocessed agricultural commodities.

From imported items: edible oil, pasta and macaroni, powder milk, rice and sugar have been included in the imported items that will be controlled. MoT also said the price of the items, described above, cannot be adjusted without prior knowledge of the Trade Bureau of the Regions and Ministry of Trade. Any business person shall display the price of their goods and services by posting such a list in a conspicuous place in his business premises or affecting price tags on the goods in a manner that includes custom duties, taxes and other lawful fees. (Source: <http://www.capitalethiopia.com>)

Task 1.1: Based on the above case study, discuss the following:

1. What is the justification for such price control?
2. What would be its effect on producers, traders, and consumers?
3. What would be its overall implication in improving/distorting the market?
4. Would such government intervention sustainable?
5. What alternative solution do you suggest to achieve the same objective?

Summary

Markets and prices play vital roles in any economy system. They determine the standard of living of a society. In a decentralized economic system, markets are the nerve system while prices are the impulses conveyed throughout the system. Prices enable us respond to stimuli and produce goods and services efficiently and changing prices force to adjust and moderate consumption patterns.

The role that prices play in an economy depends on the prevailing economic system. Different economic systems deal with the role that prices play in an economy with different degrees of efficiency, but the underlying reality exists independently of whatever particular economic system is used. Once we recognize that, we can then compare how economic systems which use prices to force people to share scarce resources among themselves differ

in efficiency from economic systems which determine such things by having government issues orders saying who can get how much of what.

In so far as prices result from supply and demand in a free market, they effectively allocate scarce resources. It forces economic agents to modify consumption and production opportunities, induce spending responses, motivate the reallocation of existing resources, and change incentives for factor accumulation. Prices convey information on resource scarcities to individual households and firms, thereby guiding consumption and production choices that bear on resource allocation. So long as people are free to spend their money for what they see fit, price changes in response to supply and demand, direct resources to where they are most in need and direct people to where their wants can be satisfied most fully by the existing supply. In a market-based economy, it is the competition between and among buyers and sellers that leads to the equilibrium price. Buyers competing with one another for goods in short supply rise price to try to capture some of the good. As price increases, demand falls and supply rises. The process continues until the price equates with the equilibrium price and quantity supplied equals quantity demanded which is equilibrating role of prices in a free market economy.

The discussion of government price controls enables us understand how powerful market forces are. In a command economy, the price mechanism plays little or no active role in coordinating economic activities. Resources are distributed and allocated where and to whom the government wants it to be distributed or allocated. The prices set by the government prevent the market from reaching the equilibrium price and quantity. In this kind of economy, government may set prices below the equilibrium price (price ceiling) to support poor consumers or above the equilibrium price (price floor) to support producers. However, price ceiling induces shortages and price floor leads to large surpluses in the markets for many agricultural products. Usually attempts to control prices are a response to the view that market prices are not always “fair” and for equity issues. It is good to note here that markets may not be always “fair,” but attempts to interfere with their operation may lead to other problems.

In conclusion, in a free market economy, only price is capable, without help, of informing economic agents (signaling), motivating agents to change their decisions (incentive), and allocating scarce resources to where they would be most efficient (rationing).

Exercises

1. Discuss the advantages and disadvantages of leaving the allocation of a country's resources to the price mechanism?
2. Why is the rationing function of price necessary for price to serve this function in the market economy? Discuss.
3. How does a price ceiling or price floor undermine the rationing and allocation function of prices?
4. Discuss the advantages and disadvantages of price ceilings and price floors in an economy.
5. Why would government intervene in the market and place a price ceiling or price floor? Discuss.
6. Distinguish between the rationing function and the allocation function of price system?
7. Discuss about the different economic systems and how resources are allocated among peoples.
8. In the late 1970s, gasoline prices were rising rapidly and there was considerable public support for proposals to set a price ceiling and issue ration coupons. Supporters of rationing

wanted to ration gasoline on the basis of “need,” but were not in agreement on how need could be measured for the actual distribution of coupons. Some bases for distribution include the number of cars a household has, the number of licensed drivers a household has, equally to all households or persons, and the number of miles each household must drive to work. Explain why some people would consider each of these bases unfair. Can you think of a method that you believe is clearly superior to any of the above methods?

9. There are a number of places in which society does not allow a market to function. There is no legal market for babies, for example (although there are markets for sperm, eggs, and wombs for rent). Markets for transplantable organs are also not legal. You cannot, for example, sell a kidney on ebay. What would be the advantage of allowing markets to function freely in these areas? On the other hand, what is the case for prohibiting these markets from forming?
10. What is market failure? Why do markets fail? Why is market failure common in developing countries? Discuss.

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SUB TOPIC 2: APPROACHES TO THE STUDY OF AGRICULTURAL MARKETING

Introduction

Agricultural marketing includes the services and functions of different institutions and intermediaries. Agricultural marketing problems vary from commodity to commodity largely due to the seasonality of production, the variations in its handling, storage, processing and the number of intermediaries involved in them. Marketing economists have developed various approaches to study agricultural marketing. The functional, institutional, commodity, the behavioral system and the structure-conduct-performance approaches are the major ones. The functional approach consists of all the activities performed in accomplishing the marketing process, the institutional approach covers all market participants, the commodity approach with the commodity at the pivot combines the previous two approaches, the behavioral system approach looks at the behavior of the firms and the structure-conduct-performance approach studies how the structure of the market and behavior of firms affect the performance of markets. These approaches are employed because the role of marketing and marketing firms will be explained based on them. In this Subtopic we will learn the details of the various approaches to the study of agricultural marketing.

Objectives

After completing this Subtopic the students will be able to:

- Recognize the different approaches to the study of agricultural markets;
- Identify the pros and cons of the different approaches to the study of agricultural markets;
- Familiarize themselves with the agricultural marketing functions, institutions and agents, market processes, and issues of organization;
- Understand the structure-conduct-performance paradigm and how the nature of industry is affected by market structure; and
- Apply these methods to a real world case, undertaking a diagnostic analysis of a specific firm and environment.

Thematic plan

| No. | Topic | Contact hours | | | Indep. study | Total workload |
|-----|--|---------------|----------|----------|--------------|----------------|
| | | Lect. | Sem | Sub-tot | | |
| 1 | Functional approach | 0.5 | 0.3 | 0.8 | 2.0 | 2.8 |
| 2 | Institutional approach | 0.4 | 0.2 | 0.6 | 1.5 | 2.1 |
| 3 | The commodity approach | 0.1 | - | 0.1 | 1 | 1.1 |
| 4 | Behavioral approach | 0.5 | - | 0.5 | 1.5 | 2 |
| 5 | The Structure-Conduct-Performance approach | 1.5 | 0.5 | 2 | 4 | 6 |
| | Total | 3 | 1 | 4 | 10 | 14 |

1.2.1 The Functional Approach

Marketing is sometimes thought of as simply the process of buying and selling though its tasks go beyond this. The functional approach study the different activities performed in changing the farm product into the product desired by the consumers. It includes all the business activities performed by firms in the marketing system. There are three general types of functions performed in any marketing system. These are the exchange functions, physical

functions and facilitating functions. In what follows we will discuss each of this function in detail.

1.2.1.1 The exchange functions

As mentioned earlier, exchange functions (buying and selling) are what are commonly thought of as marketing. The buying function is concerned with the search for and evaluation of products and services and obtain them. The selling function is concerned with promotion of the products through personal salesmen and advertizing. In general they involve finding a buyer or a seller, negotiating price and transferring ownership (but not necessarily physical transfer). At this point, formal or informal property rights are vital to ensure the reliable transfer of ownership and to guarantee legality (e.g. coffees on sale were not stolen and will not be reclaimed). As products move through many hands before reaching the final user, title changes several times. Each time title changes and a price must be set. This means that pricing plays an integral part in marketing. This involves price negotiations and transferring of product ownership through buying and selling activities.

Case study 1.2.1: The exchange functions

In the marketing of coffee in Ethiopia, the exchange functions (buying and selling) are performed at the spot (open market), road side, wholesale, cooperative, retail, and export markets.

Task 1.2.1: In your opinion what are the factors that influence coffee farmer in making a choice between traders and/or markets?

1.2.1.2 Physical functions

The physical functions are those activities which involve handling and movement of the commodity from producers to consumers. They include storage, transportation, processing, manufacturing, handling and packing. It enables the actual flow of commodities through space and time, and their transformation to a form desired by the consumer. Assembling or concentrating the product at convenient places allows its efficient transportation. Storage allows the commodity to be kept until the demand rises, thereby stabilizing supply. Processing transforms the commodity into the products desired by consumers. Grading and standardization allow the consumer to be more confident of the characteristics of the good being purchased.

Transportation

Transportation provides desired changes in location. It allows the cultivating of a produce in areas particularly adapted to their production and then moving them to the buyers. However, the long distances over which a produce are transported often results in relatively high transportation costs, and potentially lower quality, due to the damage during transport if the products are not properly packed.

Handling and packaging

For transporting the product from seller to buyer, proper handling and packing are crucial. In order for the product to be transported, it must be handled and packaged properly. Proper packaging; preserves the moisture level and protects it from contamination, facilitates

handling of the product, makes the final product more attractive to the buyers, and gives instructions on how to handle, store and use it.

The material used for packaging is a major factor in regulating the moisture content of the stored product. The selection of the packaging material is therefore crucial to preserve the humidity level, and thus the viability of the product. Packaging material should be strong, durable and well labeled. Many different materials are generally used for packaging agricultural products. The selection of the most appropriate material and size is crucial and differs according to type of storage and handling, distribution and commercialization needs. Air-proof containers provide effective protection against insect damage, and fungi. The thickness of the packaging and their uniformity determine their permeability to moisture. For example, the Ethiopian Commodity Exchange (ECX) provides standard sacks to traders and traders in turn provide these sacks to farmers for storing and transporting quality coffee that meets the export standards.

Assembly

This activity enables us bring together products from a large number of farms scattered around the countryside to a central point where they can be gathered in large lots, sorted, graded and packaged according to the desired specifications in quantity ready for the market.

Storage

Most agricultural products storage is delicate, as specific temperature and proper packaging must be observed to maintain the desired humidity level. The humidity of the air surrounding the product affects its equilibrium moisture content. Storage requirements are different depending on the product form (packaged or loose) and storage type (long term or short term). Without proper storage, most agricultural products lose their taste. Poor quality product generally results from poor drying and poor storage facilities. This affects the marketability of the product as consumers will not engage in repeated buying behaviors following low quality. Storage also facilitates the adjustment of product supplies to its demand and reduces price fluctuations as the product can be kept for some period of time and supply can be evened out, respectively.

Standardization and grading

Standardization refers to the determination of the standards to be established for different commodities. It is the establishment of quality and quantity measurement that makes selling and pricing possible. Standards are set on the basis of certain features such as size, weight, color appearance, texture, moisture content, amount of foreign matter present, etc. Grading, however, refers to sorting of product attributes into uniform categories according to the quality specifications laid down. Grading follows standardization. It is a sub-function of standardization.

Grades and standards assist market participants to determine the price because both of them will know specifically what type of product they are dealing with under a grading and certification system. Grading is important when the buyers demand products that meet specific standards and/or when producers want to be paid according to the quality of their products. It not only increases buyer's satisfactions but it also provides incentive to producers to improve qualities and improve overall efficiency of the prevailing market.

The presence of grading and standardization system in a market will enable market participants to have balanced information about the quality of the product. Thus, in such system a good quality product will be sold at a higher price than poor quality ones. However, in the absence of grading and standardization system, sellers are likely to have better information about the quality of a product than buyers. This is one of the causes for market failures termed as *information asymmetry* discussed under Sub-Topic 1. In such markets poor quality products ‘the lemons’ are likely to force good quality products of the same type out of the market. In other words, sellers will have less incentive to supply good quality products as buyers cannot identify good quality products from bad ones and hence will not be willing to pay higher prices for the good quality products. In the presence of information asymmetry between buyers and sellers, sellers are likely, in the short run, to exploit buyers by charging higher price for poor quality products. In the long run, the market is likely to be dominated by poor quality products. This is because, since buyers lack information about the quality of the product, they have no incentive to pay higher price rather they attempt to minimize risk by going for lower prices. Similarly, sellers will have no incentive to invest to improve the quality of the product as they cannot persuade buyers that their product is actually good quality. Hence in the long run, the market will be dominated by ‘lemons’.



Case study 1.2.2: See the video clip on the standardization and grading of coffee in Ethiopia.

Task 1.2.2: After looking at the video clip, discuss the pros and cons of standardization and grading in the Ethiopian coffee markets.

1.2.1.3 Facilitating functions

Facilitating functions are those activities which enable the exchange process to take place. Product standardization, financing, risk bearing and market intelligence are the four important components of facilitating functions. Facilitating functions are not a direct part of either the change of title or the physical movement of produce, but the facilitation of these activities.

Standardization

As was discussed earlier standardization simplifies exchange functions and reduce marketing costs by enabling buyers to state what they want and sellers to convey what they are able and willing to supply with respect to both quantity and quality. In the absence of standardization trade either becomes more expensive or impossible altogether.

Financing

In any production system, it is true that there are lags between investing in the necessary inputs and receiving the payment for the sale of produce. During these lag periods some individual or institution must finance the investment. The question of where the funding of the investment is to come from, at all points between production and consumption, is one that marketing must address. Consider the problem of an exporter who wishes to have good quality coffee for export where few farmers have the necessary drying and packaging materials, and storage facilities. This is a marketing problem. These could be solved by the exporters or some other institutions providing these facilities to coffee producers.

Risk bearing

In both the production and marketing of produce the possibility of incurring losses is always present. Physical risks include the destruction or deterioration of the produce through fire, excessive heat or cold, pests, floods, earthquakes etc. Market risks are those of adverse changes in the value of the produce between the processes of production and consumption. A change in consumer tastes can reduce the attractiveness of the produce and is, therefore, also a risk. All of these risks are borne by those organizations, companies and individuals.

Market intelligence

It is true that marketing decisions should be based on reliable information. Market intelligence refers to the process of collecting, interpreting, and disseminating information relevant to marketing decisions. Its role is that it reduces the level of risk in decision making. Through market intelligence the seller finds out what the buyer needs and wants. The alternative is to find out through sales, or the lack of them. Marketing research helps establish what products are right for the market, which channels of distribution are most appropriate, how best to promote products and what prices are acceptable to the market. Intelligence gathering can be done by the seller, government agency, the ministry of agriculture, or some other concerned organization.

Case study 1.2.3: Limited market information and institutional environment

In the coffee marketing in Ethiopia, limited information at all levels of the marketing chain, limited government intervention, credit access especially for suppliers, infrastructure, etc. are the major problems mentioned by market participants.

Task 1.2.3: Discuss in general the impact of policy environment on the performance of markets. Why is government intervention in the markets justifiable? Also discuss how conducive is the policy environment in SSA for markets to perform well?

1.2.2 Institutional Approach

The institutional approach examines agencies and institutions which performs various functions in the marketing process. It focuses on the study of the various institutions, middlemen and other agencies which add utility to the product. These organizations or market participants are those who perform the activities necessary to transfer goods from the producer to consumer, because of the benefit of specialization and scale that exist in marketing.

It is classified into five: Merchant middlemen, agent middlemen, facilitative organizations, processors and manufacturers (millers) and speculative middlemen. The question is that why the institutional approach? We are interested in the institutional approach because middlemen's specialization in performing a specific marketing functions leads to improvement in productivity and hence a decreased cost. This in turn results in price fall adding to the overall efficiency of the market. The second reason is the gains from specialization. Marketing functions are marked by economies of scale. Hence specialization reduces cost and hence improves efficiency. Average cost of performing marketing functions falls as the volume of products handled rises. Finally middlemen reduces market search and transaction costs.

The number, level of competition, pricing behavior, relationship, etc. of the various marketing agents or institutions is crucial in analyzing a given market. Thus, the institutional approach studies how these institutions respond to changes in market incentives. It also helps to design appropriate intervention strategies intended to improve the performance of the market. Agricultural marketing studies are hardly complete without incorporating the institutions involved in moving the product from the points of production until it reaches the final consumers. The presence of collusive act among agents at a given stage of the market chain or the level of monopoly power enjoyed by some of the agents will have greater implications in determining the marketing costs (and hence the final price) and the overall performances of the market.

1.2.2.1 Merchant middlemen

These middlemen have properties in common in that they take title to, and therefore own, the products they handle. They buy and sell for their own profit. Merchant middlemen can be divided into two: Retailers and wholesalers.

Retailers

They are merchant middlemen who buy products for resale directly to the ultimate consumers. Retailers may perform all of the marketing functions. Mostly, their number is large compared to other merchant middlemen.

Wholesalers

They are merchant middlemen or manufacturers who sell to retailers, other wholesalers, and/or industrial users but do not sell a significant amount to ultimate consumers. They make up a highly heterogeneous group of varying sizes and characteristics. They can be local buyers or rural assemblers who buy goods in the producing area directly from farmers and transport the products to the larger cities where they are sold to other wholesalers and processors. For example, in the marketing of coffee in Ethiopia, there are local assemblers who buy coffee from farmers in rural areas and transport in bulk to district towns for processing and then ship the products to Dire Dawa for selling it to exporters which are wholesalers themselves. These wholesalers/assemblers/ can handle different agricultural products or can specialize in handling a limited number of products. They may be cash-and-carry wholesalers or service wholesalers who will extend credit and offer delivery and other services.

1.2.2.2 Agent middlemen

Agent middlemen, as the name implies, act only as a representative of their clients. They do not take title to and therefore do not own, the products they handle. While merchant middlemen (wholesalers and retailers) secure their income from a margin between the buying and selling prices, agent middlemen receive their income in the form of fees and commissions. Agent middlemen in reality sell services to their principals, not physical goods to customers.

In many instances, the power of agent middlemen is market knowledge and “know-how” which they use in bringing buyers and sellers together. Though the names may differ somewhat, agent middlemen can be categorized into two major groups, commission-men and brokers.

Commission-men

They are usually given broad powers by those who transfer goods to them. They normally take over the physical handling of the product, arrange the terms of sale, collect, deduct their fee, and remits the balance to his principal.

Brokers

Brokers, on the other hand, usually do not have physical control of the product. They usually follow the directions of his principal closely and have less discretionary power in price negotiations than commission-men. They just act in between the sellers and buyers, link them and assist in negotiations. In agriculture, livestock commission-men and grain brokers on the grain exchanges are good examples of those commission-men and brokers, respectively.

Case study 1.2.4: ECX's involvement in the coffee market in Ethiopia

After the Ethiopian Commodity Exchange (ECX) has been introduced to the coffee marketing of Ethiopia, some marketing agents such as village assemblers and brokers were legally restricted from involving in the coffee marketing. In addition to this, the ECX has also established 3 to 5 local trading centers in each major coffee producing woredas. The purposes of these centers were to create conducive environment for open, competitive and accessible local markets and to facilitate preliminary quality inspection and advisory support. These centers were also to be used as market information points for displaying the prevailing prices. However, most of these coffee local trading centers are not operational.

Task 1.2.5: Discuss whether the restriction of these agents from the marketing of coffee will improve the marketing performance of coffee or not. In addition, what are the possible reasons why traders are not willing to buy coffee at the common market places?

Case study 1.2.5: Commission men at the auction market

Even though there are no brokers and commission men at the lower level of the marketing chain (between producers and wholesalers), there are commission men working as agents for coffee suppliers at the auction market (Addis Ababa). The roles of these commission men are bidding at the auction floor, speculation, etc. These commission men are required to have least a 10000 Birr on their account by ECX to avoid some acts of tacit collusion with the exporters.

Task 1.2.5: Why did ECX allow commission men to operate at the auction market though not at the lower level of the marketing chain? Discuss.

1.2.2.3 Speculative middlemen

Speculative middlemen are those who take title to products with the main objective of making profits from price fluctuations. All merchant middlemen, of course, speculate in the sense that they must face uncertain conditions. More often, however, wholesalers and retailers attempt to secure their incomes through handling and merchandizing their products and to hold the uncertain aspects to a minimum. Speculative middlemen seek out and specialize in taking these risks and usually do a minimum of handling and merchandizing. They usually attempt to earn their profits from the short-run fluctuations in prices. Purchases and sales are usually made at the same level in the marketing channel. Speculative

middlemen often perform a very important job as a competitive force in the protection of an adequate pricing structure.

Case study 1.2.6: Limited speculation in the coffee market in Ethiopia

Speculation is limited by regulation in the coffee market. For instance, coffee suppliers once they supplied their coffee to ECX warehouses are required to sell it to exporters or domestic sellers at the auction within 30 days. Similarly, exporters have to process and supply to ECX warehouse within a given time limit.

Speculation is limited by regulation in the coffee market. For instance, coffee suppliers once they supplied their coffee to ECX warehouses are required to sell it to exporters or domestic sellers at the auction within 30 days. Similarly, exporters have to process and supply what they have bought from farmers/producers to ECX warehouse within a given time limit.

Task 1.2.6: Discuss whether the actions of limiting speculative act can be justified or not.

Case study 1.2.7: The institutions involved in the marketing of Harar coffee and their functions

A case study on Harar coffee marketing followed the major marketing channels in Eastern Ethiopia from production to the export levels. The major marketing agents involved in the coffee marketing channel and their major functions can be summarized as follows.

Producers

The major functions operated by coffee producers are:

- Production
- Drying (partially)
- Short-term storage for better prices
- Transporting to traders (partially)
- Selling

Traders (Assemblers)

Traders and/or assemblers operate the following marketing functions:

- Collecting the produce from farm households (buying)
- Drying (partially)
- Transporting to processors
- Selling to processors

Trader-processors (Suppliers)

Coffee trader-processors operating at the first stage (district level) processing are those who are involved in hulling of dried coffee. These initial coffee processors may or may not have their own hulling machineries. Those without hulling machineries pay for hulling services. The major functions they perform are the following:

- Further drying of the assembled coffee
- Hulling coffee beans
- Classifying hulled coffee
- Hand-picking of hulled coffee
- Transporting to the ECX warehouses
- Selling at the auction market

Note also that in the southern part of the country trader-processors also perform pulping (red cherry beans processing). This processing was not conducted in the eastern part of the country due to shortage of high pressure water supply that pulping requires.

Exporters

All coffee exporters' further process the coffee they purchased at the auction market to meet the standards of ECX and their buyers. The major functions of the exporters are the following:

- Buying coffee at the auction market
- Remove the pulp from hulled coffee
- Classifying and hand-picking
- Packing of coffee for export
- Transporting to the buyer via Djibouti port (through transport operators)
- Roasting, packing and distributing ungraded coffee to local traders

Other marketing agents

Other marketing agents involved in the marketing of coffee are the following:

- **District coffee team:** Under the district agricultural office, this team controls the quality of coffee, regulate the marketing system, and control the moisture content of the coffee to be transported to the ECX warehouses.
- **ECX:** This is the only legal broker and warehouse operator of coffee offered to the Exchange.
- **Transport operators:** These are agents which provide transport services, but may or may not be involved in coffee business.

Task 1.2.7: Consider the maize markets in Kenya. Compare the marketing institutions involved and functions performed in the marketing of this product with that of coffee in Ethiopia?

1.2.2.4 Facilitative organizations

Facilitative organizations assist the various middlemen in performing their tasks. Such organizations do not directly participate in marketing process as either merchants or agents. One group of these organizations provides the physical facilities for the handling of products or for bringing buyers and sellers together. They take no direct part in the buying and selling of the products. However, they establish “the rules of the game” which must be followed by the trading middlemen, such as hours of trading and terms of sale. They may also aid in grading, arranging and transmitting payment and the like. They receive their income from fees and commissions from those who use their facilities. Another group of organizations falling in this general category is the trade associations. The primary purpose of a large majority of these organizations is to gather, evaluate, and disseminate information of value to a particular group of traders. They may carry on research for mutual interest.

These organizations, though crucial for smooth and efficient functioning of markets, are mostly missing and when they are present, they are poorly organized in SSA countries in general and in the agricultural markets in particular. Many of the problems observed in agricultural marketing could be attributed to the absence or poor functioning of institutions offering such services as financial, insurance, standardizing and grading, etc services. These institutions contribute for the development of agricultural markets by facilitating the buying and selling activities, by easing and speeding up the physical functions, by reducing information asymmetry, by promoting the marketing organizations, etc.

Case study 1.2.8: Facilitative organizations in the coffee markets

The facilitative organizations participating in the coffee marketing in Ethiopia include, district agricultural office, cooperatives/unions, government and private banks, informal lenders, ECX and Coffee Quality Inspection Office.

Task 1.2.8: Identify the facilitative organizations participating in the other similar agricultural commodity market in your area and discuss about the roles of each institution/organization in improving the performance of the market.

1.2.3 The Commodity Approach

This approach simply follows one product, such as coffee, and studies what is done to the commodity and who does it as it moves through the marketing system. It helps to pinpoint the specific marketing problems of each commodity as well to develop the market for the specific commodity. The approach follows the commodity along the path between producer and consumer and is concerned with describing what is done and how the commodity could be handled more efficiently. It combines both functional and institutional approaches. It is extremely useful to the person who is interested in only one product since it does allow in-depth analyses. However, it has also a disadvantage because it ignores the between product and market alternative and also the multi-product firms. As opposed to the analysis of general equilibrium or any other sort of that kind, this approach deals about the marketing of a single commodity or certain commodity groups such as grain marketing, food marketing. Thus, it is difficult to see the interaction and interrelationships that exist among commodities which could have important implications governing the behavior of the market and market agents. Note that our case study is a commodity approach as we only followed coffee marketing from producers to exporters.

1.2.4 Behavioral Systems Approach

This approach refers to the study of behavior of firms, institutions and organizations, which exist in the marketing system. It tries to answer the question how does the market or marketers behave and perform. The marketing process is continually changing in its organization and functional combinations. An understanding of the behavior of the individuals is essential if changes in the behavior and functioning of the system are to be predicted.

Under this approach, marketing firm is considered as a system of behaviour and the emphasis is on “how” change occurs. This approach views marketing as a system within which subsystems are interrelated and interacting each other. And the operation of the system is the results of the interrelationship and interactions of the subsystems. The behavioral system approach thus studies the behavior of each subsystem and predicts its implications to the main system. The point of interest is the people who are making decisions to solve particular marketing problems. This behavioral system allows systems to be identified with the particular problem being addressed.

This approach tries to answer the following questions:

- Can changes be made in the marketing system to lower the price to consumers?
- Are producers/manufacturers responding to the needs of the consumer?
- Are producers receiving an “adequate” return on their investments?

- Are traders' abusing their market power or providing incorrect market information?

In the behavioral systems approach the following are important: The input-output system, the power system, the communication system and the adaptation to internal and external changes.

1.2.4.1 The input-output system

It identifies motives and means of affecting the input–output ratio. How can a firm or a group of firms use input resources that are costly and scarce to secure a satisfactory output? What is the optimal combination of inputs to produce a profitable level of output? This is what is called technical or operational efficiency. If we compare two firms, say A and B, firm A is technically efficient if it produces the same level of output as firm B with fewer inputs. Pricing or allocative efficiency, on the other hand, refers to the efficient allocation of resources to produce maximal output. The obvious disadvantage of this method is that it is abstract in nature and the reliance on intimate knowledge of individual's firm characteristics and behavioral interactions.

1.2.4.2 The power system

Firms have a status and a vested interest in the role they are playing. For example, reputation for quality, to be market leaders, community conscience and attaining fast growth. It tries to answer the questions, how is their motivation and competence to grow and expand, to be innovators or followers etc.? It studies the level and type of market power of each buyers and sellers in the market and analyzes the implications in shaping their behavior in the market. Economic theory of monopoly and competition behavior gives insights into this system of behavior. Market power is the ability to affect prices. Oligopoly (selling power) and oligopsony powers (buying power) are the two non-competitive marketing behaviors of traders. Monopoly (one seller) and monopsony (one buyer) are the two extremes of these non-competitive marketing behaviors.

1.2.4.3 Communication systems

Farmers and traders must get information to make appropriate marketing decisions. However, market information, especially in SSA are limited, and if they exist they are mostly unreliable. These problems are mainly due to lack of effective channels of information and direction and misinterpretation. Hence the question of how to establish effective channels of information is very important to improve the marketing performance.

1.2.4.4 Adapting to internal and external changes

If change is the essential characteristics of marketing, then how to adapt to these changes is a major problem. As a rule, firms desire to survive and are ready to pay so to adapt to changes.

In summary, all the four behavioral systems are components of the operation of a marketing system at any one time. A firm may forgo the ultimate in input-output solution because its communication systems have broken down or because of considerations of its power situations. For example, a firm may, prefer integrating with another firm in order to improve its internal communication problems or to enhance its power in the market place.

1.2.5 The Structure-Conduct-Performance (S-C-P) Approach

Let us start this section by posing the following question. In many African countries during the 1980s and 1990s, there were legal prohibitions against small grain mills competing with large industrial millers. Why have many economists argued that such restrictions need to be removed if grain farmers are to benefit from structural adjustment programs?

The Structure-Conduct-Performance (S-C-P) paradigm sometimes called the traditional industrial organization was a principal approach to study the industrial organization (IO) during the second half of the 20th century. It was recognized as one of the most efficient and reliable means to analyze an industry or more specifically, the market power-profitability relationship in an industry. By industrial organization we mean a body of economic research which studies how firms and markets are organized, their interaction, and how this interaction affects market outcomes, and ultimately society's welfare.

The S-C-P paradigm was first developed by Edward Mason and Joe Bain in the 1940s and 1950s. It is an analytical approach used to study how the structure of the market and the behaviour of sellers affect the performance of markets.

1.2.5.1 Elements of S-C-P

Market structure

Market structure consists of the relatively stable features of the environment that influence the behaviour and rivalry among the buyers and sellers operating in a market. For example, if the market structure is characterized by high barriers to entry, it may result in only a few traders profitably maintaining the business activities. These few traders may engage in non-competitive behaviour such as collusion² and exclusionary or predatory³ price setting behavior. These non-competitive behaviors can result in excessive profits and widened marketing margins⁴ for traders. Concentration can also result in low producer shares⁵ for farming households which can have a significant impact on the income of producers and on their purchasing power that depend on the market as the source of food.

The major structural elements which are most critical to performance analysis are the following:

1. *Concentration*

This refers to the number of buyers and sellers in the market. When there are few buyers and sellers, they may engage in non competitive behaviors such as collusion and price discrimination. When there are few buyers of a commodity, traders offer sellers low prices which reduce the income of sellers. If there are few sellers of a commodity in the market, then sellers gain market power and increase prices, which reduce the amount of commodity that buyers can purchase with a given amount of income, therefore, making them relatively poorer than if prices were lower.

The most commonly used measures of concentration are:

i. *Concentration Ratio (CRr)*

² When rival companies and traders cooperate, overtly or covertly, for their mutual benefit.

³ Exclusionary or predatory pricing occurs when one firm lowers and maintains its price below costs until other efficient firms exit the market. Predatory pricing eliminates competition (results into monopoly power)

⁴ A marketing margin is the difference between the prices observed at different points in the supply chain when quantities are expressed in comparable units of a commodity.

⁵ A producer share in this brief refers to the percentage of the price received by the farmer over the price paid by the consumer for a commodity expressed in comparable units.

This measure shows the proportion of the industry's output accounted for by r largest firms:

$$CR_r = \sum_{i=1}^r S_i$$

Where: S_i = The market share of firm i

The ratio shows the joint market share of the largest r firms in an industry. Once the aggregate data of the industry and that of the r largest firms is accessible, the ratio can be determined, avoiding the complications of dealing with the individual accounts of the fringe of numerous small firms in the industry.

The use of concentration ratio with firm level data has been criticized for two main reasons: First, it ignores the relative size variation across the r largest firms. As a result the same concentration ratio could describe a market where there are r similarly sized firms or a situation where one of the r firms dominates. Secondly, it neglects all except the largest r firms. This makes it defective because it gives the feeling that the two markets with the same shares held by the r largest firms have identical concentration ratios even though one market contains more firms in total and is likely to be more competitive. It is important to note here that the most studies in industrial organizations used the first four largest firms ($r = 4$) and only few studies used the first eight largest firms ($r = 8$).

ii. *Herfindall-Hirschman Index (HHI)*

The HH index is the sum of squares of the market shares of each of the firms in the industry:

$$HHI = \sum_{i=1}^n S_i^2$$

where, n is the total number of firms.

In an ideal situation where all n firms are of equal size, then $HHI = 1/n$. The strength of the HHI lies in its ability to combine information on both the number and the size distribution of firms. For this reason it is the preferred measure of concentration. However, its data requirements are immense as its calculation would demand firm level data for all individual firms in the industry. It is also noted that the squaring of market shares gives greater weight to larger firms. In practice, many different distributions could give the same value of the HHI.

iii. *Gini-coefficient (GC)*

It measures the size of firms ranked from the smallest to the largest as a percentage of the number of firms in the market, plotted against the cumulative output of these firms. The greater the deviation from the diagonal line, the greater the inequality in firm size is. The GC is a measure of statistical dispersion most prominently used as a measure of inequality of wealth or product distribution. The GC can range from 0 to 1; it can also be multiplied by 100 to range between 0 and 100.

GC can be computed using different formulas having their own levels of bias. In this case, the GC of the suppliers is calculated as:

$$G = \frac{\bar{D}}{2\bar{Q}}$$

$$\bar{D} = 2 \sum_{i=1}^{i=k} n(X_i) [1 - n(X_{i+1} - X_i)]$$

where

G = Gini coefficient,

\bar{D} = Coefficient of mean difference,

$n(X_i)$ = Cumulative frequency for class i ,

$1 - n(X_{i+1} - X_i)$ = Cumulative relative frequency for class i ,

k = Number of classes,

X = Quantity supplied,

\bar{Q} = Mean of the total quantity supplied, and

\bar{X} = Mean of the product controlled by the i th class.

It is more intuitive to think of the GC as half of the relative mean difference. The mean difference is the average absolute difference between two items selected randomly from a population, and the relative mean difference is the mean difference divided by the average, to normalize for scale. As a mathematical measure of inequality, the GC carries no moral judgment about whether a particular level of inequality is good or bad. The GC is usually defined mathematically based on the Lorenz curve, which plots the proportion of the total share of the traders (y-axis) that is cumulatively shared by the bottom $x\%$ of the traders (Figure 5). The line at 45 degree thus represents perfect equality of market shares. The GC can then be thought of as the ratio of the area that lies between the line of equality and the Lorenz curve (area A) over the total area under the line of equality (area A and B). Thus, the Gini coefficient summarizes the Lorenz curve as:

$$G = \frac{A}{A + B}$$

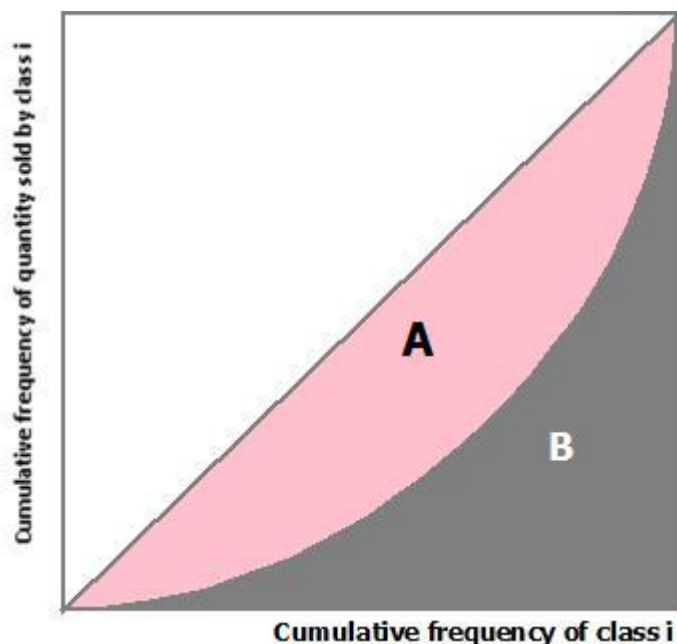


Figure 5 Graphical representation of the Gini-coefficient

Task 1.2.9: Use the data available from the case study to analyze the concentration ratio in the coffee marketing in Ethiopia using Gini-coefficient.

2. Barriers to entry

Barriers to market entry include a number of different factors that restrict the ability of new competitors to enter and begin operating in a given industry. For example, an industry may require new entrants to make large investments in capital equipment, or existing firms may have earned strong customer loyalties that may be difficult for new entrants to overcome.

The ease of entry into an industry is important because it determines the likelihood that a company will face new competitors. In industries that are easy to enter, sources of competitive advantage tend to wane quickly. On the other hand, in industries that are difficult to enter, sources of competitive advantage last longer, and firms also tend to develop greater

operational efficiencies because of the pressure of competition. The ease of entry into an industry depends upon two factors: the reaction of existing competitors to new entrants; and the barriers to market entry that prevail in the industry. Existing competitors are most likely to react strongly against new entrants when there is a history of such behavior, when the competitors have invested substantial resources in the industry, and when the industry is characterized by slow growth.

The six major sources of barriers to market entry are the following:

1. *Economies of scale*: Economies of scale occur when the unit cost of a product declines as production volume increases. When existing competitors in an industry have realized economies of scale, it acts as a barrier by forcing new entrants to either compete on a large scale or accept a cost disadvantage in order to compete on a small scale. There are also a number of other cost advantages held by existing competitors that act as barriers to market entry when they cannot be duplicated by new entrants-such as proprietary technology, favorable locations, government subsidies, good access to raw materials, and experience and learning curves.
2. *Product differentiation*: In many markets and industries, established competitors have gained customer loyalty and brand identification through their long-standing advertising and customer service efforts. This creates a barrier to market entry by forcing new entrants to spend time and money to differentiate their products in the marketplace and overcome these loyalties.
3. *Capital requirements*: Another type of barrier to entry arises when new entrants are forced to invest large financial resources in order to compete in an industry. For example, certain industries may require capital investments in inventories or production facilities.
4. *Switching costs*: This refers to a one-time cost that is incurred by a buyer as a result of switching from one seller's product to another. Examples include retraining employees, purchasing support equipment, enlisting technical assistance, and redesigning products. High switching costs form an effective entry barrier by forcing new entrants to provide potential customers with incentives to adopt their products.
5. *Access to channels of distribution*: In many industries, established competitors control the logical channels of distribution through long-standing relationships. In order to influence distribution channels to accept a new product, new entrants often must provide incentives in the form of price discounts, promotions, and cooperative advertising. Such expenditures act as a barrier by reducing the profitability of new entrants.
6. *Government policy*: Government policies can limit or prevent new competitors from entering industries through licensing requirements, limits on access to raw materials, pollution standards, product testing regulations, etc.

Case study 1.2.10: Barriers to entry in the coffee market

Coffee traders noted that the main entry barrier in the coffee marketing in eastern Hararghie is capital. Coffee trading requires huge capital investment. Because of financial constraints most coffee traders especially from Gelemso area left the coffee market.

Task 1.2.10: Consider one agricultural commodity in your area and assess the barriers of entry in the marketing of this product.

3. Vertical coordination/ integration

How are members of the industry linked to other levels of the marketing chains? The income of farmers will be affected depending on whether traders buy produce directly from them, middlemen, or transporters. If farmers sell their products in terminal, spot or auction markets, they obtain efficient or competitive prices because many buyers and sellers converge in terminal, spot or auction markets. However, spot market prices tend to be volatile, therefore

subjecting households to price and income risks when prices fluctuate due to changes in supply and demand for food commodities. In addition, farmers can deliver commodities to spot markets but fail to sell when there are few buyers.

Task 1.2.11: Consider one agricultural commodity in your area and analyze the structure of the market using these indicators.

Market conduct

Market conduct refers to the patterns of behaviour that traders follow and how they adjust to changing market conditions. Examples of market conduct include pricing strategies, collusive behaviour, mergers, etc. For example, in an environment where there are many buyers and sellers, the market tends to determine the price. If one trader tries to increase his or her price, he or she sells nothing. This means that households buy food commodities and agricultural inputs at prices that equal to the costs of producing the last unit of the commodities (marginal cost). In contrast, if there are only a few sellers of food commodities in a market, these few traders can conspire and charge consumers higher prices, up to the level where consumers can afford to buy from nearby market at a lower cost.

1. Pricing strategies

The behaviour of firms in setting their prices also plays a vital role in the S-C-P paradigm. Here the following questions are important. Who sets the price? How are prices determined? Price strategies like price discrimination, predatory pricing, and price fixing are only a few examples. Price discrimination refers to a situation where firms are selling the same product at different prices to different customers. Price fixing on the other hand refers to a situation where market structure does not allow sellers to sell products at prices below listed prices. The predatory pricing on the other hand allow products to be sold at prices below production costs. The main purpose of these strategies is to acquire market share, thus monopolistic profits.

2. Mergers

Market conduct, of which market power results, can also be viewed as a way in which the firms behave in order to increase market share. Three different types of mergers can be identified namely, horizontal mergers, vertical mergers and conglomerate mergers. Horizontal mergers occur when firms in the same industry combine. Vertical mergers occur when firms combine at different stages of the production process. Conglomerate mergers on the other hand combine unrelated firms.

3. Collusive behavior

Imperfect competition in the market does not always depend on the size of firms, but also on the behavior of firms. In a market with few competitors firms can decide whether to be non-co-operative or cooperative. In order to minimize competition amongst them; firms tend to co-operate engaging in collusion. This creates a situation where firms jointly set prices and outputs as well as sharing the market amongst them. Cartelization is another form of collusive behavior. It comprises of a set of independent firms that produces similar products working together to raise prices and restricts output.

Task 1.2.12: Consider one agricultural commodity in your area and analyze the market conduct using the above indicators.

Market performance

Market performance may be defined as the composition of end results in the dimensions of price, output, production cost, selling cost, product design and so forth which enterprises

arrive at in any market as the consequences of pursuing whatever lines of conduct they espouse. It refers to the extent to which markets result in outcomes that are deemed good or preferred by society. For example, regular and predictable availability of basic commodities at affordable prices is generally considered a desirable outcome. Other desirable outcomes would be that traders do not obtain excessive profits, and that commodities meet certain sanitary standards. In addition, prices paid by consumers should not be excessively above the cost of marketing, processing and transaction costs for a given commodity, and the prices received by producers should cover their costs of production.

Evaluations of market performance may be made from several standpoints. One objective which has long occupied a central place in economic theory, and which is sometimes claimed to be the basis of much existing public policy towards business, is that of maximizing the welfare derived by the community from the use of its scarce productive resources. The welfare of the community is said to depend on the level of subjective satisfaction experienced by each of its individual members, and this in turn will be influenced by three aspects of economic performance, namely, how the community's resources are allocated between different kinds of output, what methods are used to produce the output, and how the output is allocated among members of the community. These aspects of economic performance refer to allocative, technical and distributive efficiency. Classical theories of perfect competition are unexceptionable as such but it is generally recognized that for practical applications something more is required. The conditions of perfect competition are never collectively encountered in practice and even the individual conditions are not seen very frequently. Price levels and stability (long-run, short-run and through space), profits, margins and costs volumes, product quality and variety and distributions within the market are some indicators of market performance.

1. Price levels and stability

i. In the long run

If consumer prices for goods are higher than normal during the same period of time in previous years, then market dependant households with fixed amount of money have reduced access to goods from the market. However, if prices are stable and affordable, households that depend on the market for food, become more food secure.

ii. Over space

The difference between consumer prices in two nearby locations differs by more than transport, marketing and transaction costs. This spatial difference can indicate that areas with high prices are more affected compared to those where prices of staple food crops are lower. Factors that cause this include poor infrastructure, civil unrest and climatic conditions.

iii. In the short run

Consumer prices of food crops and products change very frequently over a short period of time in some areas. This subjects poor households to uncertainty and possibly reoccurring price shocks because food becomes very expensive to buy and planning or budgeting for basic food expenditures becomes very difficult.

2. Profits (net returns)

If traders receive excessive profits or net returns from sales of food commodities, this implies that traders are overcharging food commodities, compared to costs they incur, thus reducing the amount of food that poor households can access relative to fixed incomes.

3. Margins and costs

There are large differences between prices paid by consumers and prices received by farmers compared to marketing, processing and transaction costs for a given commodity. This indicates that produce buyers or processors are underpaying households that produce agricultural commodities and/or overcharging households that buy food commodities for consumption. These two phenomena reduce incomes of agricultural households and food access for households that depend on the market as a source of food, exposing them to food insecurity.

4. Volumes (quantity)

If there is a regular supply (volume) of staple food crops and livestock products entering the market, then there will not be shortages of food crops in the markets. This is good for food availability. If, however, the quantity of food entering the market falls below the usual average, then prices can increase, reducing the amount of food that households can access.

5. Product quality and variety

If the quality of food in the market is poor or below acceptable standards, which could have nutritional implications for households and particular members of households, then households are not able to consume the right amount of food with the required composition of nutrients for productive health. If food varieties are limited or different from the types that are preferred or typically consumed in some parts of a country, then households that do not access the food they prefer or a variety of nutritious foods will be affected.

6. Distribution within market

If there are regular supplies to different markets in the country, then access to food to all areas including those with vulnerable populations increases welfare. Market performance requires having some benchmark measurements from which comparisons can be made in order to judge deviations from what society considers normal. Thus, determining market performance is subjective. For example, when would a price be fair? And fair to whom? For example, a trader who charges a higher price than the cost for a given quantity of a commodity can say that the market is performing excellently yet the consumer who pays the higher price can say the market is performing poorly.

Task 1.2.13: Consider one agricultural commodity in your area and analyze the performance of the market.

1.2.5.2 The S-C-P paradigm

The S-C-P approach thought that an industry's performance (its success in producing benefits for consumers) depends critically on firm conduct (the competitive behavior of firms in the market). If firms have the most market power or competition amongst firms is nonexistent, then market outcomes would be worst for consumers. Moreover, firm conduct depends upon market structure. Collusion is more likely to occur when the number of firms in the industry is few, and there are barriers to entry into the market. In addition, when there are many firms in a market, and firms are free to enter, firms in the industry are more likely to compete with each other. Hence, structure determined conduct and conduct determined performance (Structure \Rightarrow Conduct \Rightarrow Performance). However, this implies that structure determined performance.

The S-C-P paradigm believed that the relationship between structure and performance through conduct was a stable, cross-industry relationship. Thus, through an examination of the structure of markets and the organization of firms, economists could explain differences

in market outcomes. Accordingly, the practice of IO at the time became one that derives the relationship between structure and performance empirically.

The objective of the S-C-P empirical investigations was to establish the cross-industry relationship between market structure and market power. A typical S-C-P study involved estimating an econometric model of the form:

$$\text{Marketpower}_i = \alpha_0 + \alpha_1 \text{structure}_i + \mu_i$$

The 1940s and 1950s witness a vast array of S-C-P studies attempting to document the link between market structure and market power. Many research outputs established a positive relationship between seller concentration and industry profitability. This stylized fact gave support to the view that an industry in which there was more than one but still just a few, large firms was indeed close to monopoly. S-C-P researchers interpreted these finding to mean high concentration caused market power. This result suggests that perhaps a firm's mere size, if it is sufficiently large, could imply a legal offense against antitrust law.

1.2.5.3 Criticisms of the S-C-P paradigm

The S-C-P paradigm formed the core of studies in IO for the most part of the early to mid 20th century. However, the challenge began in the 1970s. During this period, researchers in the field of IO found that the S-C-P paradigm had two important shortcomings. These are:

1. *Correlation is not the same as causation*

While S-C-P researchers found a positive correlation between concentration and profitability, their findings is subject to different interpretations. What does it mean when we find a positive correlation between concentration and market power? There are two main hypotheses here:

- i. *The differential collusive hypothesis* - Firms with larger market share have more ability to affect market outcomes, and thus greater market power. In this case, higher concentration causes market power.
- ii. *The differential efficiency hypothesis* - More efficient firms may have lower costs and thus gather greater market shares; and, as a result make higher profits. In this case, both higher concentration and larger profits are both due to cost advantages from larger firms.

In general correlation does not imply causation and the empirical model through which the S-C-P paradigm conducted its analysis could not distinguish between these two competing causal hypothesis.

2. *Market structure is endogenous*

What was really unsatisfactory about the S-C-P approach was that in considering its middle link - firm conduct - little or no attention was given to strategic interaction amongst firms. However, in order to assess market power, beyond the market configuration of the industry's existing firms, we also need to consider conduct - in particular the ability of new firms to enter the market.

Firms may be forced to compete for price, even in a highly concentrated industry, if new firms are ready and able to enter and compete away supra-competitive profits. Moreover,

incumbent firms can pursue strategic actions meant to influence the entry decisions of potential competitors.

Market structure is itself an endogenous outcome of conduct. That is, structure and performance are jointly determined together as the result of strategic interaction amongst firms.

Task 1.2.15: From your knowledge of econometrics discuss the problems that the endogeneity of market structure creates in regression analysis of market power?

Summary

In Subtopic 2 various approaches to agricultural marketing studies have been discussed. These are the functional, institutional, commodity, behavioral and S-C-P approaches. The functional approach looks at the different marketing functions including exchange (selling and buying), physical (storage, transportation and processing) and facilitating (standardization, financing, risk-bearing and market intelligence). Institutional approach is the second very common approach to studying marketing which emphasize on who is doing the market function. It identifies the organizations and middlemen that perform the marketing activities. These are what the agricultural producers often call “parasitic middlemen”. This middlemen are classified as merchant middlemen (retailers, wholesalers), agent middlemen (broker and commission men), speculative middlemen (buy and sell on their own account but expect profit made from price movement), processors, manufacturers and facilitators.

In the commodity approach, we only consider one product and analyze the marketing functions and the institutions in the marketing of the product from the producers to the consumers. It is useful to the person who is interested in only one product since it does allow in-depth analyses. Its disadvantage, however is that it ignores the between product and market alternative and also multi-product firms. However, it is not common to see marketing firms handling only one commodity.

A more recent approach to emphasize the system of marketing, dwelling on the interaction of subsystems rather than on individual function or firms is the system approach. This behavioral system allows systems to be identified with the particular problem being addressed. Systems type include input-output, which identifies motives and means of affecting the input–output ratio. The obvious disadvantage of this method is that it is abstract in nature and the reliance on intimate knowledge of individual’s firm characteristics and behavioral interactions. Such data and on intimate knowledge is seldom available.

The last approach is the structure-conduct-performance approach. This approach evaluates the ultimate performance of the marketing system by examining the level of competition existing in the industry. The industry structure, including the number and size of firms, is combined with firm conduct, the pricing behavior, advertising and product development to denote a performance that can be evaluated as good or bad. This approach has been used extensively by government regulatory agencies to achieve competition and avoid the evil of monopoly power. However, the lack of precise norm against which to judge performance has caused a minimal use of this approach by economists studying marketing.

Exercises

1. Discuss the advantages and disadvantages of each of the approach to agricultural market performance analysis.
2. Given the following percentage concentration measures in two different industries (A and B)

Table 1. Percentage concentration measures in two different industries

| Number of firms by size | % | A | B |
|-------------------------|----|-----|----|
| The largest 4 | 4 | 40 | 60 |
| The “ 8 | 8 | 70 | 80 |
| The “ 12 | 12 | 90 | 84 |
| The “ 20 | 20 | 100 | 90 |

Total enterprises number: 20

- a. Draw up the concentration curves for the two industries (A and B) and arrange them in accordance with the concentration degree.
 - b. If we use the concentration index of the largest 4 and 12 enterprises of each industry, what would the order (as per concentration degree) be reached? What don't index desirable properties comply this measure?
 - c. Draw up the concentration curve of an industry involves a number n of enterprises with the same size (and sales). But it might go up when a new enterprise break in, so they don't meet all the Hannah and Kay criteria. Accordingly, it gives rise to a serious problem. Therefore this index has to be cautiously used. Comment.
3. Given information on Table 2 answer the following questions:
 - a. Comment if the concentration degree in this industry seems to you low or high and why.
 - b. Arrange the indicated industries with an asterisk according to its concentration degree by using RC_5 and the inverse of the producers' number. Do the results coincide? Explain why and what of the two measures seem to you the best.
 - c. In case you could draw the concentration curves of these industries, do you think that any of these would cross each other? Give some examples and argument your answer.
 - d. The Herfindahl index measures the concentration in the industry.
 - e. In the light of the data what would you tell about the relative size of the sixth enterprise of the sugar sector?

Table 2. Industries (four digits) highly concentrated in the manufactures, United Kingdom

| Items | Concentration Ratio | Producers Total Number |
|---|---------------------|------------------------|
| Group 1 ($C_5 \geq 95\%$) | | |
| Sugar | 99.9 | |
| Margarine | 100.0 (7) | 7 |
| Gin | - | 9 |
| Cigarettes | 100.0 (7) | 7 |
| Other Manufactured Tobacco | 98.8 | 8 |
| Petroleum Derivate | 100.0 (7) | 7 |
| Hydrocarbon Derivate Halogens | 99.9 | 9 |
| Asphalt | 100.0 (7) | 7 |
| Additives For Liquid Combustibles And Oils | 95.1 | 28 |
| Telecommunication Wires | 95.3 | 14 |

| | | |
|---|-----------|----|
| Telegraph And Telephone Installations | 98.9 | 13 |
| Tractors | 95.7 | 11 |
| Cars | 98.2 | 20 |
| Aeronautic Industry | 100.0 (7) | 7 |
| Artificial And Synthetic Fibers | 95.4 | 14 |
| Tires And Air Chambers | 96.4 | 8 |
| Group 2 ($C_5 \geq 90\%$) | | |
| Cornflakes For Breakfast | 91.4 | 16 |
| Ice Creams | 90.9 | 29 |
| Crisp | 94.7 | 10 |
| Pets Feed | 94.4 | 39 |
| Coffee | 90.6 | 20 |
| Synthetic Rubber | 91.9 | 12 |
| Roller Bearing | 92.4 | 15 |
| Batteries And Accumulators | 90.8 | 19 |
| Internal Combustion Machinery | 91.4 | 20 |
| Tins And Cans | 91.5 | 57 |
| Cement | 93.0 | 10 |

4. Consider the market for coffee. You know that there are numerous firms in the market, all of which are relatively small. Assume further that there are no entry costs that cannot be recovered on exiting the industry. Suppose that a health fad emerges that encourages the consumption of natural coffee. What will be the effect on profits of coffee farmers, the price of coffee and output in both the short-run and the long-run? (Assume that input prices are constant over the relevant range.)
5. One of the “organizing frameworks” for ideas in Industrial Organization is known as the Structure-Conduct-Performance framework. In brief, this theory suggests that the structure of an industry determines its conduct, and the structure and conduct together determine performance.
 - a. Define “structure”, “conduct” and “performance” and provide examples to illustrate your definitions.
 - b. Provide one example of an economic model of an industry that fits well with the structure-conduct-performance theory. Explain clearly why the model does fit the theory.
 - c. Provide one example of an economic model of an industry that does not fit well with the structure-conduct-performance theory. Explain clearly why the model does not fit the theory.
6. What role do “barriers to entry” play in the Structure-Conduct-Performance theory? Explain.
7. Perfectly competitive firms sometimes earn substantial amounts of profit. Is this inconsistent with Structure-Conduct-Performance theory? Explain.
8. Is a monopoly industry necessarily bad for consumers and the economy, as the Structure-Conduct-Performance framework would seem to suggest? Give examples of situations in which a monopoly might not be a bad thing.
9. Imagine that the government has the choice of having an industry be a pure monopoly, or having it be dominated by one big firm but with a competitive fringe of smaller firms. Which one will the government choose, and why? In particular, in which type of industry will there be larger consumer surplus?

10. Assume that you are the owner of a large farm and you hire a top manager to manage the farm.
- Why might you link the pay of the manager to the size of the farm? If you did, what measure of size you would use?
 - Why might you think the pay of the manager to the profit of the farm? If you did, how would you decide what the link between the profit and the compensation should be?
 - Which one of the above two explanations is consistent with the empirical evidence? Explain.

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TOPIC 2 THEORETICAL MODELS OF MARKET STRUCTURE AND PERFORMANCE

Introduction

Under Topic 1, we revised the traditional and the SCP (Old IO) approaches to measure market performances of an industry. The traditional approaches are criticized for the idea that “bigness is bad” and profit as a measure of superior performance rather than as unearned booty of monopolistic firms. The SCP approach suggests that the performance of an industry is determined by the structure (Number and size of firms, degree of product differentiation and entry conditions) which is determined by market conduct (firms’ price, product and promotional strategies). It was noted in this Topic that the SCP paradigm is also blamed for it is not a cross-industry analysis and the difficulty of measuring marginal cost which appears in the Learner index. The New Empirical Industrial Organization (NEIO) paradigm, however, primarily focused on the analysis of firm behaviour in a specific market or closely related markets. This approach argues that market outcomes and profitability are affected by industry and firm specific demand and cost characteristics that are difficult to model within the SCP framework. It models demand, cost and competition as steps in analyzing the relationship between marketing mix and profits. Game theory played an important role in the development of this new approach to market analysis. We will look at the application of game theory in the NEIO under subtopic 3.

This Topic provides an economic analysis of the theory and practice of organization of firms and industries. It explores the nature of competition among firms and their behaviour in various markets, with the specific emphasis on imperfectly competitive markets. Tools for both empirical and theoretical approaches to the analysis of industries are covered. Starting from a detailed analysis of market structures, the Topic goes on to discuss various aspects of firms’ behaviour and their influence on market outcome. Among the behaviours covered in the Topic are perfect competition, monopoly, oligopoly and oligopsony. Game theory and its application in the analysis of markets when there are few firms in the industry will also be presented in the last subsection.

Topic Objectives

After completing this Topic the students will be able to:

- Explain the meaning of different market structures;
- Understand the different forms of market structure;
- Distinguish the markets on the basis of output and price setting behaviour;
- Give examples of different market structures from agriculture; and
- Explain the policy implications of the different market structures.

Thematic plan for Topic 2

| No. | Topic | Contact hours | | | Indep. study | Total workload |
|-----|---|---------------|-----|---------|--------------|----------------|
| | | Lect. | Sem | Sub-tot | | |
| 1 | Sub-Topic 1 Perfectly Competitive Markets | 1 | 1 | 2 | 3 | 5 |
| 2 | Sub-Topic 2 Imperfectly Competitive Markets | 5 | 1 | 6 | 17 | 23 |

| | | | | | | |
|---|---------------------------------------|----------|----------|-----------|-----------|-----------|
| 3 | Sub-Topic 3 Game Theory and Oligopoly | 2 | 1 | 3 | 7 | 10 |
| | Total | 8 | 3 | 11 | 27 | 38 |

SUBTOPIC 2.1 PERFECTLY COMPETITIVE MARKETS

Introduction

The notion of competition is central to economic theory, since it the mechanism of control of the marketing system. It not only guarantees that industry responds to consumer wants, but it also forces to adopt the most efficient production techniques. The concept of competition existed since Adam Smith (1776) who conceptualized perfect competition as independent rivalry between two or more persons. In this sense, competition acts as a force that would, in the long run, eliminate excessive profits and unsatisfied demand. The classical economic literature emphasized the notion of competition for price determination as the focus of economic analysis as replacing ethically and politically oriented price administration. Participants in the market would change price in response to market conditions principally through a process of rivalry. Adam Smith's major contribution to this analysis appears to have been to add systematic thinking to earlier views on the subject. Since then the development of a notion of competition gave the profession an analytical rigor akin to the character of a science. It has been argued that without the notion of competition, economics as a discipline would be referred to as a dismal science.

Objectives

At the end of this Subtopic the students are able to:

- Understand what a perfectly competitive market is;
- Explain how competition leads to prices to be set at the marginal cost;
- Understand why deviation from a perfectly competitive measures how competitive the market is;
- Explain the different features of a perfectly competitive market;
- Recognize that a perfectly competitive market is the most efficient one.

Thematic plan

| No. | Topic | Contact hours | | | Indep. study | Total workload |
|-----|---|---------------|----------|----------|--------------|----------------|
| | | Lect. | Sem | Sub-tot | | |
| 1 | Definition of perfectly competitive market | 15 min | 15 min | 30 min | 45 min | 1 |
| 2 | Characteristics of a perfectly competitive market | 20 min | 20 min | 40 min | 1 | 1.4 |
| 3 | Benefits of a perfectly competitive markets | 25 min | 25 min | 50min | 1.5 | 2.2 |
| | Total | 1 | 1 | 2 | 3 | 5 |

2.1.1 Definition of Perfectly Competitive Market

Dear students, what do you understand by a perfectly competitive market from the name itself? Hopefully you made your own guess. A perfectly competitive market is a hypothetical market where competition is at its greatest possible level. A perfectly competitive market system was best described by Keynes (1927): "perfect competition implies that there must be

no mercy or protection for those who embark their labour in the wrong direction. It is a method of bringing the most successful profit-makers to the top by a ruthless struggle for survival, which selects the most efficient by the bankruptcy of the less efficient. It does not count the cost of the struggle but looks only to the benefits of the final results which are assumed to be lasting and permanent, once it has been attained”.

Perfect competition can be defined as the presence within a market of a large enough number of firms that none can individually represent enough of the market to influence the price they receive, either by changing the volume of goods or the services they sell or by being able to influence the going price in the market. In the structure of perfect competition, firms are numerous with small size such that no one firm can influence market outcome. Products are homogeneous or standardized and entry is easy. As a consequence, each firm is driven to minimize costs. Earnings are held at competitive levels and operations are at output levels where average costs are minimum. Technology advance comes from outside the structure – e.g. in agric it’s from public sector research. The perfect competition also requires perfect knowledge on current and future market conditions.

Task 2.1. Can you give an example of a market in your area where competition is fierce? What are some of the features of this market?

2.1.2 Characteristics of a Perfectly Competitive Market

Economists generally identify the following as features of a perfectly competitive market:

- (i) **Large number of sellers and buyers:** Under perfect competition, the action of one firm do not cause any change in the competitive behaviour of other firms. If perfect competition does not prevail, a price change by one firm, or any other change in market policy, usually draws a response by one or more of other firms. A perfectly competitive market has large number of sellers selling the commodity to a large number of buyers.
- (ii) **Homogeneous product:** Under perfect competition only a single product is sold. This means that all the sellers sell the same type of product to buyers. So the product is a perfect substitute.
- (iii) **Free entry and exit:** Under perfect competition there is no barrier to any new firm or producer to enter the market to sell or produce the product. Similarly if any existing seller wants to exit the market, then he is free to do so.
- (iv) **Perfect knowledge:** Consumers have all readily available information about prices and products from competing suppliers and can access this at zero cost. In other words, there are few transactions costs involved in searching for the required information about prices. Likewise, sellers have perfect knowledge about their competitors.
- (v) **Perfectly mobile factors of production:** Land, labour and capital can be switched in response to changing market conditions, prices and incentives.
- (vi) **No externalities:** There are no externalities arising from production and/or consumption.
- (vii) **Profit maximization:** Every firm wants to earn maximum profit.

Task 2.2. Given the above mentioned characteristics of perfectly competitive markets, explain why such markets do not exist in the real world. Also explain why agricultural products markets in developing countries are highly competitive.

2.1.3 Benefits of Perfectly Competitive Markets

Can you guess why a perfectly competitive is the most desired one from the society point of view though it doesn't exist in reality?

A perfectly competitive market has the following benefits:

i) Lower prices to consumers

Since there are many competing firms in the market, the cross-price elasticity of demand for one product will be high suggesting that consumers can switch their demand to the most competitively priced products in the marketplace which forces the price of the product to go down.

Mathematically, profit maximization implies that:

$$\text{Profit} = \pi = TR - TC = PQ - C(Q)$$

$$\text{The first order condition implies that } \frac{d\pi}{dQ} = P + Q \frac{dP}{dQ} - \frac{dC(Q)}{dQ} = 0$$

Since $\frac{\partial P}{\partial Q} = 0$ (No matter how much you produce doesn't affect the market price), we have

$$P - \frac{dC(Q)}{dQ} = 0$$

This implies that $P = MC$, which is the minimum price that a consumer can pay for a product. In addition to this, low barriers to entry allow new firms to enter into the market which provides competition and ensures prices are kept low in the long run.

iii) Only abnormal profit in the short-run, but normal profit in the long-run

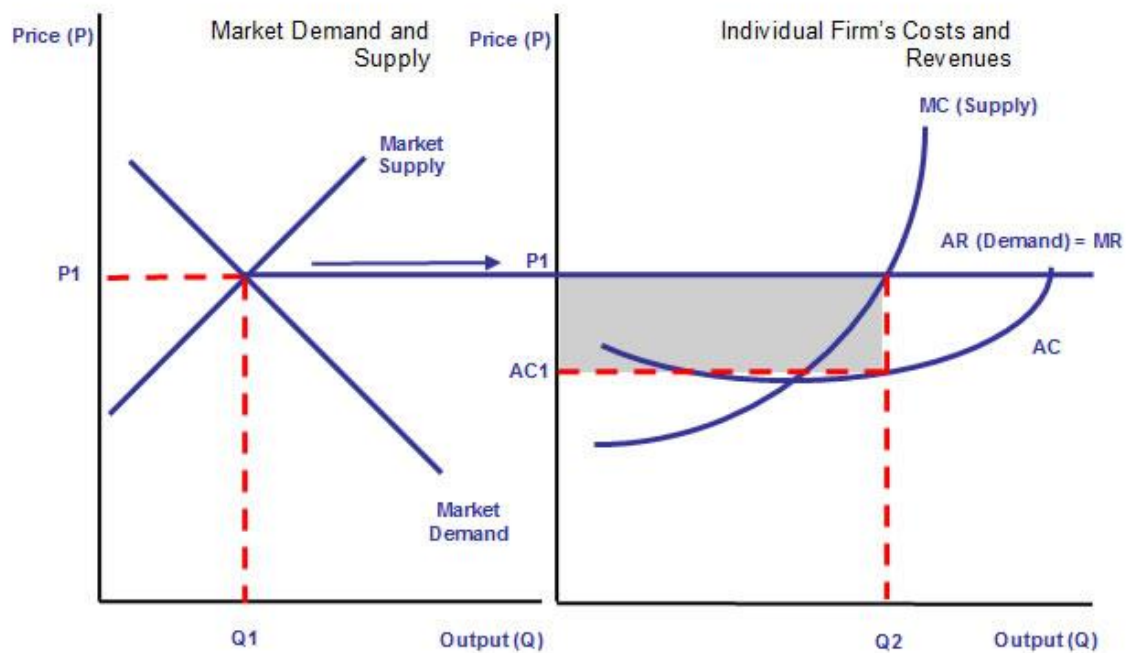


Figure 1. Short-run output and price under perfectly competitive market for some firms

In the short-run, the interaction between demand and supply determines the “market-clearing” price. Since each firm is a price taker, price P_1 is established and output Q_1 is produced. The average revenue curve is their individual demand curve. Since the market price is constant for each unit sold for a perfectly competitive firm, the AR curve also becomes the marginal revenue curve (MR). Again mathematically, $TR=PQ$ implies that $MR = \frac{dTR}{dQ} = P + Q \frac{dP}{dQ}$. Moreover, $\frac{dP}{dQ} = 0$ implies that $MR = P = MC = AR$.

For the firm, the profit maximizing output is at Q_2 where $MC=MR$. This output generates a total revenue ($P_1 \times Q_2$). Since total revenue exceeds total cost, the firm is making abnormal (economic) profits. This is not necessarily the case for all firms in the industry since it depends on the position of their short-run cost curves. Some firms may be experiencing sub-normal profits if average costs exceed the price and total costs will be greater than total revenue (Figure 2).

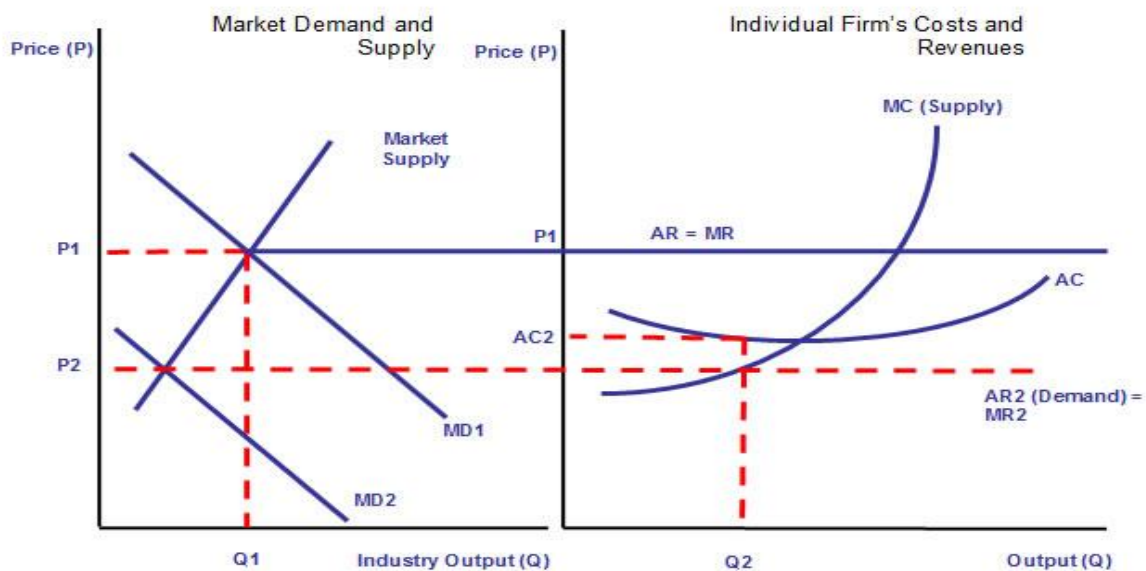


Figure 2. Short-run output and price under perfectly competitive market for other firms

If most firms are making abnormal profits in the short-run, this encourages the entry of new firms into the industry which will cause an outward shift in market supply forcing the price to go down. The increase in supply will eventually reduce the price until price is equal to long-run average cost. At this point, each firm in the industry is making normal profit. *Ceteris paribus*, there is no further incentive for the firms to enter into and exit out of the industry and a long-run equilibrium has been established (Figure 3).

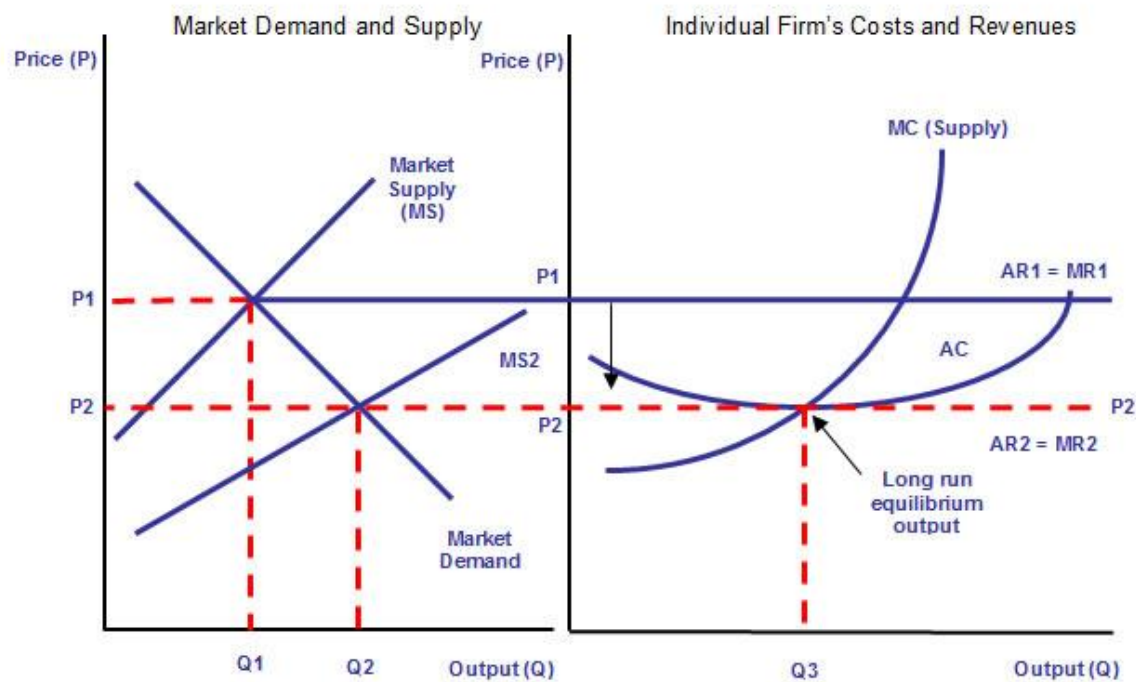


Figure 3. Long-run equilibrium output and price under perfect competition

We are assuming in Figure 3 that there has been no shift in market demand. The effect of increased supply is to force down the price and cause an expansion along the market demand curve. But for each supplier, the price they “take” is now lower and it is this that drives down the level of profit made towards normal profit equilibrium.

Task 2.3. From the discussions above trace and analyze what might happen if:

- There was a change in market demand (e.g. arising from changes in the relative prices of substitute products or complements.)
- There was a cost-reducing innovation affecting all firms in the market or an external shock that increases the variable costs of all producers.

In the next subtopic, we will also show that total profits and profit margins are lower in perfectly competitive markets than in markets dominated by a few firms.

iii) Economic efficiency

In the long run

A perfectly competitive market will have both productive efficiency and allocative efficiency in the long run.

Productive efficiency: As we know productive efficiency level of production is where $MC=AC$. That means, it is known to be productively efficient if it is producing at a point where $MC=AC$, because MC always cuts AC at its lowest point. In the case of perfectly competitive market, a firm produces at productively efficient level of output Q_3 as shown in Figure 3.

Allocative efficiency: This is the socially optimal level of output. At this point it is impossible to make one person better off without making someone else worse off. There is pareto optimality. It occurs where $MC=AR$. In other words, a firm in a perfectly competitive market produces at the profit maximizing level which is $MR=AR$. This is also the point where $MC=AR$. Thus, we conclude that in perfect competition there is allocative efficiency in the long run.

In the short run

In the short run, a firm in the perfectly competitive market may not achieve allocative efficiency and productive efficiency.

When a firm is making abnormal profit

The firm produces at Q_1 which is both profit maximizing level ($MC=MR$) and also the allocative efficient level Q_3 ($MC=AR$). However, there is no productive efficiency Q_2 .

When a firm is making abnormal loss

The firm produces at Q_1 which is both profit maximizing level ($MC=MR$) and also the allocative efficient level Q_3 ($MC=AR$). However, there is not productive efficiency Q_2 .

iv) Technological progress

The threat of competition should lead to a faster rate of technological diffusion, as firms have to be responsive to the changing needs of consumers which is also known as dynamic efficiency.

Summary

Under this subtopic we analyzed a perfectly competitive market which doesn't exist in the real world, but can be used as a benchmark to analyze how competitive a given market is. This is a market which produces lower prices to consumers, low profits for the firms, economically efficient in the long-run and improves firms' innovations.

Exercises

1. In a perfectly competitive market the demand function is $Q_D = 240 - 6P$ where Q_D is quantity demanded and P is the price. The firms operating in this market experience the following cost function:

$$TC = 450 - 10Q_s + 2Q_s^2$$

where TC is total costs and Q_s is quantity supplied. Assume the market is in equilibrium.

- Calculate the average cost curve and find the minimal average costs?
 - Find the supply curve of a single firm in the market.
 - How many firms operate in this market?
 - What is the market supply curve?
2. A perfectly competitive market is composed of 1000 firms. The short-run supply function for each firm is
- $$q = -100 + 25p.$$
- The market demand function is
- $$Q_D = 30,000 - 2500p.$$

- a. Calculate the short-run equilibrium price and market quantity.
- b. Determine the demand curve facing any one firm.
- c. At the equilibrium output, determine the elasticity of market demand and elasticity of demand facing any one firm.
3. Assume that the technology for producing a commodity using capital K and labor L is $q = f(K, L) = K^{1/2}L^{1/2}$. In the short run, let capital be fixed at 4 units, with a rent on capital of 1 and a wage rate of 4. The firm is facing a market demand function $Q_D(p) = 60 - 5p$, with 10 competitive firms in this industry.
 - a. What are the short-run individual firm's supply function and the industry supply function?
 - b. What are the market equilibrium price and quantity and how much does each firm supply? What is the level of profit for each firm?
4. A perfectly competitive firm has a cost function given by $STC(q) = q^2 + 8q + 1$.
 - a. What are its STVC and TFC?
 - b. What is its supply curve?
 - c. What is the elasticity of supply?
 - d. At what output is SATC minimized?
 - e. If there are 500 identical firms in this industry, what is the industry's supply curve?
 - f. If the market demand function is $Q_D = -50p + 1000$, what are the equilibrium price and quantity?
 - g. What is the elasticity of market demand and supply at the equilibrium price and quantity?
 - h. What is the equilibrium level of output for an individual firm?
 - i. What is the elasticity of demand facing each individual firm?
 - j. Is a firm in this market earning a pure profit, a normal profit, or operating at a loss?

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SUBTOPIC 2.2 IMPERFECTLY COMPETITIVE MARKETS

Introduction

In Sub-section 1 it has been argued that only few markets in the real world exhibit the characteristics of a perfectly competitive market. It is a deviation from perfect competition assumptions which designates market as imperfectly competitive. Under this sub-topic we identify imperfectly competitive market with a single firm supplying products to the market called monopoly and a market structure which lie in between perfect competition and

monopoly. These are markets where there is more than one seller, but too few to create a perfectly competitive market, products may not be standardized and no free entry and exit. They are broadly categorized into monopolistic competition (Hybrid of perfect competition and monopoly) and oligopoly which is competition among the few. Finally, we look at markets from the buying side, monopsony (single buyer) and oligopsony (few buyers).

Objectives

At the end of this Sub-Topic students should be able to:

- Identify and explain the characteristics of different imperfectly competitive markets.
- Identify imperfectly competitive models.
- Identify the practices of different imperfectly competitive markets;
- Explain the equilibrium of different imperfectly competitive markets;
- Explain the advantages and disadvantages of different imperfectly competitive markets; and
- Demonstrate how firms can use available information on heterogeneity in and uncertainty of consumer demands to generate higher revenue via various pricing and revenue management techniques.

2.2.1 Definition of Imperfectly Competitive Markets

Imperfect competition is a market situation where individual firms have control over the price of the commodity in an industry. A firm can affect the market price as a seller buyer of a product can be classified as an imperfect competitor. Imperfect competition arises when an industry's output is supplied only by one (monopoly), or a relatively small number of firms (oligopoly). It also arises when an industry's output is purchased by a single firm (monopsony) or a relatively small number of firms (oligopsony).

The market is imperfect competitive does not necessarily mean that a firm can arbitrarily put any price on its commodity. An imperfect competitor does not have absolute power over price. Aside from discretion over price, imperfect competitors may or may not have product differentiation/variation.

The firm under an imperfect market faces a downward sloping demand curve. This implies that if the firm wants to sell more, it should lower the price; if it wishes a higher price, he/she should restrict output. In contrast, a perfectly competitive firm, since it has no control over price, faces a horizontal demand curve.

Imperfect competition often arises when an industry's output is supplied by one or a small number of firms which may be traced to the existence of barriers to entry and significant advantages in cost conditions.

There are three types of imperfect selling markets: Monopoly, oligopoly and monopolist competition. There are also two types of imperfect buying markets: Monopsony and Oligopsony. We will present these types of markets as follows.

2.2.2 Monopoly

The term monopoly is derived from Greek words mono which means single and poly which means seller. So, monopoly is a market structure, where there only a single seller producing a product having no close substitutes. This single seller may be in the form of an individual owner or a single partnership or a Joint Stock Company. Such a single firm in market is called monopolist. Monopolist is price maker and has a control over the market supply of goods. But it does not mean that he can set both price and output level. A monopolist can do either of the two things i.e. price or output. It means he can fix either price or output but not both at a time. In monopoly, the firm has control over the price of output. Therefore, it will choose the level of price and output that maximizes profits.

2.2.2.1 Characteristics of monopoly

1. The monopolist is the sole producer in the market. Thus, under monopoly, the firm and industry are identical.
2. There are no closely competitive substitutes for the product. So the buyers have no alternative or choice. They have either to buy the product or go without it.
3. Monopoly is a complete negation of competition.
4. A monopolist is a price maker. He can even vary the price from buyer to buyer. In a perfectly competitive market there is single price, as against under monopoly, there may be differentials.
5. A pure monopolist has no immediate rivals. There are legal, technological, economic or natural obstacles which may block the entry of new firms
6. A monopolist has absolute control over the market supply, so he can control the price as well as quantity supplied.
7. Monopoly firm faces downward sloping demand curve. It means he can sell more at lower price and vice versa. Therefore, elasticity of demand factor is very important for him.
8. Monopolists may discriminate prices. A monopolist can change the price and quality of the product. He sells more quantities charging less price against the product in a highly elastic market and sells less quantities charging high price in a less elastic market.

2.2.2.2 Why do monopolies arise?

Monopolies derive their market power from barriers to entry – circumstances that prevent or greatly impede a potential competitor's ability to compete in a market. There are three major types of barriers to entry; economic, legal and deliberate.

1. Economic barriers: Economic barriers include economies of scale, capital requirements, cost advantages and technological superiority.

Economies of scale: Monopolies are characterized by decreasing costs for a relatively large range of production. Decreasing costs coupled with large initial costs give monopolies an advantage over would-be competitors. Monopolies are often in a position to reduce prices below a new entrant's operating costs and thereby prevent them from continuing to compete. Furthermore, the size of the industry relative to the minimum efficient scale may limit the number of companies that can effectively compete within the industry. If for example the industry is large enough to support one company of minimum efficient scale then other companies entering the industry will operate at a size that is less than MES, meaning that

these companies cannot produce at an average cost that is competitive with the dominant company. Finally, if long-term average cost is constantly decreasing, the least cost method to provide a good or service is by a single company.

Capital requirements: Production processes that require large investments of capital, or large research and development costs or substantial sunk costs limit the number of companies in an industry. Large fixed costs also make it difficult for a small company to enter an industry and expand.

Technological superiority: A monopoly may be better able to acquire, integrate and use the best possible technology in producing its goods while entrants do not have the size or finances to use the best available technology. One large company can sometimes produce goods cheaper than several small companies.

No substitute goods: A monopoly sells a good for which there is no close substitute. The absence of substitutes makes the demand for the good relatively inelastic enabling monopolies to extract positive profits.

Control of natural resources: A prime source of monopoly power is the control of resources that are critical to the production of a final good.

Network externalities: The use of a product by a person can affect the value of that product to other people. This is the network effect. There is a direct relationship between the proportion of people using a product and the demand for that product. In other words the more people who are using a product the greater the probability of any individual starting to use the product. This effect accounts for fads and fashion trends. It also can play a crucial role in the development or acquisition of market power. The most famous current example is the market dominance of the Microsoft operating system in personal computers.

2. Legal barriers: Legal rights can provide opportunity to monopolise the market of a good. Intellectual property rights, including patents and copyrights, give a monopolist exclusive control of the production and selling of certain goods. Property rights may give a company exclusive control of the materials necessary to produce a good.

3. Deliberate actions: A company wanting to monopolise a market may engage in various types of deliberate action to exclude competitors or eliminate competition. Such actions include collusion, lobbying governmental authorities, and force (see anti-competitive practices).

In addition to barriers to entry and competition, barriers to exit may be a source of market power. Barriers to exit are market conditions that make it difficult or expensive for a company to end its involvement with a market. Great liquidation costs are a primary barrier for exiting. Market exit and shutdown are separate events. The decision whether to shut down or operate is not affected by exit barriers. A company will shut down if price falls below minimum average variable costs.

2.2.2.3 Pricing under monopoly

A monopolist chooses its production output (Q) and price (P) in order to maximize profit (π). That is,

$$\text{Max } \pi(Q) = R(Q) - C(Q) \quad (1)$$

Where $R(Q) = QP(Q)$ is the revenue and $C(Q)$ is the cost of producing Q quantities of a product.

The first order condition gives $\frac{dR(Q)}{dQ} - \frac{dC(Q)}{dQ} = 0$ or $MR = MC$. This means that a monopolist sets price at a level where $MR = MC$.

$$\text{But } MR = \frac{dR(Q)}{dQ} = \frac{d(QP(Q))}{dQ} = P + Q \frac{dP}{dQ} = P \left(1 + \frac{Q}{P} \frac{dP}{dQ} \right) = P \left(1 + \frac{1}{\eta} \right) \quad (2)$$

where η is the price elasticity of demand.

From equation (2) we can observe that if $\eta \rightarrow \infty$ then $MR = P$ (horizontal demand faced by competitive firm). Moreover, $\frac{dP}{dQ} < 0$ implies that for a monopolist marginal revenue is less than price.

Task 2.4: The discussions above shows that a monopolist will not set prices in the range of demand that is price elastic. Explain why this is so.

$$\text{Moreover, this is equivalent to } P(Q) + QP'(Q) = C'(Q) \text{ Or } P(Q) - C'(Q) = -QP'(Q) \quad (3)$$

Dividing both sides of equation (3) by $P(Q)$ yields:

$$L = \frac{P(Q) - C'(Q)}{P(Q)} = -\frac{QP'(Q)}{P(Q)} = \frac{1}{\eta} \quad (4)$$

The extent to which a firm can take advantage of its monopolistic condition will highly depend on the flexibility of its demand curve. If it is more rigid (steeper), it will only have to reduce its production in order to achieve a higher price. However, the more flexible (flatter) the demand curve is, the less market power the firm has to increase prices. This relationship between price elasticity of demand and market power can be described using the Lerner index. This index measures the firm's level of market power by relating price to marginal cost.

L always lies between 0 and 1. The closer it is to 0, the closer it is to perfect competition; the closer it is to 1, the higher market power the seller has and hence closer to a monopoly.

For example if demand is elastic, MR is positive but less than P (e.g., $\eta = -3$ then $MR = 2/3P$). If the elasticity is unitary, ($\eta = -1$) then $MR = 0$ and TR is at its maximum, which is less than the price since the price is positive. When demand is inelastic (say $\eta = -1/3$) and the price is positive then $MR = -2P$. This is less than the positive price. We can summarize the relationship between the price and MR in Figure 2.1 as follows. When demand is relatively elastic, MR is positive, and when it is inelastic MR is negative. Moreover, when demand is unitary elastic, MR is zero. The implication of this relation is that the monopolist will not operate in the output range where demand is inelastic because this means the contribution to the total revenue is negative or $MR < 0$. When demand is elastic an increase in output and a decrease in price are associated with an increase in total revenue. On the other hand, when demand is inelastic, an increase in output and a decrease in price are associated with a decline in total revenue. Finally, when demand is unitary total revenue is at its maximum and $MR = 0$ (TR maximization). When demand is zero ($P = 0$), total revenue R is zero. Since the price changes when quantity changes, then total revenue ($= PQ$) is not linear but is concave.

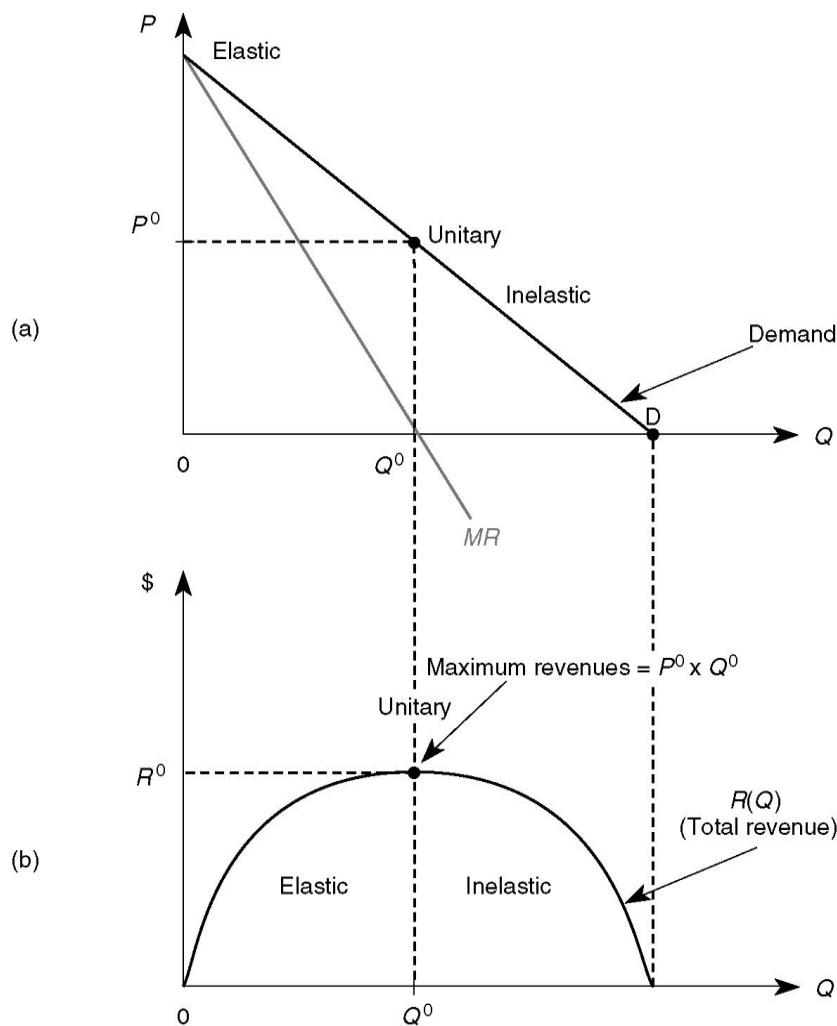


Figure 3: Monopolist profit maximization

2.2.3 Price Discrimination

Did you ever thought that differ groups of the society can be charged different prices for the same product? Firms can make more money if they treated everyone as individuals and charged them the price they are willing to pay. But doing this involves a cost and hence they have to find the right pricing strategy for each part of the market they serve – their revenues should rise, but marketing costs will also increase. It is important that you understand what price discrimination is, the conditions required for it to happen and also some of the economic and social consequences of this type of pricing strategy.

Price discrimination occurs when a firm charges a different price to different groups of consumers for the same good or service, for reasons not associated with costs. It is important to note that charging different prices for similar goods is not pure price discrimination. Product differentiation gives a supplier greater control over price and the potential to charge consumers a premium price because of actual or perceived differences in the quality or performance of a good or service.

2.2.3.1 When is price discrimination possible?

Two main conditions are required for discriminatory pricing:

1. If there are differences in price elasticity of demand: There must be a different price elasticity of demand for each group of consumers. The firm is then able to charge a higher price to the group with a more price inelastic demand and a lower price to the group with a more elastic demand. By adopting such a strategy, the firm can increase total revenue and profits (i.e. achieve a higher level of producer surplus). To profit maximize, the firm will seek to set marginal revenue = to marginal cost in each separate (segmented) market.

2. If there are barriers to prevent consumers switching from one supplier to another: The firm must be able to prevent “consumer switching” – a process whereby consumers who have purchased a product at a lower price are able to re-sell it to those consumers who would have otherwise paid the expensive price. This can be done in a number of ways, – and is probably easier to achieve with the provision of a unique service such as a haircut, dental treatment or a consultation with a doctor rather than with the exchange of tangible goods such as a meal in a restaurant.

Switching might be prevented by selling a product to consumers at unique moments in time – for example with the use of airline tickets for a specific flight that cannot be resold under any circumstances or cheaper rail tickets that are valid for a specific rail service. Software businesses such as Microsoft often offer heavy price discounts for educational users. Office 2007 for example was made available at a 90% discount for students in the summer of 2009. But educational purchasers must provide evidence that they are students

2.2.3.2 Types of price discrimination

1. First-degree or perfect price discrimination: This is charging whatever the market will bear. It is sometimes known as optimal pricing, with perfect price discrimination, the firm separates the market into each individual consumer and charges them the price they are willing and able to pay. If successful, the firm can extract the entire consumer surplus that lies underneath the demand curve and turn it into extra revenue or producer surplus. This is hard to achieve unless a business has full information on every consumer’s individual preferences and willingness to pay. The transactions costs involved in finding out through market research what each buyer is prepared to pay is the main barrier to a business’s engaging in this form of price discrimination.

If the monopolist can perfectly segment the market, then the average revenue curve becomes the marginal revenue curve for the firm. The monopolist will continue to sell extra units as long as the extra revenue exceeds the marginal cost of production. In reality, most suppliers and consumers prefer to work with price lists and menus from which trade can take place rather than having to negotiate a price for each unit bought and sold.

Task 2.5: In the case of first-degree price discrimination the firm can perfectly segment the market so that the consumer surplus is removed and turned into producer surplus and hence welfare transfer from consumers to producers. Can you explain this argument?

2. Second degree price discrimination: This involves businesses selling off packages or blocks of a product deemed to be surplus capacity at lower prices than the previously published or advertised price. Price tends to fall as the quantity bought increases.

Examples of this can be found in the hotel industry where spare rooms are sold on a last minute standby basis. In these types of industry, the fixed costs of production are high. At the same time the marginal or variable costs are small and predictable. If there are unsold rooms, it is often in the hotel's best interest to offload any spare capacity at a discount prices, providing that the cheaper price that adds to revenue at least covers the marginal cost of each unit. There is nearly always some supplementary profit to be made. Firms may be quite happy to accept a smaller profit margin if it means that they manage to steal an advantage on their rival firms.

3. Third degree (multi-market) price discrimination: This is the most frequently found form of price discrimination and involves charging different prices for the same product in different segments of the market. The key is that third degree discrimination is linked directly to consumers' willingness and ability to pay for a good or service. It means that the prices charged may bear little or no relation to the cost of production.

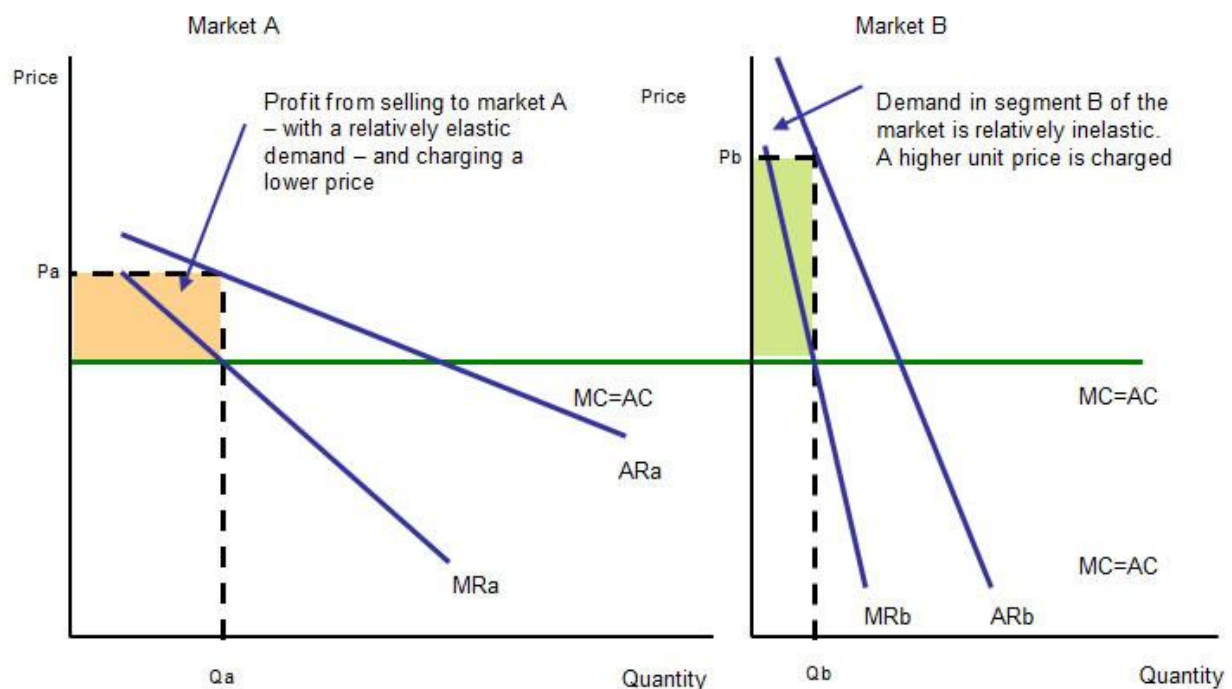


Figure 6: Third degree price discrimination

The market is usually separated in two ways: by time or by geography. For example, exporters may charge a higher price in overseas markets if demand is estimated to be more inelastic than it is in home markets.

In the peak market the firm will produce where $MRa = MC$ and charge price Pa , and in the off-peak market the firm will produce where $MRb = MC$ and charge price Pb . Consumers with an inelastic demand will pay a higher price (Pa) than those with an elastic demand who will be charged Pb .

2.2.3.3 Consequences of price discrimination

Who gains and who loses out from price discrimination? To what extent does price discrimination help to achieve an efficient allocation of resources? There are many arguments on both sides of the coin – indeed the impact of price discrimination on welfare seems bound to be ambiguous.

Impact on consumer welfare: In most cases, consumer surplus is reduced which shows a loss of welfare. For the majority of buyers, the price charged is well above the marginal cost of supply. However, some consumers who can now buy the product at a lower price may benefit. Lower-income consumers may be “priced into the market” if the supplier is willing and able to charge them less.

Examples might include legal and medical services where charges are dependent on income levels. Greater access to these services may yield external benefits (positive externalities) improving social welfare and equity. Drugs companies might justify selling products at inflated prices in higher-income countries because they can then sell the same drugs to patients in poorer countries.

Producer surplus and the use of profit: Price discrimination benefits businesses through higher revenues and profits. A discriminating monopoly is extracting consumer surplus and turning it into supernormal profit. Price discrimination also might be used as a predatory pricing tactic to harm competition at the supplier’s level and increase a firm’s market power. A counter argument is that price discrimination might be a way of making a market more contestable. Low cost airlines have been hugely successful by using price discrimination to fill their planes. Profits made in one market may allow firms to cross-subsidize loss-making activities/services that have important social benefits. For example money made on commuter rail or bus services may allow transport companies to support loss-making rural or night-time services. Without the ability to price discriminate, these services may have to be withdrawn and jobs might suffer.

In many cases, aggressive price discrimination is a means of business survival during a recession. An increase in total output resulting from selling extra units at a lower price might help a monopoly to exploit economies of scale thereby reducing long run average costs.

2.2.4 Monopolistic Competition

Monopolistic competition refers to the market organization in which there is keen competition, but neither perfect nor pure, among a large number of producers or suppliers. They have some degree of monopoly because of their differential products. Thus monopolistic competition is a mixture of competition and a certain degree of monopoly power. In other words, a market with a blending of monopoly and competition is described as monopolistic competition. Monopolistic competition is commonly found in many fields in retail, service and manufacturing industries. Examples of retail are cloth stores, chemists, electrical appliances, grocery, etc. Examples of service industry include restaurants, beauty salons, health clubs, etc. Examples of manufacturing include shoes, garments, cosmetics, furniture manufacturing etc.

2.2.4.1 Characteristics of monopolistic competition

Monopolistic competition has the following features:

1. Large number of sellers
2. No product homogeneity (Product differentiation): It is the most distinguishing feature of monopolistic competition, that product of each seller is branded and identified
3. A firm has a limited degree of control over the market as a relatively small percentage of total market is shared by individual firms
4. Large number of buyers: unlike perfect competition, here buying is by choice and not by chance
5. There is free entry for firms
6. Selling costs: This too is an unique feature. Since products are differentiated, advertising and sales promotion becomes an integral part of goods marketing. Outlays incurred on this account are termed as selling costs. This distinguishes it sharply from perfect competition, where there is no need to advertise products, because goods are homogeneous
7. Two-dimensional competition: a) price competition, where firms compete with each other on the price issue and b) non-price competition, where competition is based on product variation and selling costs
8. The group: since there is no homogeneity of product we can't think of industry. Here the concept of group was introduced, which is a cluster of firms, producing very related but differentiated goods.

2.2.4.2 Product differentiation

Product differentiation can be classified into two types: Quality and characteristic of the product and conditions relating to the sale of product.

1. Quality and characteristic of the product: Product differentiation relating to quality and characteristics of the product has wide-scale dimensions, implying real as well as imaginary differences. Real differences could be related to the physical features as well as functional areas. There could be differences in size, design and style, strength, durability, differences in the quality of materials, chemical compositions, workmanship, cost of inputs etc. There may be imaginary differences relating to brand names, color and packing. Advertising also sometimes emphasizes the imaginary differences.

2. Conditions relating to sale of product: Product differentiation may be due to the conditions of sale and marketing. This is apparent in many different forms like: proximity and prestige of the location of business, attitude of the staff, business reputation of the firm, terms of trade like discounts offered, guarantee, repairs etc.

Task 2.6: What does monopolistic competition have in common with monopoly? Discuss.

2.2.5 Oligopoly

In this subtopic, we consider the behaviour of firms in markets which are dominated by a small number of sellers of a particular type of good or service. The number of firms is said to be “small” when the actions of any one firm have significant impacts on the market (or industry) as a whole. Such markets are called oligopolistic markets. The small numbers in oligopolistic markets means that each firm's output choices influence the market price and thus the choices of other firms. This implies a special kind of interdependence between firms in the market. How might firms behave in markets where behaviour is interdependent? There are

three possibilities. The first is that firms may simply ignore the existence of this interdependence, behaving as if other firms did not exist or do not matter. This option almost inevitably leads to a very poor outcome for any group of firms which behave in this way. The second possibility is that firms recognise their interdependence and recognise that acting together, colluding, offers an opportunity to maximise the combined profits of the group which we call the co-operative behaviour approach to oligopoly. The third option is that firms recognise mutual interdependence exists, but for some reason act independently which we call the non-co-operative behaviour approach to oligopoly. We will present the latter two possibilities in this subsection.

2.2.5.1 Characteristics of oligopoly markets

An oligopoly market has the following characteristics:

- 1. Profit maximization conditions:** An oligopoly maximizes profits .
- 2. Ability to set price:** Oligopolies are price setters rather than price takers.
- 3. Entry and exit:** Barriers to entry are high. The most important barriers are government licenses, economies of scale, patents, access to expensive and complex technology, and strategic actions by incumbent firms designed to discourage or destroy nascent firms. Additional sources of barriers to entry often result from government regulation favouring existing firms making it difficult for new firms to enter the market.
- 4. Number of firms:** “Few” – a “handful” of sellers. There are so few firms that the actions of one firm can influence the actions of the other firms.
- 5. Long run profits:** Oligopolies can retain long run abnormal profits. High barriers of entry prevent sideline firms from entering market to capture excess profits.
- 6. Product differentiation:** Product may be homogeneous (steel) or differentiated (automobiles).
- 7. Perfect knowledge:** Assumptions about perfect knowledge vary but the knowledge of various economic factors can be generally described as selective. Oligopolies have perfect knowledge of their own cost and demand functions but their inter-firm information may be incomplete. Buyers have only imperfect knowledge as to price, cost and product quality.
- 8. Interdependence:** The distinctive feature of an oligopoly is interdependence. Oligopolies are typically composed of a few large firms. Each firm is so large that its actions affect market conditions. Therefore, the competing firms will be aware of a firm’s market actions and will respond appropriately. This means that in contemplating a market action, a firm must take into consideration the possible reactions of all competing firms and the firm’s countermoves. It is very much like a game of chess or pool in which a player must anticipate a whole sequence of moves and countermoves in determining how to achieve his or her objectives. For example, an oligopoly considering a price reduction may wish to estimate the likelihood that competing firms would also lower their prices and possibly trigger a ruinous price war. Or if the firm is considering a price increase, it may want to know whether other firms will also increase prices or hold existing prices constant. This high degree of interdependence and need to be aware of what other firms are doing or might do is to be contrasted with lack of interdependence in other market structures. In a perfectly competitive (PC) market there is zero interdependence because no firm is large enough to affect market price. All firms in a PC market are price takers, as current market selling price can be followed predictably to maximize short-term profits. In a monopoly, there are no competitors to be concerned about. In a monopolistically-competitive market, each firm’s effects on market conditions is so negligible as to be safely ignored by competitors.

9. Non-price competition: Oligopolies tend to compete on terms other than price. Loyalty schemes, advertisement, and product differentiation are all examples of non-price competition.

2.2.5.2 Joint profit maximization (cartels)

Unless a monopoly is allowed to exist due to a government license or protection from a strong patent, markets have at least a few sellers. When a market has multiple sellers, at least some of which provide a significant portion of sales and recognize that their decisions on output volume will have an effect on market price, the arrangement is called an oligopoly. At the extreme, sellers in an oligopoly could wield as much market power as a monopolist. This occurs in an oligopoly arrangement called a cartel, where the sellers coordinate their activities so well that they behave in effect like divisions of one enterprise, rather than as a competing business, that make independent decisions on quantity and price. A cartel is defined as a group of firms that gets together to make output and price decisions. The conditions that give rise to an oligopolistic market are also conducive to the formation of a cartel; in particular, cartels tend to arise in markets where there are few firms and each firm has a significant share of the market. In many countries cartels are illegal; however, internationally, there are no restrictions on cartel formation. The organization of petroleum exporting countries (OPEC) is perhaps the best known example of an international cartel; OPEC members meet regularly to decide how much oil each member of the cartel will be allowed to produce.

Oligopolistic firms join a cartel to increase their market power, and members work together to determine jointly the level of output that each member will produce and/or the price that each member will charge. By working together, the cartel members are able to behave like a monopolist. For example, if each firm in an oligopoly sells an undifferentiated product like oil, the demand curve that each firm faces will be horizontal at the market price. If, however, the oil-producing firms form a cartel like OPEC to determine their output and price, they will jointly face a downward-sloping market demand curve, just like a monopolist. In fact, the cartel's profit-maximizing decision is the same as that of a monopolist. The cartel members choose their combined output at the level where their combined marginal revenue equals their combined marginal cost. The cartel price is determined by market demand curve at the level of output chosen by the cartel. The cartel's profits are equal to that of a monopolist. Note that a cartel, like a monopolist, will choose to produce less output and charge a higher price than would be found in a perfectly competitive market.

Once established, cartels are difficult to maintain. The problem is that cartel members will be tempted to cheat on their agreement to limit production. By producing more output than it has agreed to produce, a cartel member can increase its share of the cartel's profits. Hence, there is a built-in incentive for each cartel member to cheat. Of course, if all members cheated, the cartel would cease to earn monopoly profits, and there would no longer be any incentive for firms to remain in the cartel. The cheating problem has plagued the OPEC cartel as well as other cartels and perhaps explains why so few cartels exist.

Task 2.7: Cheating is one factor for not maintaining cartels. Can you think of other factors why it is difficult to maintain cartels?

2.2.5.3 Quantity-setting model

In an oligopoly markets there are two decision variables on how the firms interact in the market, namely quantity and price. Oligopoly models where quantity is the decision variable are the Cournot and Stackelberg models while that in which price is the decision variable is the Bertrand model. Here, we will present duopoly models when quantity is the decision variable.

Cournot model

Cournot duopoly is a simultaneous game in which two firms with identical costs and homogenous products decide their output at the same time.

Consider the following example. There are two firms in the industry, each with a marginal cost of \$20. The total demand in this market is given by the following inverse demand function:

$$P = 200 - q_1 - q_2$$

Compute the Cournot equilibrium (p^* , q^*) in this duopolistic market.

Step 1: Compute the best response of firm 1 to firm 2's decisions. Given q_2 , firm 1's total revenue is:

$$TR_1(q_1, q_2) = p \times q_1 = (200 - q_1 - q_2) \times q_1$$

So that the marginal revenue of firm 1 will be:

$$MR = 200 - q_2 - 2q_1$$

Given q_2 , firm 1 maximizes his profits by setting $MR=MC$:

$$200 - q_2 - 2q_1 = 20$$

$$q_1^*(q_2) = 90 - 1/2q_2$$

Step 2: Compute the best response of firm 2 to firm 1's decision. This is done in exactly the same way as above and we get:

$$200 - q_2 - 2q_1 = 20$$

$$q_2^*(q_1) = 90 - 1/2q_1$$

Step 3: Compute the Cournot equilibrium which occurs at the point where the two above best response functions intersect.

$$q_1^*(q_2) = 90 - 1/2q_2^*(q_1)$$

$$\text{This implies that } q_1 = 90 - 1/2(90 - 1/2q_1)$$

$$\text{This gives us } q_1^* = 60 \text{ and } q_2^* = 60$$

Stackelberg model

This is a market structure where it is assumed that there are two firms, who both assume the other firm will keep prices unchanged. Therefore, each firm has an incentive to cut prices, but, this actually leads to a price war.

There are two firms and they make their production decisions sequentially. Each firm has a marginal cost of \$20. The total demand in this market is given by the following inverse demand function:

$$P = 200 - q_1 - q_2$$

Compute the Stackelberg equilibrium (p^* , q^*) in this duopolistic market. Suppose that firm 1 is the Stackelberg leader (so that it moves first) and firm 2 is the Stackelberg follower.

Step 1: Compute the best response of firm 2 to firm 1's decisions. Given q_1 , firm 2's total revenue is:

$$TR_2(q_1, q_2) = p \times q_2 = (200 - q_1 - q_2) \times q_2$$

So that the marginal revenue of firm 2 will be:

$$MR = 200 - 2q_2 - q_1$$

Given q_1 , firm 2 maximizes his profits by setting $MR=MC$:

$$200 - 2q_2 - q_1 = 20$$

$$q_2^*(q_1) = 90 - 1/2q_1$$

Step 2: Firm 1 will take into account firm 2's response when it is making its decision about how much to produce. Therefore firm 1's total revenue, given firm 2's best response will be:

$$\begin{aligned} TR_1(q_1, q_2) &= (200 - q_1 - q_2^*(q_1))q_1 \\ &= (200 - q_1 - 90 + 1/2q_1)q_1 \end{aligned}$$

So that firm 1's marginal revenue is going to be given as,

$$MR = 200 - 2q_1 - 90 + q_1$$

And firm 1 chooses the quantity that satisfies $MR=MC$, so that,

$$200 - 2q_1 - 90 + q_1 = 20$$

This gives us $q_1^* = 90$

Step 3: Given firm 1's optimal decision, q_1^* , we can determine q_2^* using firm 2's best response function:

$$q_2^*(q_1^*) = q_2^*(90) = 90 - 1/2 \times 90 = 45$$

Notice that the Stackelberg outcome differs significantly from the Cournot equilibrium outcome in terms of the equilibrium quantity of production for both firms. Specifically, we see that the Stackelberg leader ends up producing more in the Stackelberg equilibrium and the follower produces less compared to the Cournot outcome.

Task 2.8: Can you explain why the Stackelberg's follower produces less quantity compared to Cournot?

2.2.5.4 Price setting models

It is a model of price competition between duopoly firms which results in each charging the price that would be charged under perfect competition, known as marginal cost pricing. The Bertrand model is essentially the Cournot-Nash model except the strategic variable is price rather than quantity.

It is a simultaneous game move where price setting game results in Bertrand Nash equilibrium. It is a game since the profits of the two firms depend on both p_1 and p_2 . If output is homogenous, then the price equals marginal cost in equilibrium i.e. $p_1 = p_2 = c$. This is the same outcome as a perfect competition even though there are only two firms. The story is that, whenever p_1 or p_2 exceed c , there is always an incentive to undercut your rival's price so prices are driven down until they equal marginal cost. Is this realistic? The price equals marginal cost result does not hold in some repeated games or when output is not homogeneous. In the latter case reaction curves slope so prices exceed costs in equilibrium.

Example 2.1. Assume a symmetric duopoly with constant unit costs $c = 5$ and linear demands.

The demand for good 1 is given by $q_1 = 10 - p_1 + \frac{1}{2} p_2$ and vice versa for good 2. Goods 1 and 2 are substitutes, but not perfect substitutes, or goods 1 and 2 are not homogeneous.

The profit function of firm 1 is:

$$\Pi(p_1, p_2) = (p_1 - c)q_1 = (p_1 - 5)(10 - p_1 + \frac{1}{2} p_2) = -50 + 15p_1 - p_1^2 + \frac{1}{2} p_1 p_2 - \frac{5}{2} p_2$$

The f.o.c. for profit maximization is:

$$\frac{\partial \pi}{\partial p_1} = 0 = 15 - 2p_1 + \frac{1}{2} p_2 \quad (R_1)$$

$$\Rightarrow p_1 = \frac{15}{2} + \frac{1}{4} p_2$$

Firm 1's reaction curve R_1 is a reaction curve in prices and slopes up.

By symmetry, firm 2's reaction curve is:

$$p_2 = \frac{15}{2} + \frac{1}{4} p_1 \quad (R_2)$$

In Bertrand-Nash equilibrium, $p_1^* = p_2^*$ because the game is symmetric. Thus substituting p_1^* for p_1 and p_2 in R_1 :

$$p_1^* = \frac{15}{2} + \frac{1}{4} p_1^*$$

This implies that $p_1^* = p_2^* = 10$.

The Bertrand-Nash equilibrium is at a point where the two reaction curves R_1 and R_2 intersect.

Task 2.9: Draw the reaction curves for the two firms on a diagram and indicate the equilibrium prices.

2.2.5.4 Conjectural variations

The earliest models of oligopolistic behavior assumed that firms formed expectations about the reactions (or variations) of other firms, now called conjectural variations. The Cournot, Bertrand, and Stackelberg models can be interpreted as conjectural variations models rather than as game theory models. In each model, firms control only quantity or price. In the Cournot and Stackelberg models, firms choose their output levels, and the demand curve determines price; in the Bertrand model, firms choose prices and let demand determine output.

Cournot's model was the first conjectural variation model (and first oligopoly model). In Cournot's original story, a firm makes one of the simplest possible assumptions about the behavior of other firms: other firms continue to produce the same level of output no matter how it behaves. That is, each firm's conjecture is that other firms are satisfied to continue selling their current quantity of output. This very parsimonious and strong assumption leads to clear behavioral implications, but it is arbitrary and may be incorrect.

Stackelberg follower firms make the Cournot conjecture. The Stackelberg leader takes those conjectures into account in making its decisions. In the Bertrand model, each firm makes the conjecture that its rivals will not change their price in response to a change in its own price.

Criticisms of conjectural variations models

Conjectural variations models are attacked for two reasons. First, the conjectures that firms hold are arbitrary. It is this arbitrariness that led to develop cartel theory of oligopoly behavior and the game theorists to develop their models. Nonetheless, cartel and game theory models also make many arbitrary assumptions (for example, that firms choose output rather than prices or that firms have particular beliefs about other firms). Thus, there is little difference in the arbitrariness of these models.

Second, and perhaps more devastating, multiperiod interpretations of conjectural variations models are implausible. Unlike multiperiod game theory models, which have equilibria based on credible strategies that do not contradict firms' beliefs, dynamic conjectural variations models are based on inconsistent beliefs and actions.

Consider a standard multiperiod interpretation of the Cournot model of the melons market discussed in the text. Suppose, in the first period, Firm 1 produces 300 melons and Firm 2 produces 200. Then, in Period 2, Firm 1 uses its (one period) best-response function and produces $R_1(200) = 360 - q_2/2 = 260$ melons. Firm 2 produces $R_2(300) = 360 - q_1/2 = 210$ melons in the second period. In subsequent periods, each firm continues to use its one-period best-response function to react to its rival's output in the previous period. Eventually, the output of each firm converges to the Cournot equilibrium of 240 melons.

There are two serious problems with this multiperiod interpretation of a Cournot model. First, the firms' myopia over time is unreasonable. A firm can observe the response of its rivals to changes in its output during the last period and can verify that those changes do affect what its rivals do. In other words, although a firm sees that its Cournot conjecture of no response by its rival is wrong, it continues to rely on this false conjecture. That is, it continues to use its one-period best-response function. Alternatively stated, the Cournot equilibrium is not robust with respect to experimentation. At the equilibrium, if one firm varies its output slightly, as an experiment, and observes how the other firm behaves, it will learn that its Cournot assumption of no reaction is false.

Second, in a multiperiod model, it does not make sense for a firm to maximize its profits in the current period alone, as these models imply. Rather, the firm should maximize the present discounted value of its future stream of profits. A firm may be willing to trade large profits in the future for smaller profits today. Indeed, firms can increase profits by varying their behavior over time as shown in the section on multiperiod games.

Many economists use a general conjectural variations model in their empirical research on market power. For simplicity, assume there are two firms in an industry, Firm 1 and Firm 2, which produce homogenous outputs q_1 and q_2 . Firm 1 maximizes its profits,

$$\pi_1 = q_1 p(q_1 + q_2) - C(q_1) \quad (1)$$

through its choice of its output level, q_1 , where industry price, p , is a function of industry output and its cost function, $C(\cdot)$, is the same as for Firm 2. Firm 1's first-order condition is

$$(d\pi_1/dq_1) = p + q_1 p'(q_1 + q_2)(1 + (dq_2/dq_1)) - C'(q_1) = 0 \quad (2)$$

where $C'(q_1)$ is its marginal cost and $p'(q_1 + q_2)$ is the slope of the inverse demand function. Firm 1 holds a conjecture $v = dq_2/dq_1$ about the other firm, so Equation (2) can be written as

$$p + q_1 p'(q_1 + q_2)(1 + v) - C'(q_1) = 0 \quad (3)$$

By symmetry, the first-order condition for Firm 2 is the same, with the 1 and 2 subscripts reversed.

If v is 0, Equation 3 is the first order condition for a Cournot firm. That is, a Cournot firm conjectures that the other firm will not change its output in response to a change in its own output level. Setting $v = 0$ in Equation 3 gives the usual Cournot first-order condition.

If $v = -1$, the firm holds the Bertrand competitive conjecture. A Bertrand firm believes that any increase in its output is exactly offset by a decrease of its rivals' output, so that the market price remains unchanged. If there are n identical firms, the Bertrand conjecture is $v = -1/(n - 1)$. Substituting $v = -1$ into Equation 3 gives the equilibrium condition $p = C'$ (price equals marginal cost), which is the Bertrand or competitive equilibrium.

If $v = 1$, the firm holds a conjecture that leads to the collusive equilibrium if firms behave symmetrically ($q_1 = q_2$). The firm believes that its rival will change its output by the same amount as it does. Thus, the firm can affect total industry output, but not its market share (of 50 percent) by varying its output. The firm cannot increase its profits at the expense of the other firm, so it produces the cartel output. The first-order condition becomes $p + 2q_1 p'(Q) = C'(q_1)$, which is the cartel solution because total output, $Q = q_1 + q_2 = 2q_1$ if $q_1 = q_2$.

Other values for v are also possible. If one estimates v , using Equation 3, one can calculate Lerner's Index, $(p - C')/p$. Thus, one can interpret v as either a conjectural variation or as a measure of the gap between price and marginal cost.

Task 2.10: Compare and contrast the game theoretic and conjectural variations approach to market analysis.

2.2.6 Monopsony and Oligopsony in Agricultural Markets

A firm has monopsony power if its share of purchases in the upstream input market is sufficiently large that it can cause the market price to fall by purchasing less and cause it to rise by purchasing more. An oligopsony market is a market when there are few firms who purchase products from the upstream parties. An example of oligopsony is the food processing industries because of the geographic nature of their input markets. The food industry transforms raw materials into consumer goods. In many cases, the raw materials are costly to transport, due to their bulky nature and/or perishability. Moreover, they are supplied by numerous price taking producers. In such setting, each producer is likely to face only small number of processing firms as prospective buyers.

Monopsony power results in lower price which is achieved through the act of purchasing less. The exercise of monopsony power results in prices being depressed below competitive levels. Monopsony power, assuming the absence of price discrimination, will result in a quantity distortion and loss of efficiency in the input market that will usually harm not only upstream suppliers, but also downstream consumers. The exercise of monopsony power in the input

(upstream) market results in a transfer of profit from upstream suppliers to the buyer and a reduction in output below competitive levels. A firm with monopsony power will behave in the output market as if it had higher marginal costs than a firm that does not have monopsony power.

As a result, prices in the downstream will be higher and downstream consumers are harmed even though input prices are lower. This is true even if the monopsonist is a competitive firm in the downstream market and supply from competing suppliers is perfectly elastic. If the monopsonist also has market power in the downstream market, the harm to efficiency and consumers is greater than if it does not.

The key to identifying monopsony power in practice is recognizing that it is the existence of alternatives for sellers that determines the extent of a buyer's monopsony power. If sellers can easily find other buyers, then a buyer will have limited monopsony power. Other buyers may be in different geographic regions, have a different use for the input, or demand a different input that can be made from the same productive assets. The relevant market for the purpose of identifying monopsony power is the smallest set of products in the smallest geographic area such that a hypothetical monopsonist of those products in that area would be able to depress prices by a small but significant and non-transitory amount.

A precondition for the exercise of monopsony power is the existence of supplier rents. Supplier rents can either be Ricardian, quasi, or monopoly. The welfare implications of the exercise of monopsony power depend on the type of rents available. Ricardian rents exist when the factors of production used by suppliers are differentiated in terms of their productivity. Ricardian rents give rise to upward sloping long-run supply curves. The exercise of monopsony power depends on the elasticity of supply. The more inelastic supply, the greater the ability to exercise monopsony power. The exercise of monopsony power leads to a quantity distortion in the input market and typically harms consumers in the downstream market even though the input price decreases. A firm with monopsony power will behave in the output market as if it had higher marginal costs than a firm that does not have monopsony power. Consumers are harmed downstream even if the monopsonist is a competitive firm in the downstream market and there is perfectly elastic supply. If the monopsonist also has market power in the downstream market, the harm to efficiency and consumers is greater than if it does not.

A monopsonist may be able to make all-or-none offers to individual suppliers. The profit-maximizing all-or-none offer is for the competitive quantity for a total payment that just covers the costs of supply. Relative to a uniform price, an all-or-none offer is more efficient and, because it involves greater purchases of the input, better for consumers in the downstream market. Unless normative weight is given to the distribution of Ricardian rents accruing to suppliers, the welfare implications of all-or-none offers are not ambiguous: they are welfare enhancing. Preventing all-or-none offers, for example by requiring uniform prices, will harm consumers in the downstream market and reduce efficiency. Moreover, a danger with putting greater weight on the rents of producers, relative to consumers, is the adoption of policies that end up restricting competition and innovation among suppliers.

The key to identifying monopsony power in practice is recognizing that it is the existence of alternatives for the sellers that determine the extent of a buyer's monopsony power. If the sellers can easily find other buyers (who use the input for a different use), other buyers in different geographic areas (who use the input for a similar use), or other buyers for whom the assets can be used to make a different input, then a buyer will have limited monopsony

power. The relevant market for the purpose of identifying monopsony power is the smallest set of products in the smallest geographic area such that a hypothetical monopsonist of those products in that area would be able to depress prices by a small but significant and non-transitory amount.

Quasi-rents are the difference between total revenue and short-run avoidable costs. In the short run, a monopsonist may be able to extract quasi-rents. In the long run, any attempt to expropriate suppliers' quasi-rents will induce their exit: anticipating that they will not be able to recover their sunk investments, suppliers do not reinvest. Hence, if the input market is competitive, a monopsonist will not be able to exercise monopsony power in the long run unless there are Ricardian rents.

Measuring monopsony and oligopsony power

The usual index used to measure the extent of market power exercised by a seller is the Lerner Index. In the case of a monopolist, it can easily be shown that:

$$L = \frac{P - MC}{P} = \frac{1}{\eta}$$

where the Lerner Index is the markup (price less marginal cost) as a percentage of price and it is equal to the inverse of the elasticity of demand (η). In the case of a monopsonist, the mirror image is the Buyer Power Index (BPI):

$$\lambda = \frac{VMP - w}{w}$$

where w is the factor price and VMP is the value of marginal product. In a competitive market $VMP=w$ and $\lambda=0$.

For a monopsonist it is easy to show that

$$\lambda = \frac{1}{\varepsilon}$$

where ε is the elasticity of supply. Hence, as with a monopolist, the ability of a monopsonist to exercise buyer market power depends on the willingness and ability of the other side of the market to substitute. In the case of a monopsonist, the greater the inelasticity of supply, the less sensitive supply to price, the greater the exercise of monopsony power. This makes intuitive sense, since the avenue through which suppliers can discipline the exercise of monopsony power is by reducing their supply. This harms the monopsonist since she loses her margin ($VMP-w$) on units no longer available to purchase when she reduces the price.

If there is a competitive fringe of small buyers that compete in the input market with one large buyer, then the buyer market power of the dominant firm will be constrained not only by the elasticity of supply of the sellers in the upstream market, but also by the fringe of small buyers. The more elastic the demand by the fringe, the more their purchases rise as the price falls, and the more difficult it will be for the dominant firm to exercise buyer side market power. The reduction in its demand, and hence the profits foregone, as it attempts to depress the price, will be greater as suppliers can instead substitute and sell to the fringe. It is possible to show that the BPI in the case of a dominant buyer is:

$$\lambda = \frac{s}{w + \eta_f(1-s)}$$

where s is the share of purchases of the dominant buyer and η_f is the elasticity of demand of the competing buyers in the fringe. As expected, the exercise of market power by the

monopsonist is inversely related to the elasticity of supply and the elasticity of demand for the fringe.

In equilibrium, the market share of the dominant firm and its exercise of market power will be correlated. The greater its share of purchases, the greater will be the BPI. However, this is not a causal relationship as both the BPI and s_i are endogenous. Instead it means that the larger the advantage the dominant firm has vis-à-vis the buyer fringe, the greater its market power. Presumably, the reason the dominant buyer is dominant is because its marginal revenue product is significantly higher than the fringe buyers' value of marginal product (i.e. because it is more efficient and/or its use for the input has a higher end value).

In the case of oligopsony with a downstream competitive market, the BPI for an individual buyer is:

$$\lambda = \frac{s_i}{\varepsilon}$$

where s_i is the share of purchases by firm i . Starting with this expression, it is possible to show that the exercise of monopsony power in the market (λ) is given by a weighted average of each firm's exercise of monopsony power,

$$\lambda = \sum_{i=1}^N \lambda_i s_i = \frac{HHI}{\varepsilon}$$

where the weights are each firm's share of purchases and

$HHI = \sum_{i=1}^N s_i^2$ HHI is the Herfindahl–Hirschman Index based on share of purchases when there are N buyers.

Summary

From the selling side, four types of market structure namely perfect competition, monopoly, monopolistic competition and oligopoly were identified. Perfect competition and monopoly markets rarely exist in the real world. Monopoly, if it exists is usually due to government policy, patent right, etc. Monopolistic competition and oligopoly markets do exist in many situations. Collusion which is prohibited in most countries by law exists in markets in a tacit form. Other oligopolistic markets assume interdependence between firms in setting market prices or quantity. Such models include quantity models (Cournot and Stackelberg), price model (Bertrand) and the dominant firm model. From the buying side, two types of market structure namely monopsony and oligopsony were presented and discussed.

Exercises

1. Which element of monopolistic competition is similar to a monopoly and which elements are similar to a perfectly competitive market?
2. "The degree of monopoly power is limited by the elasticity of demand". Comment.
3. Assume that there are two big companies which produce a certain commodity. These companies established a cartel to optimize their profits. The two firms are pretty similar in technology used and size, so they can both produce a commodity at constant marginal cost of \$0.50 per unit of the commodity. Assume also that both companies have fixed costs of \$ 800 per year. The overall demand for the commodity in the country per year is given by the following function:
 $Q = 40,000 - 3,000P$

If the companies work together in a cartel, what are the equilibrium price, quantity, and profit per firm?

4. A restaurant in Addis Ababa has recently removed prices from its menu: each consumer is asked to pay what he or she thinks the meal was worth. Is this a case of price discrimination? Explain.

5. Assume there are two firms competing over quantities (Cournot-Nash Duopoly). So we can find reaction-curves, which give us the quantity produced of one firm, given the quantity offered by the other one. The reaction curves are the following:

$$Q_1 = 7,500 - (Q_2 / 2)$$

$$Q_2 = 7,500 - (Q_1 / 2)$$

Find the Cournot-Nash equilibrium, which is the quantity combination where no firm has an incentive to change their production level. Calculate the equilibrium price and the profit per firm as well.

6. A monopolist faces the demand function $Q_D = 1,000 - 0.5P$ and the cost function $TC = 200,000 + 2Q + 0.1Q^2$. Find the profit maximizing price and output combination.

7. “A price-taking firm selling in a market with a price greater than the firm’s average cost should increase its output level”. Comment.

8. A firm sells one million units at a price of \$100 each. The firm’s marginal cost is constant at \$40, and its average cost (at the output level of one million units) is \$90. The firm estimates that its elasticity of demand is constant at 2.0. Should the firm raise price, lower price, or leave price unchanged? Explain.

9. According to Bertrand’s theory, price competition drives firms’ profits down to zero even if there are only two competitors in the market. Why don’t we observe this in practice very often? Explain.

10. Consider a market for a homogeneous product with demand given by $Q = 37.5 - P/4$. There are two firms, each with constant marginal cost equal to 40.

a) Determine output and price under a Cournot equilibrium.

b) Compute the efficiency loss as a percentage of the efficiency loss under monopoly.

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SUBTOPIC 2.3 GAME THEORY AND OLIGOPOLY

Introduction

Under this subtopic, we will continue the discussion on marketing decisions in presence of strategic interaction and interdependence. We will develop tools using game theory that will assist agricultural economists in making decisions in oligopolistic markets. Game theory is a branch of applied mathematics that has wider applications in the social sciences, most notably in economics. Game theory attempts to mathematically capture behavior in strategic situations, or games, in which an individual's success in making choices depends on the choices of others. While initially developed to analyze competitions in which one individual does better at another's expense (zero sum games), it later on extended to games of mutual benefit. Traditional applications of game theory attempt to find equilibrium in these games. In equilibrium, each player of the game has to adopt a strategy that they are unlikely to change (most famous is the Nash equilibrium).

Objectives

Under this subtopic students are able to:

- Understand the different components of a game;
- Understand the theoretical issues in game theory and how they can be applied in industrial organization;
- The analytical skills to understand theoretical developments in game theory, extended skills in mathematical and quantitative techniques, the ability to construct and interpret theoretical models that employ game theoretic tools;
- An understanding of how strategic interaction among small number of firms can be modeled as a non-cooperative game.

2.3.1 Representation of Games

A game consists of a set of players, a set of moves (strategies) available to those players, and a specification of payoffs for each combination of strategies. Most cooperative games are presented in the characteristic function form, while the extensive and the normal forms are used to define non-cooperative games.

2.3.1.1 Extensive form

The extensive form can be used to formalize games with some important order. Games here are often presented as trees (as shown in Figure 1). Here each node represents a point of choice for a player. The player is specified by a number listed by the node. The lines out of the node represent a possible action for that player. The payoffs are specified at the bottom of the tree.

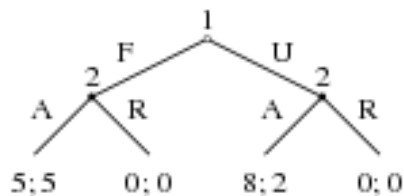


Figure 1: An extensive form game

In the game shown in Figure 1, there are two players. Player 1 moves first and chooses either F or U. Player 2 sees Player 1's move and then chooses A or R. Suppose that Player 1 chooses U and then Player 2 chooses A, then Player 1 gets 8 and Player 2 gets 2.

The extensive form can also capture simultaneous-move games and games with imperfect information or asymmetric information. To represent it, either a dotted line connects different vertices to represent them as being part of the same information set (i.e., the players do not know at which point they are), or a closed line is drawn around them.

2.3.1.2 Normal form

The normal (or strategic form) game is usually represented by a matrix which shows the players, strategies, and payoffs (see the example to the right). More generally it can be represented by any function that associates a payoff for each player with every possible combination of actions. In the accompanying example there are two players; one chooses the row and the other chooses the column. Each player has two strategies, which are specified by the number of rows and the number of columns. The payoffs are provided in the interior. The first number is the payoff received by the row player (Player 1 in this example); the second is the payoff for the column player (Player 2 in this example). Suppose that Player 1 plays Up and that Player 2 plays Left. Then Player 1 gets a payoff of 4, and Player 2 gets 3.

| | Player 2 chooses <i>Left</i> | Player 2 chooses <i>Right</i> |
|---------------------------------|---------------------------------|----------------------------------|
| Player 1 chooses <i>Up</i> | 4, 3 | -1, -1 |
| Player 1 chooses <i>Down</i> | 0, 0 | 3, 4 |

Figure 2: Normal form or payoff matrix of a 2 player, 2-strategy game

When a game is presented in normal form, it is presumed that each player acts simultaneously or, at least, without knowing the actions of the other. If players have some information about the choices of other players, the game is usually presented in extensive form.

2.3.2 Application of Game Theory to Economics

Economists have long used game theory to analyze a wide array of economic phenomena, including auctions, bargaining, duopolies, fair division, oligopolies, social network formation, and voting systems and to model across such broad classifications as behavioral economics and industrial organization. This module however, focuses on particular sets of strategies known as equilibria in games. These “solution concepts” are usually based on what is required by norms of rationality.

In non-cooperative games, the most famous of these is the Nash equilibrium. If each player's strategy represents the best response to the other strategies, this set of strategies is a Nash equilibrium. So, if all the players are playing the strategies in a Nash equilibrium, they have no unilateral incentive to deviate, since their strategy is the best they can do given what others are doing.

The payoffs of the game are generally taken to represent the utility ('or disutility if it is negative') of individual players. Often in modeling situations the payoffs represent money, which presumably corresponds to an individual's utility. This assumption, however, can be faulty.

2.3.3 Types of Games

2.3.3.1 Symmetric and asymmetric games

A symmetric game is a game where the payoffs for playing a particular strategy depend only on the other strategies employed, not on who is playing them. If the identities of the players can be changed without changing the payoff to the strategies, then a game is symmetric. Many of the commonly studied 2×2 games are symmetric. The standard representations of chicken, the prisoner's dilemma, and the stag hunt are all symmetric games.

| | E | F |
|---|------|------|
| E | 1, 2 | 0, 0 |
| F | 0, 0 | 1, 2 |

Figure 3: An asymmetric game

Most commonly studied asymmetric games are games where there are not identical strategy sets for both players. For example, the ultimatum game and similarly the dictator game have different strategies for each player. It is possible, however, for a game to have identical strategies for both players, yet be asymmetric. For instance, the game in Figure 3 is asymmetric despite having identical strategy sets for both players.

2.3.3.2 Zero-sum games

Zero-sum games are a special case of constant-sum games, in which choices by players can neither increase nor decrease the available resources. In zero-sum games the total benefit to all players in the game, for every combination of strategies, always adds to zero (more informally, a player benefits only at the equal expense of others). Poker exemplifies a zero-sum game (ignoring the possibility of the house's cut), because one wins exactly the amount one's opponents lose. Other zero-sum games include matching pennies and chess.

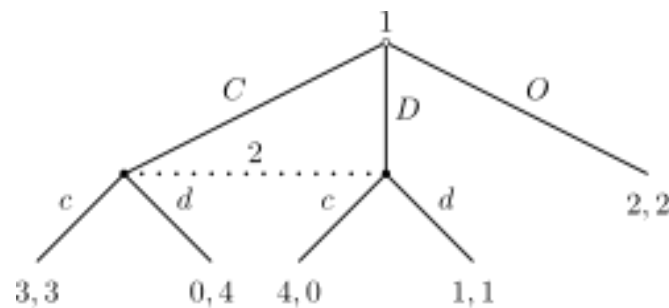
| | A | B |
|---|-------|-------|
| A | -1, 1 | 3, -3 |
| B | 0, 0 | -2, 2 |

Figure 4: A zero-sum game

Task 2.12: Explain why the game indicated in Figure 4 is a zero-sum game.

2.3.3.3 Simultaneous and sequential games

Simultaneous games are games where both players move simultaneously, or if they do not move simultaneously, the later players are unaware of the earlier players' actions (making them effectively simultaneous). Sequential games (or dynamic games) are games where later players have some knowledge about earlier actions. This need not be perfect information about every action of earlier players; it might be very little knowledge. For example, a player may know that an earlier player did not perform one particular action, while he does not know which of the other available actions the first player actually performed.



The difference between simultaneous and sequential games is captured in the different representations discussed above. Often, normal form is used to represent simultaneous games, and extensive form is used to represent sequential ones; although this isn't a strict rule in a technical sense.

2.3.3.4 Perfect information and imperfect information

An important subset of sequential games consists of games of perfect information. A game is one of perfect information if all players know the moves previously made by all other players. Thus, only sequential games can be games of perfect information, since in simultaneous games not every player knows the actions of the others. Most games studied in game theory are imperfect-information games. Perfect information games include chess. Perfect information is often confused with complete information. Complete information requires that every player know the strategies and payoffs of the other players but not necessarily the actions.

2.3.3.5 Infinitely long games

Games, as studied by economists and real-world game players, are generally finished in finitely many moves. Pure mathematicians are not so constrained, and set theorists in particular study games that last for infinitely many moves, with the winner (or other payoff) not known until after all those moves are completed.

2.3.3.6 Discrete and continuous games

Much of game theory is concerned with finite, discrete games that have a finite number of players, moves, events, outcomes, etc. Many concepts can be extended, however. Continuous games allow players to choose a strategy from a continuous strategy set. For instance,

Cournot competition is typically modeled with players' strategies being any non-negative quantities, including fractional quantities (this is a game for duopolies).

Summary

Game theory is the study of how optimal strategies are formulated in conflict. Because of the mathematical complexities of game theory, this module is limited to two-person and zero-sum games. A two-person game allows only two people or two groups to be involved in the game. Zero-sum means that the sum of the losses for one player must equal the sum of the gains for the other player. The overall sum of the losses and gains for both players, in other words, must be zero. Depending on the actual payoffs in the game and the size of the game, a number of solution techniques can be used. In a pure strategy game, strategies for the players can be obtained without making any calculations. When there is not a pure strategy, also called a saddle point, for both players, it is necessary to use other techniques, such as the mixed strategy approach, dominance, and a computer solution for games larger than 2×2 .

Exercises

1. Construct the payoff-matrix for the following game and find the Nash-equilibrium. How would you call a strategy like A and a strategy like B? You sit opposite of another player and both of you have to write either an A or B on a sheet of paper at the same time. You're not allowed to show your sheet to you partner or communicate by any other meaning. If both of you write an A on the sheet, both of you will get one dollar. If both of you have B on the sheet, you'll get two dollars each, and if one has an A and one B, the one who wrote an A will get three dollars and the one with a B doesn't get anything.

2. Consider the following game in which player 1 chooses a row and player 2 chooses a column.

| | L | M | R |
|---|-----|-----|-----|
| U | 3,3 | 0,5 | 1,2 |
| M | 4,2 | 8,7 | 6,4 |
| D | 5,7 | 5,8 | 2,5 |

- Does player 1 have a dominant strategy?
- Does Player 2 have a dominant strategy?
- What is the Nash Equilibrium for this game? Is it ever possible for either player to use a strategy other than his dominant strategy? Explain.

3. What are the assumptions regarding player rationality implicit in solving a game by elimination of dominated strategies? Contrast this with the case of dominant strategies.

4. Consider the following two-player game in which each player has three strategies.

| | | Player A | | |
|----------|---|----------|-----|-----|
| | | L | M | R |
| Player B | U | 1,1 | 2,3 | 1,6 |
| | M | 3,4 | 5,5 | 2,2 |
| | D | 1,10 | 4,7 | 0,4 |

Find all the (pure strategy) Nash equilibria for this game.

5. Consider the two-player game described by the payoff matrix below.

| | | Player A | |
|----------|---|----------|-----|
| | | L | R |
| Player B | U | 1,1 | 0,0 |
| | D | 0,0 | 4,4 |

- Find all pure-strategy Nash equilibria for this game.
- This game also has a mixed-strategy Nash equilibrium; find the probabilities the players use in this equilibrium, together with an explanation for your answer.

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TOPIC 3 SPATIAL AND INTER-TEMPORAL MARKET LINKAGES

Introduction

The ability of the marketing system to allocate agricultural products over space and time has been a serious problem in agricultural marketing. Farmers as any business organization want to sell their farm products at a fair returns or profit. Moreover, prices of agricultural products vary temporally, between various grades of a product and between alternative markets. Hence, in order to ensure maximum returns, farmers must make their production decisions considering the most favorable place, time and form in which their products could be marketed. Having realized the fact that prices varies considerably between different market locations and seasons of the year, it is therefore important to examine the factors responsible for these variations and measure the extent of price differentials between places and time. This topic therefore focuses on the analysis of agricultural markets linkages (integration) over time and space. It is mainly about the relationship between prices of agricultural commodity at different points in time and in different connected markets. Do prices of a product in two separated markets differ only by the transaction costs incurred? Are there inter-temporal additional building stocks or hoarding over time? Two or more markets are said to be spatially integrated or linked if the prices of a product in two or more markets only differ by transaction costs. Prices of a product at different points in time are said to be inter-temporally integrated or linked if the prices of a product in different points in time only differ by storage costs. Market integration analysis can explain how well prices for the same commodity across different markets are spatially connected or how prices for a commodity within a market over time are related.

Objectives

By the end of this Topic, students should be able to:

- Explain why intertemporal and spatial market integration are important in agriculture; of
- Explain the possible implications of poorly integrated markets;
- Identify the different methods of analysing market integration and choose the best one;
- Identify the different spatial equilibrium models and state their pros and cons.

SUBTOPIC 1 INTER-TEMPORAL MARKET LINKAGES

Introduction

Often farmers must decide not simply what price to set or what quantity to produce, but how the price of a product and their output should change over time. Agricultural products markets have specific characteristics which distinguish them from other products marketing. The existence of lag between planting and harvesting (cycles), seasonality and secular trends are few to mention. In agricultural markets, it would seem logical for prices to rise and fall as the market tracks crop development, supply arrives at harvest time and product is consumed throughout the year. Under this subtopic we analyze an inter-temporal agricultural products price linkages or time series price data. That means, we will focus on inter-temporal price linkages prevalent in agricultural products such as the cobweb cycles, seasonality, secular trends, and the forward and futures contracts.

Objectives

At the end of this subtopic the students are able:

- Understand why the prices of agricultural commodities show inter-temporal variations.
- Identify the cyclical, seasonal and secular trend components of a time series data.
- Use appropriate models to analyze cobweb cycle, seasonal and secular trends agricultural time series data.

3.1.1 Cobweb Cycles

Agriculture is an important sector in many developing countries where most of the population makes their living. Agricultural products markets are mainly characterized by the fluctuation of the prices which has a direct impact on people's daily life. The high price fluctuations in agricultural products are mainly due to the production process and the nature of the products (perishability, bulkiness, etc.). The cobweb cycle theory is one kind of dynamic balance analysis the western economists carried out in 1930s to test whether the equilibrium state is stable or not. In this theory, taking the factor of temporal variation into consideration, after examining the interactions of the demand, supply and the prices during different periods, they try to analyze the actual undulation process and results of the output and price of such commodities with comparatively longer production cycle as agricultural products and products of animal husbandry after deviating from the equilibrium state.

Cobweb cycles are the result of lagged response of commodity production to price changes, due to the intrinsic delay between production decisions and actual supply of goods. The typical example is agricultural production, where gestation lags can vary from one season (as with corn) to a few seasons (livestock) to some years (fruit trees).

Combining the market equilibrium and elasticity theory, the cobweb cycle theory then involves examinations of the change in the market price and the output, namely using the law of demand and supply to explain the repeatedly varying price and output and impact on each other when the demand and supply of some commodities with long production cycle become imbalanced. The main products studied in the cobweb cycle theory need a long production cycle from the manufacturing to its appearing in the market. Furthermore, once the scale of production is ascertained, it can't be changed on half-way until the manufacturing process finishes. And consequently the variation of the market price can just affect the output in the following cycle. Also the output of this cycle depends on the price of the last cycle and in the same way the price of this cycle will decide the output of the next cycle.

Cobweb models are easily explained using the example used by Kaldor in 1934 for agricultural markets. Suppose for example that as a result of unexpectedly bad weather during a year, the quantity supplied of a certain crop to be quite small (Q_t , see figure below, first diagram). This excessive demand, or shortage, causes prices to be unusually high (P_t). When farmers realize how high prices are, they'll plant more in order to supply more the following year. However, supply is so high the following year (Q_{t+1}) that prices decrease to meet consumers' demand (P_{t+1}). Since prices are low, farmers decide to lower their supply the following year (Q_{t+2}), resulting in high prices again (P_{t+2}). As this process repeats itself, oscillating between periods of low supply with high prices and then high supply with low prices, the price and quantity trace out a spiral. They may spiral inwards, in which case the economy converges to the equilibrium where supply and demand cross; or they may spiral outwards, with the fluctuations increasing in magnitude. This process will go on until equilibrium is reached after a few fluctuations.

The cobweb cycle can have two main types of outcomes:

1. Convergent cobweb: When the elasticity of supply is less than that of demand ($E_s < E_d$), the extent of effect of the change in the market price on supply volumes will be less than that on demand. In this case, the effect of price fluctuation on the output will be increasingly weak and the fluctuation range of the price and yield will be smaller and smaller ultimately towards equilibrium spontaneously. Reflected in the graphics, it will be a cobweb with contraction inward and convergence in equilibrium point, and hence named convergent cobweb (Figure 3.1.1).

2. Divergent cobweb: When the elasticity of supply is greater than that of demand ($E_s > E_d$), the extent of effect of the change in the market price on supply volumes will be larger than that on demand. In this case, the effect of price fluctuation on the output will be increasingly strong and the fluctuation range of the price and yield will be greater and greater ultimately farther and farther from the equilibrium point. Reflected in the graphics, it will be a cobweb spreading out and far from the equilibrium point, and therefore called divergent cobweb (Figure 3.1.2).

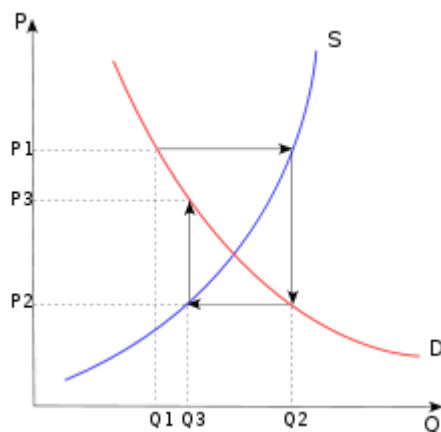


Figure 3.1.1: The convergent case: each new outcome is successively closer to the intersection of supply and demand

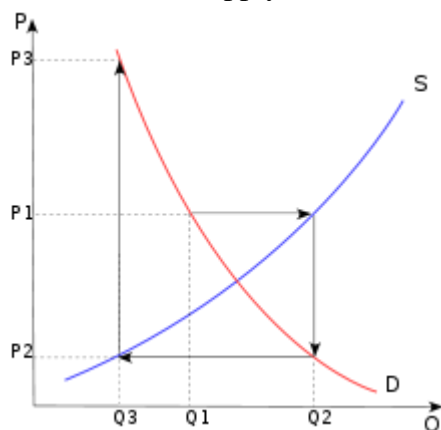


Figure 3.1.2: The divergent case: each new outcome is successively further from the intersection of supply and demand

Task 3.1. Explain what you have to do as a farmer if the price of a pepper increased significantly.

3.1.2 Seasonality and Secular Trend

Seasonal price patterns in agricultural products are normal price movements or fluctuations that occur within a year. Recognizing the presence and magnitude of seasonal price patterns can improve producers' marketing and production management decisions. However, there are also other factors such as secular trends (general long-term price direction). In this section, we will define and look at the methods to be used for analyzing seasonality and secular trends in agricultural products marketing over a period of time.

3.1.2.1 Seasonal patterns

Agricultural production is driven by climatic seasons and biological factors that result in supplies changing over the year. Agricultural production is greatly influenced by climatic season, which in turn creates seasonality in the marketing of agricultural products. Additionally, demand for many agricultural products is seasonal. When combined, seasonal supply and demand factors (direct and derived from subsequent stages along the marketing chain) create seasonal price patterns. When opposite of "normal" seasonal conditions emerge, market participants often refer to the situation as being counter-seasonal. Seasonal price patterns tend to differ depending on the product type (perishability, bulkiness, etc). There also can be differences in seasonal price patterns within agricultural products based on geographic location.

Price seasonality is defined as regular or average agricultural product price patterns occurring within a year. Typically, seasonal patterns for livestock are developed on a calendar year basis and crops are developed based on crop-years.

Seasonality can be measured using the following methods: Seasonal average, link relative, ratio to trend and ratio-to-moving average methods.

1. Seasonal average method: In this method, we first determine seasonal average and general average and then calculate the seasonal index as the ratio of the two averages.

Seasonal average = Total seasonal values/No. of years

General average = Total seasonal averages/No. of seasons

Seasonal index = Seasonal average/General average

Example 3.1.1: From the data given in the table below, calculate quarterly seasonal indices assuming the absence of any type of trend.

Table 3.1. Season prices of a good for five years

| Year | I | II | III | IV |
|------|-----|-----|-----|-----|
| 2000 | - | - | 127 | 134 |
| 2001 | 130 | 122 | 122 | 132 |
| 2002 | 120 | 120 | 118 | 128 |
| 2003 | 126 | 116 | 121 | 130 |
| 2004 | 127 | 118 | - | - |

Solution: First calculate of quarterly seasonal indices

| Year | I | II | III | IV | Total |
|--|--------|------|-------|--------|--------|
| 2000 | - | - | 127 | 134 | |
| 2001 | 130 | 122 | 122 | 132 | |
| 2002 | 120 | 120 | 118 | 128 | |
| 2003 | 126 | 116 | 121 | 130 | |
| 2004 | 127 | 118 | - | - | |
| Total | 503 | 476 | 488 | 524 | |
| Average | 125.75 | 119 | 122 | 131 | 497.75 |
| Quarterly turn over seasonal indices 124.44=100 | 101.05 | 95.6 | 98.04 | 105.03 | |

Hence, general average = $497.75 / 4 = 124.44$, and the quarterly seasonal variation index = $125.75 / 124.44 \times 100 = 101.05$. We calculate the other seasonal indices similarly.

2. Link relative method: In this method, the following steps are taken for calculating the seasonal variation indices.

Step 1. We calculate the link relatives of seasonal figures using the formula:

Link relative = (Current season's figure/Previous season's figure) x 100

Step 2. We calculate the average of link relative for each season.

Step 3. Convert these averages into chain relatives on the basis of the first seasons.

Step 4. Calculate the chain relatives of the first season on the base of the last seasons.

There will be some difference between the chain relatives of the first seasons and the chain relatives calculated by the pervious method. This difference will be due to effect of long term changes. For correction, the chain relative of the first season calculated by 1st method is subtracted from the chain relative calculated by the second method. Then express the corrected chain relatives as percentage of their average.

3. Ratio to moving average method: In this method seasonal variation indices are calculated in following steps:

i. We calculate the 12 monthly or 4 quarterly moving averages.

ii. We use the following formula for calculating the moving average ratio:

Moving average ratio = (Original data/Moving average) x 100

Then we calculate the seasonal variation indices on the basis of average of seasonal variations.

4. Ratio to trend method: In ratio to trend method, we will calculate annual trend values. Then on this basis, we will calculate quarterly trend value. Now, it will be easy for us to calculate the ratio of original value to trend value which will be the seasonal indices. This method is based on multiple model of time series. Here, we use the following steps:

i. We calculate the trend value for various time durations (Monthly or Quarterly) with the help of least square method.

ii. Then we express the all original data as the percentage of trend on the basis of the following formula.

Seasonal index = (Original data/Trend value) x 100

3.1.2.2 Secular trend

Secular trend is a long term movement in a time series. A time series data may show upward trend or downward trend for a period of years and this may be due to factors like: increase in population, change in technological progress and large scale shift in consumers' demands. For example, population increases over a period of time, price increases over a period of years, production of goods on the capital market of the country increases over a period of years. These are the examples of upward trend. The sales of a commodity may decrease over a period of time because of better products coming to the market. This is an example of declining trend or downward.

Methods for calculating secular trends

The following methods are used for calculation of a secular trend: Free hand curve, semi-average, moving average and least square methods.

1. Free hand curve method: In this method, the data is denoted on graph paper. We take "Time" on 'x' axis and "Data" on the 'y' axis. On the graph there will be a point for every point of time. We make a smooth hand curve with the help of these plotted points.

Example 3.1.2: Draw a free hand curve on the basis of the following data:

| Year | Production of wheat |
|------|---------------------|
| 2001 | 100 |
| 2002 | 111 |
| 2003 | 146 |
| 2004 | 422 |
| 2005 | 720 |
| 2006 | 800 |
| 2007 | 1106 |
| 2008 | 1323 |

Using any statistical software you can draw the graph shown in the figure below.

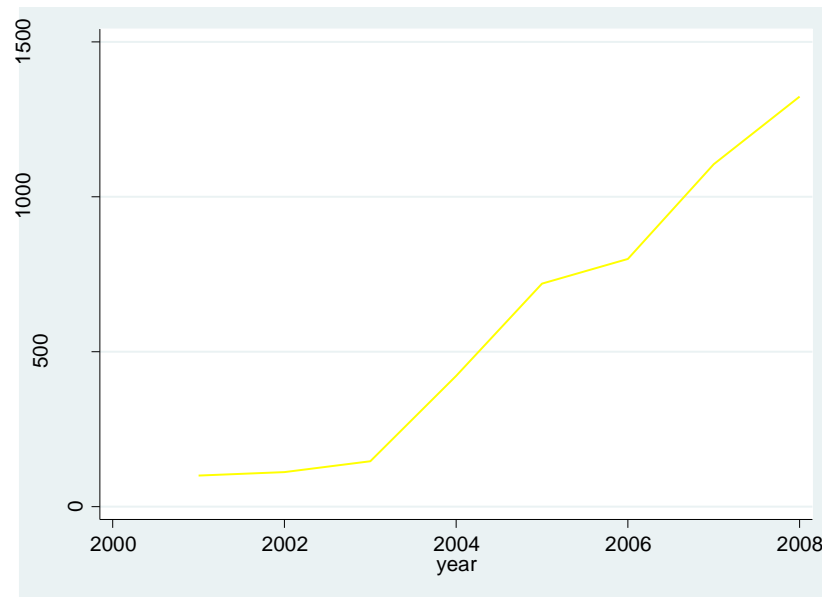


Figure 3.1.3. Line graph

2. Semi-average method: In this method, the given data are divided in two parts, preferable with the equal number of years. For example, if we are given data from 1989 to 1996, i.e., over a period of eight years, the two equal parts will be first four years, i.e., 1989 to 1992 and from 1993 to 1996. In case of odd number of years two equal parts can be made simply by ignoring the middle year. For example, if data are given for 9 years from 1990 to 1998 the two equal parts would be from 1990 to 1993 and from 1995 to 1998 - the middle year 1994 will be ignored.

Example 3.1.3: Find the trend line from the following data by semi-average method.

| Year | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------------|------|------|------|------|------|------|------|------|
| Production | 150 | 152 | 153 | 151 | 154 | 153 | 156 | 158 |

There are total 8 trends. Now we distributed it in equal parts. Part I refers to years from 1989 to 1992 and Part II refers to years from 1993 to 1996. Now we calculate average mean for every part.

$$\text{Part I} = (150 + 152 + 153 + 151)/4 = 151.50$$

$$\text{Part II} = (154 + 153 + 156 + 158)/4 = 155.25$$

Then the trend line using semi-average method is given in Figure 4 below.

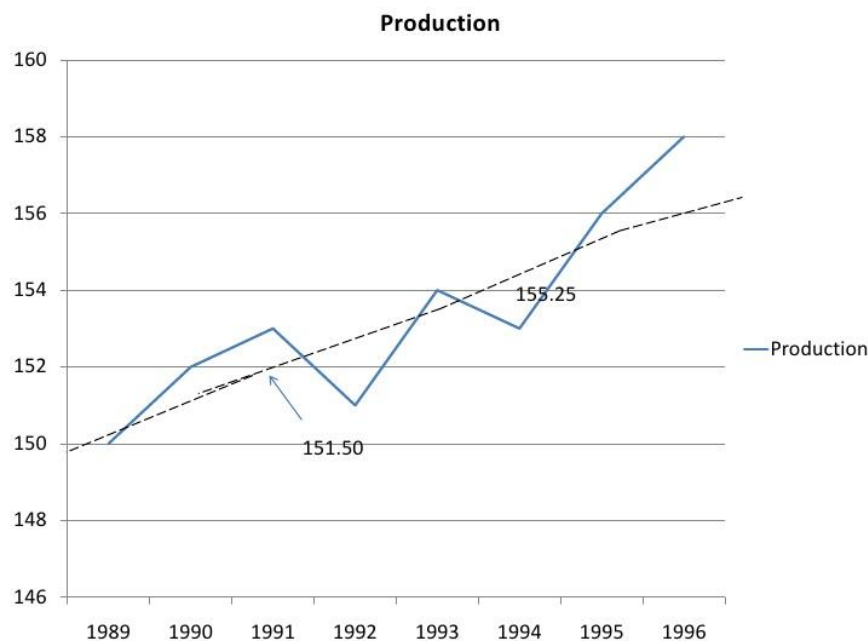


Figure 3.1.4: Trend line using semi-average method

3. Moving average method: It is one of the most popular methods for calculating long term trend. This method is also used for ‘Seasonal fluctuation’, ‘cyclical fluctuation’ and ‘irregular fluctuation’. In this method, we calculate the ‘Moving average’ for certain years. For example, the three year’s moving average according to this method is: Three year’s moving average $= (1)+(2)+(3)/3$, $(2)+(3)+(4)/3$, $(3)+(4)+(5)/3$,

Where (1),(2),(3),..... are the various years of time series.

Example 3.1.4: Find out the five year’s moving average for the data given below.

| | | | | | | | | | | | | | | | |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Year | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
| Price | 20 | 25 | 33 | 33 | 27 | 35 | 40 | 43 | 35 | 32 | 37 | 48 | 50 | 37 | 45 |

Solution: The five year’s moving average for the above data is given in the last column of the table below.

| Year | Price of flour in kg | Five years’ moving total | Five years’ moving average (Col 3/5) |
|------|----------------------|--------------------------|--------------------------------------|
| 1988 | 20 | - | |
| 1989 | 25 | - | |
| 1990 | 33 | 135 | 27 |
| 1991 | 33 | 150 | 30 |
| 1992 | 27 | 165 | 33 |
| 1993 | 35 | 175 | 35 |
| 1994 | 40 | 180 | 36 |
| 1995 | 43 | 185 | 37 |
| 1996 | 35 | 187 | 37.4 |

| | | | |
|------|----|-----|------|
| 1997 | 32 | 195 | 39 |
| 1998 | 37 | 202 | 40.4 |
| 1999 | 48 | 204 | 40.8 |
| 2000 | 50 | 217 | 43.4 |
| 2001 | 37 | - | |
| 2002 | 45 | - | |

4. Least square method: This method is most widely used one. When this method is applied, a trend line is fitted to data in such a way that the following two conditions are satisfied.

1. The sum of deviations of the actual values of y and computed values of y is zero.

$$\sum_{i=1}^n y_i - \hat{y}_i = 0$$

2. i.e., the sum of the squares of the deviation of the actual and computed values is least from this line. That is why method is called the method of least squares. The line obtained by this method is known as the line of 'best fit'. That is, $\sum_{i=1}^n (y_i - \hat{y}_i)^2$ is least.

The method of least square can be used either to fit a straight line trend or a parabolic trend. The straight line trend is represented by the equation:

$$Y_c = a + bx$$

Where, Y = Trend value to be computed

X = Unit of time (Independent Variable)

a = Constant to be calculated

b = Constant to be calculated

Example 3.1.5: Draw a straight line trend and estimate trend value for 2006 from the data given in the table below:

| | | | | | |
|------------|------|------|------|------|------|
| Year | 2001 | 2002 | 2003 | 2004 | 2005 |
| Production | 8 | 9 | 8 | 9 | 16 |

Solution: We first construct the following table.

| Year | Deviation from 1990 X | Y | XY | X ² | Trend: Y _c =a+bX |
|------|-------------------------|-------------------------|------------------------------|---------------------------|-----------------------------|
| 2001 | 1 | 8 | 8 | 1 | 5.2+1.6(1)=6.8 |
| 2002 | 2 | 9 | 18 | 4 | 5.2+1.6(2)=8.4 |
| 2003 | 3 | 8 | 24 | 9 | 5.2+1.6(3)=10.0 |
| 2004 | 4 | 9 | 36 | 16 | 5.2+1.6(4)=11.6 |
| 2005 | 5 | 16 | 90 | 25 | 5.2+1.6(5)=13.2 |
| N=5 | $\sum_{i=1}^5 X_i = 15$ | $\sum_{i=1}^5 Y_i = 50$ | $\sum_{i=1}^5 X_i Y_i = 166$ | $\sum_{i=1}^5 X_i^2 = 55$ | |

Now we calculate the values of two constants ‘a’ and ‘b’ with the help of the following two equations:

$$\sum_{i=1}^5 Y_i = Na + b \sum_{i=1}^5 X_i$$

$$\sum_{i=1}^5 X_i Y_i = a \sum_{i=1}^5 X_i + b \sum_{i=1}^5 X_i^2$$

Now using the values from the table above, we have:

$$50 = 5a + 15(b) \quad (1)$$

$$166 = 15a + 55(b) \quad (2)$$

$$\text{Or } 5a + 15b = 50 \quad (3)$$

$$15a + 55b = 166 \quad (4)$$

Multiplying equation (3) by 3 and subtracting (4), we have:

$$-10b = -16 \text{ or } b = 1.6$$

Now putting the value of “b” in the equation (3), we have

$$5a + 15(1.6) = 50$$

$$5a = 26$$

$$a = 5.2$$

Now using the values of ‘a’ and ‘b’ the trend line is given by:

$$Y_c = a + bx$$

$$Y = 5.2 + 1.6X$$

Now we calculate the trend line for 2006:

$$Y_{2006} = 5.2 + 1.6(6) = 14.8$$

3.1.2 Forward and Futures Contracts

Agricultural commodity prices are volatile because short term production and consumption elasticities are low. Production responsiveness is low for annual crop commodities because planting decisions are made before prices for the new crop are known. These decisions depend on expected prices and not price realizations.

With markets risk and uncertainty go hand in hand. And, for as long as markets have existed, there have been some that seek to reduce their risk exposure and others that view risk as an opportunity to profit. Thus, one important function of the market is to enable the transfer of risk from one set of actors to another. This is specifically important for agricultural products which are perishable and bulky, and where most producers in developing countries are poor farmers.

An important dimension of risk is time. A derivative, as a way to guarantee or fix price across, is a mechanism for managing and transferring risk. A derivative is thus essentially an agreement to trade between a future buyer and a future seller, in contrast to a spot transaction,

which is an agreement to trade “on the spot” or immediate period. Most derivatives, however simple or complex, can be classified into four types: a forward contract, which is an agreement to buy or sell a good at a specified price on a specified future date; a futures contract, which is a standardized forward contract executed through an organized exchange; a swap contract, which is an agreement to exchange future cash flows, and an option contract, which grants its holder the right, but not the obligation, to buy or sell something at a specified price on or before a specified date. Whatever the form, derivatives are variations of a price guarantee. In this sub section, we focus on the most widely used contracts, forward and futures contracts.

3.1.3.1 Forward contracts

Spot markets essentially consisted of transactions on the spot, with cash paid up front for immediate delivery of the good. However, the volatility of weather conditions led to wide swings in supply and demand which results in farmers often found themselves with no buyer to buy their product, and would end up dumping their unsold grain in the streets or the nearby lake. Although early forward contracts provided some security in ensuring buyers for sellers and vice versa, the risk of default by either side when prices changed in a particular direction remained a serious problem. In the forward contract, which is a purely bilateral arrangement, the buyer and seller bear the full risk of default at the date of delivery. With a futures contract, the exchange which lists the contract conducts a daily settlement of the margin, by adjusting the margin deposit for daily price movements reduces the default risk. Moreover, because futures contracts are listed on an exchange, there are a lot more buyers and sellers for a given contract, giving the market more liquidity.

A forward contract is a contract made today for delivery of a product at a pre-specified time in the future at a price agreed upon today. The buyer of a forward contract agrees to take delivery of an underlying product at a future time, T , at a price agreed upon today. No money changes hands until time T . The seller agrees to deliver the underlying product at a future time, T , at a price agreed upon today. Again, no money changes hands until time T .

A forward contract, therefore, simply amounts to setting a price today for a trade that will occur in the future. Example 1 illustrates the mechanics of a forward contract. Since forward contracts are traded over-the-counter rather than on exchanges, the example illustrates a contract between a user and a producer of the underlying commodity.

Example 3.1.6: A wheat farmer has just planted wheat that is expected to yield 300 quintals. To eliminate the risk of a decline in the price of wheat before the harvest, the farmer can sell the 300 quintals of wheat forward. A miller may be willing to take the other side of the contract. The two parties agree today on a forward price of \$30 per quintal, for delivery six months from now when the crop is harvested. No money changes hands now. In six months, the farmer delivers the 300 quintals to the miller in exchange for \$9000. Note that this price is fixed and does not depend upon the spot price of wheat at the time of delivery and payment. As a result, the farmer does not have to worry about the price at which he is going to sell the wheat, and the miller does not have to worry about the price at which he is going to buy wheat. They have hedged the price of their output and input respectively.

Problems with cash forward contract

1. The contracting parties must check each other credit worthiness

2. Forward contract are inherently credit instrument
3. They help to reduce uncertainty but they do not eliminate it all together
4. They are also inflexible in that difficulties occur if either parties fails to meet his obligations

3.1.3.2 Futures contracts

A futures contract is similar to a forward contract except for two important differences. First, intermediate gains or losses are posted each day during the life of the futures contract. This feature is known as marking to market. The intermediate gains or losses are given by the difference between today's futures price and yesterday's futures price. Second, futures contracts are traded on organized exchanges with standardized terms whereas forward contracts are traded over-the-counter (customized transactions between a buyer and a seller).

Futures contract is a standardized legally binding agreement to buy or sell a certain amount of commodity at a predetermined price at specified date and place in the future. Differently, it is an auction market in which participants buy and sell commodity/future contracts for delivery on a specified future date. Trading is carried on through open yelling and hand signals in a trading pit. In commodity futures market only the price of the commodity is left unspecified, but all other factors and standards (quantity, quality, place, date, standard etc) are legally binded. The period of the contract may vary from few months to years. Buyers and sellers may not have direct contact. In the futures market it is the contract rather than the the commodity which is the unit of trade

Problems of futures markets

1. Difficulty to meet the standards
2. Cost associated with the place of delivery
3. If not deliverd contract will cancelled out

How are forward and futures contracts used?

Forward and futures contracts are used for two basic functions: hedging and speculation. Those interested in hedging use them to manage uncertainty, while those interested in speculating use them to bet on uncertainty. Hedgers are essentially interested in reducing financial risk, or the probability of financial loss in the face of uncertainty. Let us again consider the case of the pasta factory. As a processor, the pasta factory is interested in obtaining a given amount of wheat at a future date at a fixed price, upon which their operation and profitability depend. In order to protect itself against a future price increase, the factory would like to lock in the purchase price by taking an opposite or offsetting position in the futures market.

Speculators, in contrast, use forward and futures contracts to potentially profit from financial risk. Based on informed views of what the future direction of the market will be, a speculator takes a single position, rather than an offsetting position, that can either enable them to profit highly or to lose the entire value of their contract. Without appropriate checks and balances in the rules of trading on an exchange, large and spectacular losses are possible for the unwise speculator, leading some to consider futures markets the "wild beast of finance".

However, forward and futures contracts exist, and have survived millennia, because uncertainty exists and matters. They have incredible power in that they enable us to quantify uncertainty, and manage, price, and trade this uncertainty. A commodity futures contract enables farmers to make better planting decisions and lock in prices even before the first seed is planted by selling forward. Similarly, it enables an exporter or a processor to better manage their operations and lock in their profit by buying forward on the same market.

Summary

Under this subtopic we looked at the intertemporal market linkages for agricultural products. These are cobweb cycle, seasonality, secular trends and the forward and futures contracts. Cobweb cycle refers to fluctuations occurring in markets in which the quantity supplied by producers depends on prices in previous production periods. It is characteristic of industries in which a large amount of time passes between the decision to produce and its arrival on the market. It occurs most commonly in agriculture, because the decision of what to produce in the coming year is often based on the results of the previous year. Seasonality is intended to identify price patterns and possible turning points within the span of a year. It is mostly related to agricultural commodity markets as prices in these markets rise and fall as the market tracks crop development, supply arrives at harvest time and product is consumed throughout the year. Secular trend describes the movement over the long term of a time series that can be increasing, decreasing, or stable. A future is a contract between two parties requiring deferred delivery of underlying asset (at a contracted price and date) or a final cash settlement. Both parties are obligated to perform and fulfill the terms. Forward contract is simply a customized futures contract.

Exercises

1. Describe the economic assumptions of the Cobweb model.
2. The CPI (Consumer Price Index) for country for the six years from 1998 to 2003 is listed below.

| 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|------|------|------|------|------|------|
| 108 | 110 | 112 | 115 | 118 | 120 |

Determine the least squares equation and estimate the value of the CPI for 2008.

3. The following table the output of maize in tons produced in a district from 1998 to 2003.

| 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|-------|-------|-------|-------|-------|-------|
| 10000 | 11100 | 11500 | 12200 | 12800 | 13000 |

- a. Provide a time series graph.
 - b. Determine the least squares trend equation.
 - c. Interpret the coefficients in the trend equation.
 - d. Estimate the number of person-trips for 2005 and 2006.
 - e. Use the least squares trend equation to calculate the trend value for 2003? Why is this value not the same as the given value 1300? Explain.
4. What will the company which wants to contracts today for some future date of actual currency exchange makes use of? Explain.

5. Explain why forward/futures contracts are zero-sum game?
6. Assume that today's spot price is USD46.75. Tanzania's interest rate 7.25% per annum while Ethiopia's interest rate is 5.5% per annum. Find out the theoretical price for contracts maturing on 6th month and 8th month from today.

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SUBTOPIC 3.2 SPATIAL MARKET INTEGRATION

Introduction

Due to geographical variations of agricultural production, products flow from surplus to deficit areas in the country and abroad. Apart from the separation of the areas of surpluses and deficits by geographical barriers, there is a lack of specialization in the production of agricultural commodities and consequently, there is in lack of concentration of supply, with only small surpluses available for sale at the end of the farming season. The analysis of the spatial product price variations is important as it has implication on the economic growth, social welfare, functioning of markets and efficient allocation of resources. If markets are spatially integrated it means that it takes some time for the exogenous shocks to transform and reach the various geographically separated markets. The imperfectly integrated markets may send wrong price information signals to producers and other actors of the marketing chain, resulting incorrect production and marketing decisions. For example, if the price of an agricultural commodity decreases in one region and increases in another one, then regional prices diverge, because the price information flow between the markets is wrong. If this happens, changes in market price between the regions do not necessarily reflect relevant economic phenomena in the country. The extent of agricultural market integration is relevant to: analyze price transmission, allocation of resources and forecast the price effect of a shock in one market on the other market to which it is connected.

Objectives

After completing this subtopic the students are able to:

- Define spatial market integration;
- Understand why spatial market integration analysis is important;
- Realize why prices of agricultural commodities show spatial variations; and
- Identify factors affecting spatial market integration.

3.2.1 Spatial Market Integration and Price Transmission

A fundamental issue when analyzing trade policy reform in agricultural markets of a given country is the extent to which agricultural commodity markets in the country respond to changes in the prices of a given market or international markets. Price transmission from one market to the other is central in understanding the extent of the integration of economic agents into the market process. Two markets are said to be spatially integrated if price at destination market equals price at the source market augmented by transaction costs. Market integration can also be defined as the degree of price transmission between either vertically or spatially related markets, as a proxy for marketing efficiency. The extent of price transmission is defined in terms of notional components such as completeness, dynamics and asymmetry of adjustment which collectively, enables us assess market integration and the extent to which policies and other distortions affect price transmission process. Good market integration implies successful trade between deficit and surplus areas, efficient flow of goods and prices between markets and a significant food security, growth and welfare of producers and consumers. Poor market integration, however, indicates a decrease in social welfare of producers and consumers by increasing price of consumers in deficit areas and decreased price of producers in surplus areas, imprecise price information, presence of either government policies or infrastructural and institutional bottlenecks and inefficient flow of goods and services between markets.

3.2.2 Why Is Spatial Market Integration Analysis Important?

If markets are not well-integrated, then price signals could be distorted which leads to an inefficient allocation of resources, and the marketable surplus generated by the farmers could result in depressed farm prices and diminishing income. Market integration is an alternative approach to stabilize prices, allocate resources and rectify market imperfections like entrenched monopolies or monopsonies and inadequate and costly information transmission. The rectification of market imperfections smoothes the way to attain market efficiency, which in turn facilitates the attainment of agricultural development and equal distribution of income. If markets are well integrated then government can stabilize the price in one key market and rely on commercialization to produce a similar outcome in other markets. This reduces the cost of stabilization considerably. Further, farmers will not be constrained by local demand conditions.

In the case of widely spatially dispersed regional markets in developing countries, the nature and extent of market integration is of particular importance. The nature of optimal policies depends on the dynamics of market integration and the cost of incorrect policies can be massive (Ravallion, 1986).

Price transmission studies have both practical and theoretical usefulness. On the theoretical level, price transmission play a key role in neo-classical economics by postulating that prices drive resource allocation and output mix decisions by economic actors, and price transmission integrates markets spatially or vertically.

Price transmission studies are useful to policy makers in many respects. For instance, countries that liberalize their domestic markets require knowledge on how world price signals are transmitted to their domestic markets. Knowledge on effective price transmission which results in the integration and efficiency of spatially separated markets is also a prerequisite for ensuring a distributional balance between food-deficit and surplus regions in developing

countries; and for assessing the role played by profit-seeking arbitrageurs in this regard (Abdulai, 2007).

Furthermore, evidence on price transmission is required in understanding the impact of policy changes on the performance of agricultural markets. Particularly, negotiations in the ongoing WTO Doha Round, the economic partnership agreements (EPA), and other bi- or multilateral agreements in developing countries in the face of the recent global economic and food price crises need to be informed by evidence on the ability of domestic agricultural markets in these countries to respond to changes in international prices of agricultural commodities.

In addition to these, spatial market integration analysis is important for the following reasons:

1. It tells us how much additional products will be supplied at or near current costs. It sheds considerable light on the likelihood that traders can readily access good in other, larger markets without driving up local prices of the good significantly.
2. It shows where the viable prospective source markets are. Markets with which the target recipient market is already well linked are typically not good candidates for local or regional procurement that aims to supplement food availability in the recipient market.
3. It can shed light on the likelihood that cash or voucher transfers might drive up commodity prices significantly in recipient markets, as well as help us understand the likely food price effects in potential source markets by informing our understanding of supply responsiveness.
4. It helps us to identify whether demand or supply side interventions will have differential price effects in local markets, with possible implications for local growers and processors.
5. It ensures a more rapid and effective price adjustments between markets with the help of market reforms.
6. It is useful to understand the function of markets and design and adopt most suitable agricultural price stabilization policies.
7. Generally it is useful in making agricultural policies and strategies for price stabilization, price risk management and food security.

3.2.3 Determinants of Spatial Market Integration

Spatial market integration studies identified several factors that hinder the transmission of price signals from one market to the other. Distortions introduced by governments in the form of policies either at the border, or as price support mechanisms weaken the link between the markets. Agricultural policy instruments such as import tariffs, tariff rate quotas, and export subsidies or taxes, intervention mechanisms, as well as exchange rate policies insulate the domestic markets and hinder the full transmission of international price signals by affecting the excess demand or supply schedules of domestic commodity markets.

Other factors that affect market integration include high transaction costs and marketing margins which hinder the transmission of price signals, as they may prohibit arbitrage. This makes changes in prices in a given market not to fully pass to prices in the other markets, resulting in economic agents to adjust partly to shifts in the supply and demand in this market. The other factor is the non-competitive behavior of traders. Oligopolistic behavior and collusion among traders in a given market may retain price differences between two separated markets in levels higher than those determined by transaction costs.

Summary

Market integration analysis can explain how well prices for the same commodity across different markets are spatially connected or how prices for a commodity within a market over time are related. The degree of markets inter-relationships determines the strength and effectiveness of price mechanism in resource allocation. Without integration of markets for instance, price signals will not be transmitted from supply deficit regions to surplus markets; prices will be more volatile; agricultural and food producers for instance will not specialize according to long-run comparative advantage, and gains from trade will not be realized. Distorted government's policy, high transaction costs and marketing margins and imperfections in the markets are the major factors which affect spatial market integration adversely.

Exercises

1. Explain in your own words the importance of spatial market integration analysis.
2. Explain how high transaction costs affect the spatial efficiency of markets.

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SUBTOPIC 3.3 TRANSACTION COSTS

Introduction

The market is a central element in the construction of modern economic theory. Usually pictured as the demand curve crossing the supply curve, the market in standard economics textbooks is free of any institutional structure. Simply reduced as a price-making mechanism, the market serves more as a theoretical construct than as a characterization of the actual process of exchange. Recent developments in new institutional economics have strained much attention to empirical studies of economic institutions. However, the emphasis largely rested on the institutional structure of production, particularly business firms overlooking the institutional structure of exchange. According to Coase (1937) although economists claim to study the working of the market, in modern economic theory the market itself has an even more shadowy role than the firm. Overlooking the institutional structure of the market leads economists to take the existence of the market for granted. Nothing more than “the law of supply and demand” is required for economists to reach a conclusion on their blackboard that the price mechanism (i.e., the market) works. Economists hence seldom bother to investigate how the market as an economic institution emerges and develops in the real world. Taking the existence of the market for granted makes us blind to know the underlying economic forces that shape the institutional structure of exchange. One of the most influential concepts brought into economists’ tool-kit after Coase (1937) is the concept of transaction costs. According to him, acknowledging the existence of transaction costs in market analysis helps economists move out of their imaginary world and come down to the reality. In the real world, we cannot help but realize that transaction costs are everywhere. Without transaction cost as the tool of marketing, it is no wonder that economic analysis in the past was out of touch with real world economic activities. Ever since the introduction of transaction costs, economists have made considerable progress in understanding real world economic institutions, particularly in the field of marketing.

Objectives

At the end of this subtopic the students are able to:

- Define transaction costs;
- Classify transaction costs;
- Identify factors affecting transaction costs; and
- Understand the importance of introducing transaction cost economics in economics.

3.3.1 Transaction Costs Defined

In economics, a transaction cost is a cost incurred in making an economic exchange. For example, coffee farmers in developing countries pay commission for brokers, when buying or selling a coffee; that commission is a transaction cost of marketing coffee. Another example can be buying an orange from a shop. To buy an orange, your costs will be not only the price of the orange itself, but also the energy and effort it requires to find out which of the various orange products you prefer, where to get them and at what price, the cost of travelling from your house to the shop and back, the time waiting in line, and the effort of paying itself; the costs above and beyond the cost of the orange are the transaction costs.

Transaction costs can be defined as the costs other than the money price that are incurred in trading goods or services. Before a particular mutually beneficial trade can take place, at least

one party must discover that there may be someone with whom such a trade is potentially possible, find out one or more such possible trade partners, inform him/them of the opportunity, and negotiate the terms of the exchange. All of these activities involve opportunity costs in terms of time, energy and money. If the terms of the trade are to be more complicated than simple (for example, if the agreement involves such complications as payment in installments, prepayment for future delivery, guarantees for quality, provision for future maintenance and service, options for additional future purchases at a guaranteed price, etc.), negotiations for such a detailed contract may itself be prolonged and very costly in terms of time, travel expenses, lawyers' fees, etc. After a trade has been agreed upon, there may also be significant costs involved in monitoring or policing the other party to make sure he is honoring the terms of the agreement (and, if he is not, to take appropriate legal or other actions to make him do so). These are all transaction costs.

3.3.2 Types of Transaction Costs

Transaction costs are mainly categorized into three. The first is *search and information* costs which are costs incurred in determining that the required good is available on the market, who has the lowest price, etc. The second is *negotiation costs* which are the costs required to come to an acceptable terms with the other party to the transaction, drawing up an appropriate contract and so on. The third is *monitoring costs* which are the costs of making sure the other party sticks to the terms of the contract, and taking appropriate action (often through the legal system) if this turns out not to be the case.

Abdellatif and Nugent (1996) categorize transaction costs into five: (i) the costs of obtaining information about market conditions, (ii) the costs of information (regulations, exchange rate, restrictions, and tariff), (iii) the costs of each potential party of identifying appropriate trading partners, (iv) the costs of negotiating, writing, and enforcing contracts and resolving disputes between parties and (v) the costs of financing the transaction. These transaction costs change substantially over time with changes in the identities of the trading partners, environmental conditions and character of the respective markets.

Task 3.3.1: Can you think of information, negotiation and monitoring costs when a consumer buys a sack of flour from a village market? Explain.

3.3.3 Determinants of Transaction Costs

The determinants of transaction costs in the specific institutional environment are associated with: behavioral characteristics of the agents which include bounded rationality and opportunism, and with economic dimensions of individual transactions which include frequency, uncertainty, assets specificity and appropriability. We will discuss them as follows.

Bounded rationality: Individual agrarian agents do not possess full information about the economic system (price ranges, demands, trade opportunities, trends of development) since collection and processing of such information would be either very expensive or impossible (e.g. for future events, for partners intention for cheating). In order to optimize decision-making they have to spent costs for “increasing their imperfect rationality” (for data collection, analysis, forecasting, training etc.).

Opportunism: Second factor is that economic agents are given to opportunism. Accordingly, if there is an opportunity for some of transacting sides to get non-punishably an extra rent

from exchange he (or she) will likely do so. It is very costly or impossible to distinguish opportunistic from non-opportunistic behavior (because of bounded rationality). Therefore, agrarian agents have to protect their transactions from hazard of opportunism through: *ex ante* efforts to find a reliable counterpart and to design an efficient mode for partners credible commitments; and *ex post* investments for overcoming (through monitoring, controlling, stimulating cooperation) of possible opportunism during contract execution stage.

Frequency: In addition to behavioral characteristics, transaction costs depend also on “critical dimensions” of each transaction. When recurrence of transactions between same partners is high, both sides are interested in working out a special form for standardization of their ongoing relationships (e.g. building an incentive structure, adjustment mechanisms, conflict resolution devices, etc). Continuation of relationships with a particular partner and designing a special mode for transacting has a high economic value. Parties restrain for opportunism which detection is “punished” by turning to a competitor (losing future business). Besides, costs for development of a special mode could be effectively recovered for repeated transactions. When a transaction is incidental then possibility for opportunism is great since cheating side cannot be easily punished (building a reputation is not of value). Transaction costs become very high (and may block transacting) when low frequency coincides with high uncertainty and requirement for large relation-specific investments.

Uncertainty: When uncertainty which surrounds transactions increases then costs for overcoming this uncertainty go up (bounded rationality is crucial and opportunism can emerged). That is why agrarian agents will seek, develop, and use such modes of organization which diminish transaction uncertainty - internal integration, cooperation, rational (relational) contract etc.

There are strong mutual incentives to develop a special form for repeated transacting when high uncertainty is combined with significant relation specific investments. When transacting between same counterparts is rare, and it is not supported by specific assets, and appropriability is high, then faceless (autonomous) market exchange is the most efficient mode. Depending on the levels of uncertainty and their risk aversion the agrarian agents will take different entrepreneurial risk and will get normal, low or extra than average rate of return from transactions.

Asset specificity: Transaction costs are very high when some of the parties is to make specific for the transaction with a particular partner investments. In this case it is impossible to change a partner of transaction (alternative use of assets) without a big loss in value of specific capital.

Specific investments are “locked” in relationships with the particular partner (personality of partner matters) and they cannot be returned back by “faceless” market transactions. Costless redeployment (alternative use) of specific assets is not possible if transactions fail to occur, they are prematurely terminated, or less favorable conditions of exchange are renegotiated (in contract renewal time and before the end of life-span of the specific capital). Therefore, if a transaction requires significant specific investments agrarian agents will have to design a special mode to safeguard their investments from expropriation (possible opportunism) – tiedup contracts, quasi or complete integration etc.

If symmetrical assets dependency (regime of bilateral trade) exists there are strong incentives in both parties to elaborate a special private mode of governance. However, when a unilateral dependency of investments exists then dependent side (facing a mini or total monopoly) has

to protect investments against possible opportunism (behavioural uncertainty) either through integrating transactions (unified organization, joint ownership, cooperative); or safeguarding them with some form of interlinked contract, exchange of economic hostages, development of an collective organization to outstand asymmetrical dependency (such as association for price negotiation, lobbying for Government regulations, etc).

Serious transacting problems arise when condition of assets specificity is combined with high uncertainty and low frequency of transactions. In this case elaboration of a special governing structure for private transacting is not justified since set up costs cannot be recovered by occasional transactions. Specific investments are not made and transactions fail to occur. Third party involvement (e.g. local authority, Government agency, non-governmental or hybrid organization) in individual transacting (through assistance, arbitration, regulation) is crucial for smooth organization of that type transaction. Special mode for trilateral transacting such as neoclassical contract has been invented to manage transactions with high uncertainty and asset specificity, and low frequency.

Appropriability: Transacting is particularly difficult when appropriability of product or services is low. In this case, possibility for unwanted (unequal) market or private exchange is great. For transactions with low appropriability the costs and benefits are independent for individual participants. Because of bounded rationality the transaction costs for protection, detection, verification, and a third-party (e.g. court) punishment of unwanted exchange (non paying consumers-opportunists) are extremely high.

3.3.4 Transaction Cost Economics

Let us start this subsection by posing the following questions: Why do firms exist? Why is it sometimes beneficial to, say, produce a part needed in the production process yourself, and why is it better to contract with an outside firm at other times? Where are the boundaries between what will be performed internally and what will be performed externally? How should firms be organized? Transaction Cost Economics (TCE) is a central theory in the field of economics which addresses questions about why firms exist in the first place (i.e., to minimize transaction costs), how firms define their boundaries, and how they ought to govern operations.

In TCE, the starting point is the individual transaction (the synergy between the buyer and the seller). The question then becomes: Why are some transactions performed within firms rather than in the market, as the neoclassical view prescribes. The answer, not surprisingly, is because markets break down.

As a consequence of human cognitive limitations, coupled with the costs associated with transacting, the basic assumptions associated with efficient markets (e.g., anonymous actors, atomistic actors, rational actors, perfect information, homogeneous goods, the absence of liquidity constraints) fail to hold. For these reasons it is often more advantageous to structure transactions within firms. And this is why firms are not just ubiquitous in our society, but also worthy of study in their own right. This contrasts with the typical view of firms in neoclassical economic theory as, at worst, a market aberration that ought not exist, and at best, a black box production function.

The transaction cost approach to the theory of the firm was pioneered by Ronald Coase. Neoclassical economists view the price mechanism as the key to resource allocation, coordinating resources through exchange transactions in the market. Coase argues that

without taking into account transaction costs it is impossible to understand properly the working of the economic system and have a sound for establishing economic policy.

He further contends that market prices govern the relationships between firms but within a firm decision are made on a basis different from maximizing profit subject market prices. Within the firm decisions are made on through entrepreneurial coordination.

Williamson's contributions to the field of TCE complement, and extend, those of Coase. First, Williamson started with an explicitly behavioral assumption of human behavior (bounded rationality). Second, he recognized that transacting parties sometimes behave opportunistically and take advantage of their counterparties. Finally, he identified features of transactions (e.g., specificity, uncertainty, frequency) that cause markets to fail; and hence, are likely to lead certain transactions to be organized within firms (hierarchies) rather than markets. TCE asserts that the transaction is the basic unit of economic activity, where a transaction "may be said to occur when a good or service is traded across a technologically separable interface" (Williamson, 1993).

Goods and services are obtained by transforming a set of inputs. The latter can enter the manufacturing process in different combinations and proportions, depending on the technologies which have been adopted. A different perspective focuses on how firms ensure the supply of inputs on the one hand and reach the final consumer on the other hand: rather than production functions, firms are regarded here as governance structures. Transaction cost theory concentrates on the relative efficiency of different exchange processes. If for the firm-as-a-production-function view the internalization of one or more stages of production might generate technological economies (that is savings on the costs of physical inputs), for the firm-as-organization view it could lead also to transactional economies (that is savings on the costs of exchange inputs, when reduced amounts of resources are required to get the intermediate inputs).

Task 3.3.2: Compare and contrast neoclassical and transactional cost economics.

Summary

Under this subtopic, we looked at what transaction costs is, its types, factors affecting it and a short explanation about the emergence of transaction cost economics were given. The factors affecting transaction costs are categorized in to two major groups: behavioral characteristics (bounded rationality and opportunism), and economic dimensions of individual transactions (frequency, uncertainty, assets specificity and appropriability). Transaction cost economics suggests that the costs and difficulties associated with market transactions sometimes favor hierarchies (or in-house production) and sometimes markets as an economic governance structure. An intermediate mechanism, called hybrid or relational, between these two extremes has recently emerged as a new governance structure.

Exercises

1. Explain how financial intermediaries help lower transaction costs in the economy.
2. Explain how internet marketing reduces transaction costs.
3. What does Coase mean with the statement, "without taking into account transaction costs it is impossible to understand properly the working of the economic system and have a sound for establishing economic policy".
4. Explain why the boundary of the firm is important in TCE.

5. Discuss the main ideas brought to economics by transaction cost economics.

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SUBTOPIC 3.4 MARKET INTEGRATION MODELS

Introduction

As noted in subtopics 1 and 2, the analysis of spatial or intertemporal market integration have attracted much attention recently and equally several analytical models have been suggested for estimation. This subtopic presents the main econometric models used for price transmission analysis over the years. It chronologically begins from the simple linear correlation and regression models, through cointegration-and error correction-based to recent regime-switching models. Details on the various models may be found in the market integration and price transmission literature.

Objectives

After completing this subtopic the students are able to:

- Identify the different market integration models;
- State the pros and cons of the different market integration models; and
- Apply these models to the analysis of agricultural markets integration.

3.4.1 Static Correlation and Regression Models

Traditionally, price transmission and market integration analysis used standard static models such as bivariate correlation and regression models, to test for the law of one price (LOP). Bivariate correlation models (BCM) measure the extent of market integration by examining the co-movement of price series at fixed transaction costs. For instance, if P_t^i and P_t^j are two

contemporaneous price series in markets i and j connected by trade for a homogenous commodity, the correlation coefficient, r , is given by:

$$r = \frac{\sum_{t=1}^T (P_t^i - \bar{P}_i)(P_t^j - \bar{P}_j)}{\sqrt{\sum_{t=1}^T (P_t^i - \bar{P}_i)^2 \sum_{t=1}^T (P_t^j - \bar{P}_j)^2}} \quad (1)$$

Where \bar{P}^i and \bar{P}^j are the mean values of P_t^i and P_t^j respectively.

The correlation coefficient (r) ranges between -1 and +1. By this approach significantly positive r indicates well integrated markets.

The bivariate regression models (BRM) of price transmission and market integration are commonly specified as:

$$P_t^i = \beta_0 + \beta_1 P_t^j + \mu_t \quad (2)$$

Where P_t^i and P_t^j may be in their first-difference or logarithmic form and T_t is transaction costs. The β_i s are the parameters to be estimated and showing the markets are integrated or not and μ_t is the error term which is assumed to be independently and identically distributed with mean zero and constant variance. Even though the static models are easy to estimate using only price data, their assumption of stationary price behavior and fixed transactions costs make them underestimate the extent of market integration (Barrett, 1996; Baulch 1997).

3.4.2 Dynamic Models

Dynamic market integration models recognize and specify lead/lag relationships in price transmission to account for the dynamic nature of prices and transaction costs. Unlike the static models that merely investigate whether markets are integrated or segmented, the dynamic models check in addition the extent of integration by estimating speeds of price adjustment. The three widely used dynamic models in market integration analysis are presented below.

3.4.2.1 Granger causality tests

Granger (1969) causality test provides evidence of whether price transmission is occurring between two markets, and in which direction. P_t^i is said to granger-causes P_t^j if both current and lagged values of P_t^i improves the accuracy of forecasting P_t^j (Judge et al., 1988). Typical Granger causality models are specified as in (3).

$$P_t^i = \sum_{k=0}^n \alpha_k P_{t-k}^i + \sum_{k=1}^n \beta_k P_{t-k}^j + \mu_{1t} \quad (3)$$

$$P_t^j = \sum_{k=0}^n \phi_k P_{t-k}^j + \sum_{k=1}^n \gamma_k P_{t-k}^i + \mu_{2t} \quad (4)$$

From equations (3) and (4), Granger causality can be tested by testing for the statistical significant of the coefficient parameters, β_k and ϕ_k . For instance, P_t^i Granger causes P_t^j if

$\sum_{k=1}^n \phi_k$ (k is lag length) in equation (3) is significantly different from zero, while $\sum_{k=1}^n \beta_k$ of (4)

is not. The P_t^j Granger causes P_t^i if the opposite scenario holds. These are termed uni-directional causality. If both β_k and ϕ_k tests are significantly different from zero, then a form of feedback relation exists between the two prices and there exists bilateral causality between the prices.

Note that the statement “ P_t^i Granger causes P_t^j ” does not necessarily imply that P_t^j should be seen as the effect or results of P_t^i , since the Granger test measures only precedence and information content on P_t^j , and does not indicate causality. Granger test only reveals whether the P_t^i helps us better in the prediction of P_t^j .

While this model has some advantage over correlation coefficients and bivariate regression as they allow for lagged or leading effects in price inter-relationships, results can still be spurious since they did not take into account seasonality and other implications of non-stationarity.

3.4.2.2 Ravallion's model of market integration

In the market integration literature, Ravallion's model became the standard tool as it provided more comprehensive assessment of markets inter-relationships and resolved many of the shortfalls of the previous approaches. Especially, it allowed for short and long-run dynamics, autocorrelation and spurious correlation. His model specifies a radial framework of numerous rural markets linked to a central market, and his test for market integration determines whether the price of a commodity in a given rural market is affected by its price in a central market. He assumed that while there may be some trade among rural markets, it is the trade with the central market that dominates local price formation; hence price shocks originate from the central market.

If we define the price of the central market by P_t^i and others by P_t^j where in this case P_t^j is the price of the j^{th} local market at time t with ($j = 1, 2, \dots, N$), then Ravallion's model can be represented as:

$$P_t^i = \sum_{k=1}^n a_{ik} P_{t-k}^i + \sum_{j=1}^N \sum_{k=1}^n b_{ik} P_{t-k}^j + c_i X_t^i + \mu_{it} \quad (5)$$

Where a_{ij} , b_{ij} and c_i are the parameter estimates, and k ($k = 1, 2 \dots n$) is the lag lengths.

3.4.2.2 Timmer model

Timmer (1987) assumed that the central market price is predetermined relative to the local market prices and made two modifications to the Ravallion model by using the logarithm of the prices and a single lag rather than the six lags used by Ravallion.

Timmer's model is specified as:

$$P_t^i = c_0 (P_t^1 - P_{t-1}^1) + (c_0 + c_{1i}) P_{t-1}^1 + c_{11} P_{t-1}^i + \eta X_t^i + \mu_{it} \quad (6)$$

where assuming that $\eta = 0$, then $c_0 + c_{1i}$ and c_{11} are the contributions of the central and local market price history respectively to current prices.

3.4.3 Co-integration Models

The cointegration of a pair of markets means that the dynamics of the price relationships in the markets converge in the long run towards the LOP. If two price series P_t^i and P_t^j , in two spatially separated markets contain stochastic trends and are integrated of the same order, say $I(d)$, the markets are said to be cointegrated if there is a linear relationship $P_t^i + \beta P_t^j \sim I(0)$, between the price series. The two commonly employed approaches to cointegration analysis are Engel and Granger (1987) used for bivariate analyses and the Johansen (1990) variance autoregressive (VAR) approach used in multivariate analyses. The first step in employing any of the two approaches is testing unit roots in the price series individually under a null hypothesis of unit roots using the Dickey-Fuller (DF), augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and/or a host of other procedures.

3.4.4 Switching Regime Regression Models (SRM)

Usually, prices are related nonlinearly, contrary to the assumption in much of the premier price transmission literature that linear price relationships exist. The realization that price relationships may be nonlinear due to transactions costs motivated the introduction of a class of models collectively called switching regime models (SRM). Four classes of SRM are widely used in the literature for price transmission analysis—the error correction models (ECM), threshold autoregressive (TAR) models; parity bound models (PBM) and Markov-switching models (MSM).

3.4.4.1 The Error Correction models (ECM)

The ECM is an extension of the cointegration model. If P_t^i and P_t^j are cointegrated, then the equilibrium relationship between them can be specified as: $P_t^c - \beta_1 P_t^s - \beta_0 = \mu_t$. And if μ_t , the error term, is assumed to follow an autoregressive (AR) process, then $\mu_t = \delta \mu_{t-1} + v_t$.

This means the equilibrium relationship between P_t^i and P_t^j can be expressed as:

$$P_t^c - \beta_1 P_t^s - \beta_0 = \delta \mu_{t-1} + v_t \quad (6)$$

The above equation implies that the long run relationship (cointegration) between P_t^i and P_t^j is a function of the autoregressive process μ_{t-1} , where μ_{t-1} is the deviation from long run equilibrium, and called the error correction term (ECT), while δ measures the response P_t^i and P_t^j to deviation from equilibrium. The stand ECM has been extended to asymmetric error correction (EC), vector EC and switching vector EC models.

3.4.4.2 Threshold Autoregressive (TAR) models

The TAR models explicitly recognize the influences of transactions costs faced by traders on spatial market integration and account for them without necessarily using actual transactions costs data. The idea is that, inter-market price differentials must exceed thresholds bands arising from transactions costs, before provoking existing market equilibrium and causing price adjustment to ensure market integration.

Typically, a vector autoregressive (VAR) specification of the threshold model is stated as:

$$\Delta P_t = \begin{cases} \sum_{i=1}^k \alpha^{(1)} \Delta P_{t-i} + \theta^{(1)} \mu_{t-1} & \text{if } |\mu_{t-1}| \leq c \\ \alpha^{(2)} \Delta P_{t-i} + \theta^{(2)} \mu_{t-1} & \text{if } |\mu_{t-1}| > c \end{cases} \quad (7)$$

Where P_t is the vector of prices being analyzed, c denotes the value of the threshold giving rise to the alternative regimes and μ_{t-1} is the variable used to capture threshold behaviour.

3.4.4.3 Parity Bound Models (PBM)

The PBM explicitly consider transaction costs and trade flow data, in addition to price series, in analyzing market integration; and unlike the conventional dynamic approaches, which strictly accept price transmission or reject a null hypothesis at a given significance level, PBM have the advantage of allowing for a continuum of inter-market price relationships within the range of perfect market integration and complete market segmentation.

Baulch (1997) introduced the PBM to price transmission and market integration analysis, while Barrette and Li (2002) made significant extension to it. The original PBM model is a maximum likelihood function specified as:

$$L = \prod_{t=1}^T [\gamma_1 f_t^1 + \gamma_2 f_t^2 + (1 - \gamma_1 - \gamma_2) f_t^3] \quad (8)$$

Where γ_1 and γ_2 are the estimable probabilities of the market being in regimes 1 and 2 respectively, $1 - \gamma_1 - \gamma_2$ is the probability of the market being in regime 3.

3.4.4.4 Markov Switching Models (MSM)

The standard Markov-switching model is formulated based on the price transmission that if y_t is a time series variable with a finite set of M regimes such that each t y is associated with an unobservable regime dummy variable s_t ; i.e. $s_t \in \{1, 2, \dots, M\}$ ($1, \dots, M$) and $s_t = 0$ or 1 , then a Markov-switching specification of the autoregressive process for y_t in a two-regime case is:

$$\begin{aligned} y_t &= \delta_1 y_{t-1} + v_{1t} & \text{If system is in regime 1} \\ y_t &= \delta_2 y_{t-1} + v_{2t} & \text{If system is in regime 2} \end{aligned} \quad (9)$$

where δ_1 is the autoregressive parameter of the series when the current regime is 1, and δ_2 is the parameter when the current regime is 2.

Summary

Price transmission occurs between markets, between stages of a market chain, and between commodities, but not always. Correlation coefficient is easy to calculate and interpret but gives limited information. Regression analysis gives estimate of market integration, can take into account lagged effects, but is misleading if prices are non-stationary. If prices are non-stationary, we need to at minimum, regress first-differences. Preferably, carry out co-integration analysis using Engel Granger method or Johansen method. Non-linearity of the transaction costs led to switching regression models.

Exercises

1. Explain the major weaknesses of the correlation and regression methods in the analysis of market integration.

2. What are the major reasons for developing switching regression models in the analysis of market integration?

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SUBTOPIC 3.5 SPATIAL EQUILIBRIUM MODELS

Introduction

Spatial equilibrium models can be defined as the models solving the simultaneous equilibria of plural regional markets under the assumption of existence of transportation costs between two regions. This complicated proposition can be arranged into a simpler style applying the theorem that the solution of the competitive equilibrium is equal to the one of the maximization of social surplus (i.e. the total amount of producer surplus and consumer surplus) under the perfectly competitive market condition. Samuelson (1952) indicated that a unique equilibrium solution could be found by the maximization of total area under the excess demand curve in each region minus the total transportation costs of all the shipment. The implication of his indication can be regarded as follows.

Objectives

After completing this subtopic the students are able to:

- Identify the different spatial equilibrium models;
- State the pros and cons of the different spatial equilibrium models; and
- Apply these models to the analysis of agricultural markets.

3.5.1 Perfect Competition Model

The classical specification of the Law of One Price can be thought of as an existence of long-run competitive market equilibrium. Thus, if markets are efficient, in the sense of competitive equilibrium where expected marginal profit to arbitrage is zero, we should expect prices to equilibrate across space after all transfer costs are accounted for. Following spatial

equilibrium theory, three consistent conditions ensue, based on trade flow restrictions and arbitrage conditions. Spatial competitive equilibrium implies that:

$$E(P_{1t}) \leq P_{2t} + \tau_{12t} \quad (1)$$

Thus, if we take P_{2t} and τ_{12t} as given, then P_{1t} is expected to be at least equal to P_{2t} since in this setting, market 1 is importing from 2. E is the expectations operator, P_{1t} is the price in market 1 in time t , and τ_{12t} is the transfer cost from 2 to 1 in time t . By spatial competitive equilibrium condition in (1), two market conditions follow;

$$E(P_{1t}) = P_{2t} + \tau_{12t} \quad (2)$$

$$E(P_{1t}) < P_{2t} + \tau_{12t} \quad (3)$$

In (2) where equality holds, the product is tradable between markets and the welfare gains from competitive equilibrium emerge whether or not trade flows actually occur. Baulch (1997) refers to this condition in spatial market integration as the competitive equilibrium condition under tradability or perfect integration by Barrett and Li (2002).

From (3) the negative expected profit to arbitrage means no attractive opportunities for marketing intermediaries to trade and exploit. This is consistent with spatial competitive equilibrium with non-trading activities (segmented competitive equilibrium), since in such cases there might be so high transfer costs that arbitrage is unprofitable in expectation (Samuelson, 1952) for rational arbitrageurs to conduct trade. In this case however, the LOP in its strict form does not hold. Thus, if trade occurs and is unrestricted, the marginal trader earns zero profits and (2) prevails. Under this situation, prices in the two markets co-move perfectly.

3.5.2 Spatial Monopoly Model

Most of spatial equilibrium models assume perfect competition. Thus, they do not take into account the non-competitive effects that may arise because of the existence of monopolies on markets. The existence of monopolistic behavior on markets may influence market equilibrium and qualifies the existing models results. However, there exist few spatial monopolistic market models.

A first attempt has been developed by Takayama and Judge (1971) who considered a spatial monopoly market model and analyze how market equilibrium was modified compared to the perfectly competitive spatial model. In their setting, they assumed that the same firm operates in all the regions. When resale among regions is not possible, then the monopolist discriminates price among regions. They showed that when there is trade from region i to region j then the marginal revenue of the firm in market j is exactly equal to the marginal cost of the firm in region i plus the transportation cost from i to j . Note that in the perfect competition framework, the equality is between the price in market j and the marginal cost of the firm in region i plus the transportation cost from i to j . Obviously, in the monopoly case, prices are higher and productions are lower than in the perfect competition case.

Takayama and Judge also explored monopoly pricing rule when resale among regions is possible (that is assuming that arbitrage is possible). This imposes additional constraint for the monopoly, namely prices among regions cannot differ more than the transportation cost between the considered regions.

3.5.3 Spatial Nash Non-cooperative Equilibrium Model

Hashimoto (1984) has extended the model proposed by Takayama and Judge and developed a spatial Nash non-cooperative equilibrium model. He considered that there is one firm per region which competes à la Cournot with the other firms. A comparison of the Nash equilibrium model with the perfect competitive and the monopoly models shows that the differentials in interregional prices in the Nash equilibrium are greater than in the perfect equilibrium framework and lower than in the monopoly case. Hashimoto also showed that market equilibriums (demand, supply, prices) are modified and that the trade flows may differ from one framework to the other. In the non competitive setting, trade between regions depends not only on transportation costs but also on additional margins that are proportional to the level of imports.

3.5.4 Spatial Oligopoly Equilibrium Model

Nelson and McCarl (1984) proposed a modified version of the spatial equilibrium model to analyze an oligopoly model. They discussed how to integrate different market structures (Cournot, Stackelberg and conjectural variations). The methodology consists in modifying the perfect equilibrium framework by adding a condition of maximization of firms' profits that take into account the strategic interactions between firms. However, they assumed that all firms (one firm in each region) have identical costs and that transportation costs are zero. This considerably reduces the empirical attractiveness of their model. More recently, Yang *et al.* (2002) have extended the symmetric spatial Cournot competition model developed in the literature to heterogeneous demand and cost functions. In particular, they defined necessary conditions for the uniqueness of solution. They applied it to the US coal market.

However, the implementation of imperfect competitive framework in applied models is still not well studied. In the food sector, Kawaguchi *et al.* (1997) have applied an imperfectly competitive spatial equilibrium model to the dairy industry in Japan using the general methodology developed by Nelson and McCarl (1984) and Hashimoto (1984). They took into account the specificities of the Japan milk market organization. In particular, they distinguished the fluid milk market from manufacturing milk market. Market power on the fluid milk market is analyzed while quota and guaranteed price prevails on the manufacturing milk market. Moreover, they integrated the pooled price policy used in this country. They found that the Cournot-Nash equilibrium solutions were more similar to actual observations compared to the monopoly case or to the perfectly competitive framework.

It should be stressed that under a perfect competition framework, trade between regions is always one-way trade. On the contrary, with an imperfect competition framework (and homogenous products), two-way trade occurs in numerous cases. This framework is thus one of the possible explanations of two-way trade frequently observed. Note that another important explanation is related to product differentiation. Numerous empirical models are built upon the seminal work of Armington (1969).

As shown by Brander and Krugman (1983), from a theoretical point of view, different situations may occur from no trade to bilateral trade given the market structure, the production and trade costs, and the pattern of demand in each country as well as policy instruments.

Summary

Most models used to analyze the economic impact of agricultural policies consider that agricultural markets work in a perfectly competitive framework. Thus, they do not take into account the non competitive effects that may arise because of the existence of oligopolies on markets. The existence of oligopolistic behaviour on markets may influence market equilibrium and qualifies the existing models results. Spatial equilibrium models vary from perfect competition to monopolistic competition with oligopolistic competition lying in between the two.

Exercises

1. What is the LOP? What are the limitations in its applicability?
2. What makes spatial equilibrium models different from market equilibrium models discussed in Topic 2.
3. Compare and contrast the different spatial equilibrium models.

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TOPIC 4 HORIZONTAL AND VERTICAL INTEGRATION OF AGRICULTURAL INDUSTRIES

Introduction

Smallholder farmers in developing countries usually complain about the monopsony power of buyers. They complain that they do not have power to set prices for their products. The likely reasons for this is that they do not have easy access to markets due to lack of information on prices and technology, weak connection with market actors, absence of input and output markets, credit constraints and high transaction costs. Due to these reasons farmers usually receive lower prices for their products. What should farmers do to overcome these problems? This requires close linkages between farmers, processors, traders and retailers to coordinate supply and demand and to access such services as market information, input supplies and transport services. From the farmers perspective there are two types of linkages or integration that helps them. They are horizontal integration among farmers and vertical integration among farmers and other market actors (traders, processors, agri-food companies, retailers, etc).

In addition to these, the commercialization and globalization of agriculture also brought opportunities for rural households in developing countries the possibilities to supply higher-value products such as meat, milk and its products, fruits and vegetables in markets of the growing urban centers in their countries or to international markets. Moreover, the increasing demand for particular product features, such as quality, food safety and concern over production standards and certification mechanisms are challenges to be confronted. To get access to these high-end markets, rural smallholder farmers need to gain the capacity to produce at such standards and the market institutions that guarantee the acceptability of their products. The incapability to do so due to market failures, mis-configuration of supply chains and the associated developments in product and process standards adversely affect rural smallholders, and exclude them from accessing markets in which the demand for their products is rapidly increasing. In this situation, contract farming has remains a potentially effective market-oriented institution to bridge the gap between the rural smallholder producer's resources, assets, and capacities on the one hand, and the increasingly stringent demands of the consumers on the other. In this Topic we will look closely market organization forms unique to agriculture (Horizontal and vertical integration), their advantages and disadvantages, backward integration by monopsonist, the importance of vertical integration for product differentiation and the policy implications of mergers.

Objectives

By the end of this topic, the students will be able to:

- Define horizontal and vertical integration;
- Identify the determinants of horizontal and vertical integration;
- State the advantages and disadvantages of horizontal and vertical integration;
- State the economic effects of horizontal and vertical integration;
- Recognize the importance of horizontal and vertical integration for small-scale farmers in developing countries;
- State the policy implications of horizontal and vertical integration.

SUBTOPIC 4.1 HORIZONTAL AND VERTICAL INTEGRATION

Introduction

In today's globalized world filled in by many changes, the agriculture sector in the developing countries needs to make some structural changes. The structural changes include technological change, globalization of markets, rapid expansion of farm land in some developing countries, increased sensitivity to environmental and food safety concerns, more particular and specialized consumer demands, foreign currency fluctuations and the emergence of cumbersome new barriers to access key foreign markets. In response to these forces, firms in the agriculture sector should improve their ability to control production costs, satisfy market demand and generate additional income by expanding their operations in a variety of ways. Such expansion may include horizontal integration among farmers or vertical integration with other market actors.

There are essentially two kinds of structural change occurring in the agricultural industries: horizontal and vertical integration. High levels of horizontal integration of the firms participating in a market are generally referred to as concentration or economic concentration. Horizontal integration is the result of the merger or combination of two or more firms in the same industry and which are engaged in the same stage of the production stage. Vertical integration occurs when one firm acquires or allies with another firm in the same industry but at another stage of the production stage. This type of integration is now rather pervasive in the agricultural sector of many developing countries, and often it spans the full marketing chain through a combination of production contracting or strategic alliances as well as outright purchase. This, however, may cause a general trend toward fewer and larger firms across most of the businesses in the sector. The process of growth and merger of firms is usually called consolidation which is generally agreed to bring at some point about changes in the economic structure and functioning of markets in the sector. Extensive consolidation results in what is called concentration, the level beyond which the actions of one or more of the few firms can significantly possess market power and affect prices for goods.

Objectives

After completing this subtopic, the students are able to:

- Define horizontal and vertical integration;
- Identify the determinants of horizontal and vertical integration;
- State the advantages and disadvantages of horizontal and vertical integration.

4.1.1 Horizontal Integration

Horizontal integration is the acquisition of additional business activities that are at the same level of the value chain in similar or different industries. This can be achieved by internal or external expansion. Because the different firms are involved in the same stage of production, horizontal integration allows them to share resources at that level. If the products offered by the companies are the same or similar, it is a merger of competitors. If all of the producers of a particular good or service in a given market were to merge, it would result in the creation of a monopoly. Also called lateral integration. A farmer cooperative is a typical example of horizontal integration, which can help smallholder farmers to participate in the market on behalf of the farmers' interests and put them in equal position. Horizontal integration enable farmers to reduce their transaction costs of accessing inputs and outputs, obtain the necessary

market information, access new technologies, enter the high value markets allowing them to compete with larger farmers and agribusinesses, and improve their bargaining power with buyers and intermediaries. Farmer cooperative will be discussed in detail in Topic 5. An example of this type of integration can be where both firms engaged in seed production and production of crops merge. This form of integration occurs at all levels of the agriculture sector and would also include integration of farmland ownership at the local level.

4.1.1.1 Why do firms integrate horizontally?

Profits and profitability increase when firms integrate horizontally because it:

1. Lowers the cost structure as it creates increasing economies of scale and reduces the duplication of resources between two companies.
2. Increases product differentiation through product bundling (broader range at single combined price), total solution (saving customers time and money) and cross-selling (leveraging established customer relationships).
3. Replicates the business model in new market segments within same industry.
4. Reduces industry rivalry by eliminating excess capacity in an industry and easily implement tacit price coordination among rivals
5. Increases bargaining power through increased market power over suppliers and buyers and gaining greater control over commodities.

4.1.1.2 Problems with horizontal integration

Studies suggest that the majority of vertical integration through mergers and acquisitions do not create value and that many may actually destroy value. Implementing a horizontal integration is not an easy task. This is due to problems associated with merging very different company cultures, high management turnover in the acquired company when the acquisition is a hostile one, tendency of managers to overestimate the benefits to be in the merger and tendency of managers to underestimate the problems involved in merging their operations. The merger may be blocked if merger is perceived to create a dominant competitor, create too much industry consolidation and have the potential for future abuse of market power.

Task 4.1: Give an example of your own which is a horizontal integration. Also explain the advantages and disadvantages of it.

4.1.2 Vertical Integration

Vertical integration refers to the synchronization of successive stages of production and marketing with respect to quantity quality and timing of product flows. In other words, it is the expansion of operations backward into an industry that produces inputs for the farmer or forwards into an industry that process and distributes the farmer's products. Vertical integration is where the supply chain of a company is owned by that company. To guarantee consistent and quality supplies traders and processors engage in vertical coordination with farmers to overcome farmers' constraints by involving the provision of seed and fertilizer on credit, technical assistance and a guaranteed price at harvest. Contract farming is an important form of vertical integration which is an institutional solution to the problems of market failure in the market of credit, insurance and information and the arrangement commonly used to guarantee product quality and food safety standards. Contract farming is

also considered as an instrument that links farmers to domestic as well as foreign markets thereby reducing poverty.

Task 4.2: Can you think of some of the drawbacks of vertical integration of traders with farmers from farmers' point of view?

4.1.2.1 Types of vertical integration

A company may expand its operations backward into industries that produce inputs to its products or forward into industries that utilize, distribute or sell its products.

1. Backward vertical integration: Company expands its operations into an industry that produces inputs to the company's products.

2. Forward vertical integration: Company expands into an industry that uses, distributes, or sells the company's products.

3. Full integration: Company produces all of a particular input from its own operations and disposes of all of its completed products through its own outlets.

4. Taper integration: In addition to company-owned suppliers, the company can also use other suppliers for inputs or independent outlets in addition to company-owned outlets.

4.1.2.2 Why do firms vertically integrate?

A number of factors can motivate a firm to enter into a vertical integration. This includes: reduction of transaction costs, increase monopoly profits, double markup, supply assurance, correct market failure and avoid government regulation. We will discuss them one by one.

1. Lower transaction costs: If a firm requires specialized assets in its production process, it may have an incentive to integrate with an upstream supplier of these assets. Uncertainty about input quality may give a firm an incentive to integrate the production of that input. For relationships involving moral hazard, it may benefit a company to integrate vertically. Coordination issues may also encourage integration.

2. Increase monopoly profits: Let us consider an example to show how vertical integration leads to increased market power.

Assume a fixed-proportions production function, i.e., $Q = M = L$. Let us also assume that the upstream industry (intermediate good) is a monopoly and the downstream (final good) sector is competitive. Demand for the final good is $P = P(Q)$.

With no integration the derived demand for intermediate good is $m(Q) = P(Q) - w$. Since $M=Q$, the derived demand can also be written as $m(M) = P(M) - w$. The monopolist maximizes:

$$[P(M) - w]M - cM$$

With vertical integration, the integrated firm maximizes:

$$P(Q)Q - wQ - cQ$$

These two maximization problems are equivalent.

If L and M are substitutable in the production function, then whenever the upstream monopoly raises price, the downstream industry will substitute L for M . The resulting input combination is inefficient because the MRTS (which is equated to m/w) is different from the factor cost ratio (c/w).

If the upstream firm integrates forward so that it controls the downstream industry, it can use inputs (L and M) in the most efficient combination and its profits will increase.

3. Double markup: Suppose both the upstream and the downstream firms are monopolies in their respective sector. When the upstream firm sells the intermediate good to the final good producer, he adds a markup above marginal cost. When the final good producer chooses his price, he in turn marks up the cost (which is the price of the intermediate good) by some percentage to reap profits. Two layers of markup are added in this chain of monopolies and the result will be too little output.

Example 4.1: Let production cost for the upstream firm = 3; distribution cost for downstream firm = 1; demand for final product is $P = 10 - Q$.

For an integrated monopoly, maximize:
 $Q(10 - Q) - 3Q - 1Q$

The solution to this problem gives
 $Q = 3$; $P = 7$; profits = 9.

If the two firms are not integrated, we can solve the problem backwards. First, let the upstream firm sell the intermediate good to the downstream firm at a price of m . The final good producer will take m as given and choose Q to maximize:
 $Q(10 - Q) - mQ - 1Q$

The solution to this problem gives:
 $Q = (9 - m)/2$; $P = (11 + m)/2$

Note that $Q = (9 - m)/2$ is the derived demand for the upstream firm's product. The upstream monopoly therefore choose m to maximize:
 $[m - 3][(9 - m)/2]$

The solution is
 $m = 6$; $Q = 1.5$; profits = 4.5
 We can now go back and calculate for the downstream firm:
 $P = 8.5$; profits = 2.25

Note that the combined profits are higher with vertical integration. Note also that price is lower (i.e., consumers are better off). An alternative to vertical integration is for the upstream firm to engage in price discrimination.

4. Supply assurance: Timely delivery of an item is of concern to business people, yet standard models of market behavior ignore this topic. Assurance of supply is important in markets where price is not the sole device used to allocate goods. When rationing is a possibility, there is an incentive to vertically integrate in order to raise the probability of obtaining the product. A firm has an incentive to produce its own supplies to meet its

predictable level of demand and rely on other firms for supplies to meet its less stable demand.

5. Correct market failure: Consider an industry where maintain a positive reputation for a product is of importance to the manufacturer. The positive externality associated with selling a high quality product may cause retailers to under produce quality. By integrating retail sales, the manufacturer can offer a consistent level of quality.

6. Avoid government regulation: Vertically integrated firms can avoid price controls on intermediate goods. If a firm is located in different areas, it can shift profits to the areas with lower tax burdens. If only one division of a firm is regulated, then a vertically integrated firm can effectively avoid the regulation.

4.1.3 Determinants of Horizontal and Vertical Integration and their Consequences

To some extent, firms seek out horizontal or vertical integration in order to reduce uncertainty and generate savings in their input and transaction costs. Economic analyses suggest that the desire to capture economies of scale and economies of scope, and to increase revenue, is a common motivation for such actions. With respect to vertical integration, there are benefits from internalizing (i.e., keeping within the firm or the production chain it controls) the transaction costs between stages in the production cycle, thereby reducing the uncertainty of some cost components in the process. However, research does indicate that for large-sized firms, diseconomies of scale resulting from bureaucratic control problems can overwhelm economies of scale and inhibit growth.

If horizontal integration increases beyond a given level, the remaining firms in the industry will attain what is referred to as market power. A firm is said to have market power if it can significantly affect price through its actions. The exercise of market power can occur when firms meet certain conditions, and this capability to exercise market power is enhanced if in addition to the consolidation there is also vertical integration. Conditions that can result in market power, and the extent to which they are met in the agricultural sector, include:

- 1. Possession of superior information:** This condition is met by agribusiness concerns that purchase inputs under contract, where the prices paid under those contracts are not reflected in open markets.
- 2. Greater participation in a larger number of segments of a market:** This condition occurs in vertically integrated firms, which are commonly found in the pork and poultry sector.
- 3. Control over channels in the marketing system:** This condition is present for firms that control both processing and distribution functions, such as large-scale grain marketing and processing.

Summary

Market integration refers to the expansion of some firms to the point that they begin to occupy larger portions of the market, in terms of either activities or market share. Horizontal integration occurs when some firms grow so large within one trade that they are able to dominate that trade. Vertical integration is the expansion of activities of a firm until it controls its raw materials at one end and its markets at the other. Horizontal integration is aimed at lowering costs by achieving greater economies of scale. It also reduces the intensity

of rivalry in an industry and thereby makes the industry more profitable. Horizontal integration can also provide access to new distribution channels. Despite the potential benefits of vertical integration, their financial results often are very disappointing. This might be due to the cultural differences, the buyer pays more for a target company than that company is worth and the buyer never earns back the premium it paid. Vertical integration is aimed at reducing transaction costs, increasing monopoly profits, double markup, supply assurance, correct market failure and avoidance of government regulation.

Exercises

1. What are the major differences between vertical and horizontal integration? Discuss.
2. Consider you are performing a vertical integration in your firm, either backwards or forwards. Just opt for one. What will be the benefits you envisage for your organization?
3. Suppose the president of your college or university decided to merge with or acquire another school. What schools would be good candidates for this horizontal integration move? Would the move be a success?
4. Note that horizontal integration can be attained through mergers or acquisition. Given that so many mergers and acquisitions fail, why do you think that firms keep making horizontal integration moves?
5. Identify a well-known company that does not use backward or forward vertical integration. Why do you believe that the firm's executives have avoided these strategies?
6. Assume that the production cost for the upstream firm is 5, distribution cost for downstream firm is 3 and the demand for final product is $P = 15 - Q$. What is the combined profit for the two firms? Do they benefit from vertical integration? What other option do the upstream firm has? Explain.

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SUBTOPIC 4.2 COMPETITIVE EFFECTS OF BACKWARD VERTICAL INTEGRATION

Introduction

Why do processors of agricultural products want to vertically integrate with farmers? One reason could be to mitigate the hold-up problem created by suppliers. The second reason is that integration increases efficiency through reduction of costs leading to greater industry output and, hence, lowers final good prices. The other reason is that integration allows it to generate and appropriate a greater level of profits at the expense of consumers. In this

subtopic we will analyze the motives for backward vertical integration, its effect on the industry market structure and welfare of the society.

Objectives

After completing this subtopic the students are able to

- State why firms vertically integrate backward with suppliers;
- Understand the effect of backward vertical integration on the market structure and welfare of the consumers.

4.2.1 Why Do Firms Integrate Backward?

Consider vertical integration. A downstream processor of agricultural products who integrates backwards into upstream supply will do so to increase its own profits. As it controls the means by which inputs get translated into goods for final consumers, the only way it can improve its profits is by lowering its own costs. If cost reduction involves any reduction in marginal costs, that will lower final good prices and enhance consumer surplus even where there is a downstream monopolist. Inefficient vertical integration that either reduces the investment incentives of suppliers or forecloses on them will only be undertaken if it reduces the input costs of the backward integrator. Consequently, it must involve some beneficial reduction in double marginalization or improvement in the bargaining position that overwhelms any other efficiency costs. As such, even if there is an overall reduction in welfare, the backward integrator and its consumers will always benefit.

Studies on the competitive detriments of backwards integration have focused on the case of duopsonists or oligopsonists who compete with each other downstream. In that case, vertical integration can raise a rival's costs and thereby harm downstream competition. In these models, the use of vertical integration is not so much a leverage of buying power but a means of consolidating and leveraging upstream market structure downstream. The basic idea is that by foreclosing on an upstream firm, other nonintegrated downstream firms are left vulnerable to the exercise of upstream market power. As such, these are really theories of how vertical integration harms consumer welfare as a result of monopolistic rather than monopsonistic forces per se.

Task 4.3: What is vertical foreclosure? What are some of the effects of vertical foreclosure on the efficiency of the markets? Explain.

4.2.2 Competitive Effects of Backward Vertical Integration

The effects of vertical integration on consumer and overall welfare are subject of ongoing debates amongst economists, antitrust lawyers, and policy makers. Over the last two decades substantial progress has been made in identifying pro- and anticompetitive effects of vertical integration. Productivity increases due to cost synergies have been advanced as a major source of efficiency gains from vertical integration while the ability of integrating parties to raise their rivals' costs has been recognized as a factor fostering foreclosure. Yet an open theoretical question of substantial practical relevance is how these effects depend on the underlying market structure. In particular, is vertical integration more likely to harm consumers when the industry is otherwise highly competitive, or should antitrust authorities be more vigilant when the integrating firm's competitors exert substantial market power?

Studies on integration modeled the competitive effects of vertical integration as a function of the underlying market structure and the degree of vertical integration, taking into account both productivity gains and incentives to raise rivals' costs. The model assumed the following:

1. There are a number of non-integrated firms and one partly vertically integrated firm.
2. All firms exert oligopolistic market power downstream, where they compete à la Cournot, and oligopsonistic market power upstream.
3. To produce the final good, firms need a fixed input, termed capacity that is competitively offered on an upward sloping supply curve.
4. The more capacity a firm buys on the market, the lower is its marginal cost of producing the final good. The vertically integrated firm owns some capacity at the outset. This is referred to as its *ex ante* degree of vertical integration and can be as low as zero or so large that the firm effectively monopolizes the market (or anything in between). As the *ex ante* degree of vertical integration increases, the marginal cost of the integrated firm decreases, and so it produces more output.

Thus, their model explicitly allows for productivity gains from vertical integration due to economies of scale. However, because the cost of acquiring the inframarginal units of capacity is sunk by the time the integrated firm interacts with the other firms on the input market, it bids more aggressively for capacity. Therefore, increases in its *ex ante* degree of vertical integration lead to increases in the market price of capacity, which raises its rivals' costs and thus leads to (partial) foreclosure.

Based on this setup, the following results are obtained. First, vertical integration is more likely to be pro-competitive (i) the less competitive is the industry, i.e., the fewer are the non-integrated competitors, and (ii) the smaller is the *ex ante* degree of integration. While result (ii) is arguably as one would expect, result (i) is somewhat surprising. However, a clear intuition for this result based on this model implies that antitrust authorities should be more suspicious about vertical mergers when there are more firms in the industry. They also demonstrate that the effects from vertical integration on consumer surplus can be substantial even if the number of firms is large. Second, vertical integration is pro-competitive under a fairly wide array of circumstances. In the extreme, even monopolizing the downstream market can enhance consumer welfare because the integrated firm expands its quantity by a very large extent after integrating. Third, they show that as the number of competitors becomes large, vertical integration is anticompetitive irrespective of the *ex ante* degree of vertical integration. In the limit, their model yields Riordan's (1998) powerful result that vertical integration by a dominant firm who faces a competitive fringe is always anticompetitive. Fourth, even if it is pro-competitive, vertical integration is not necessarily welfare increasing. Pro-competitive but welfare reducing mergers is possible because vertical integration changes the cost structure in the industry. Last, there exist critical thresholds for input and output market shares for an integrating firm above which further vertical integration is anticompetitive. These are useful measures for practical policy purposes.

Summary

Under this subtopic, we investigated the need for backward integration and its effect on the structure of the market. Many researchers have examined the role of market power exercised by firms in vertical structures, but the implications of vertical integration remain a subject of debate. Some argues that greater vertical integration leads to efficiency gains, while others

raise lingering concerns about potential adverse welfare effects of vertical integration and possible efficiency losses associated with reduced competition.

Exercises

1. Does backward integration by a monopsonist harm consumers? Explain.
2. Discuss the advantages and disadvantages of backward vertical integration by firms on the structure of the market?
3. When is vertical integration anticompetitive? Explain.

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SUBTOPIC 4.3 VERTICAL INTEGRATION AND PRODUCT DIFFERENTIATION

Introduction

In business life, one should always opt to either to lower down the cost of their final products or find ways in the value chain where they can save money. What strategy the farmer or company will adopt in order to save or lower the cost? How can they save when it is a differentiated product? As we all know that differentiation would incur additional expenses. The best response for these questions according to literature is vertical integration. Vertical integration can be defined as the degree to which a firm owns upstream suppliers, and its downstream buyers. A firm or a business organization can do this because it can have a significant impact on the business unit's position in its industry with respect to cost, differentiation and other strategic issues. If your product is a differentiated one, and some features or materials in that product needs to be outsourced because of lack of resources, rare items and high-end material, then vertical integration is the solution. If the cost of creating this differentiated product is greater than the value of the product itself, then how can vertical integration help the company to minimize its costs? One of the benefits of vertical integration as mentioned in Subtopic 1 is that it provides more opportunities to differentiate products by increased control over inputs.

Objectives

At the end of this subtopic the students are able to:

- Understand how vertical integration improves product differentiation; and

- Demonstrate how comparative and competitive advantages lead to vertical integration and product differentiation.

4.3.1. Outsourcing

Recently, “outsourcing” has become a word frequently spelled by production managers and CEO’s all over the world. Reduced trade barriers, lower domestic and international transport costs, increased worldwide standardization of intermediate goods, easier and more precise transfer of industrial information, more homogeneous firm organization as a result of the demise of socialism as a production system, all these facts seem to have encouraged an increase in the process of vertical disintegration of firms or, as we prefer today, of outsourcing. Vertical disintegration has taken place in a world where consumers and firms seem to put a relevant emphasis on differentiation.

Nonetheless, vertical integration has remained so far quite detached from the analysis of product differentiation policies of firms, despite the large amount of literature on this latter topic and the wide lot of questions left open. As a matter of fact, there does not seem to be any relationship between vertical integration and differentiation if the characteristics of the final good do not depend on those of the intermediate inputs and/or if the intermediate inputs can be standardized without decreasing the degree of differentiation of the final good, or its “specificity”. However, there are circumstances in which the relationship between vertical integration and the ability to foster product specificities and/or quality standards is robust and live. In all these cases, more open markets may increase standardization, mainly of inputs via diffuse outsourcing, eroding the space for input differentiation through less vertical integration.

As we know, specific productive assets provide a rationale for vertical integration (Grossman and Hart, 1986). However, the degree of specificity cannot be taken for granted since it depends upon the transaction regime in which assets are embedded. This makes for a close relationship between specificity and the cost of exchanging a product.

Task 4.4: Can you explain why franchise agreements and joint-venture can also reduce costs and differentiation problems?

4.3.2. Theory of Comparative and Competitive Advantages

Trade between organizations is possible, even when one organization is less efficient than another in the production of both commodity or provision of both services. The organization will specialize in producing the commodity or provision of the service, with fewer disadvantages and exchange a part of the same with another organization subjected to more disadvantage. According to Porter (1980), a competitive advantage is an advantage over competitors gained by offering consumers greater value, either by means of lower prices or by providing greater benefits and service that justifies higher prices. Comparative advantage can lead countries to specialize in exporting primary goods and raw materials that trap countries in low-wage economies due to terms of trade, but Competitive Advantage attempts to correct this issue by stressing maximizing scale economies in goods and services that garner premium price

Competitive advantage occurs when an organization acquires or develops an attribute or combination of attributes that allows it to outperform its competitors by performing at a

higher level than others in the same industry or market. These attributes can include access to natural resources, such as high grade ores or inexpensive power, or access to highly trained and skilled personnel human resources. New technologies such as robotics and information technology either to be included as a part of the product, or to assist making it. A firm is said to have a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential player. Successfully implemented strategies will lift a firm to superior performance by facilitating the firm with competitive advantage to outperform current or potential players. Competitive advantage provides the understanding that resources held by a firm and the business strategy will have a profound impact on generating competitive advantage. Business strategy is the tool that manipulates the resources and create competitive advantage, hence, viable business strategy may not be adequate unless it possess control over unique resources that has the ability to create such a unique advantage.

4.3.3. Generic Strategy: Differentiation

This strategy involves selecting one or more criteria used by buyers in a market and then positioning the business uniquely to meet those criteria. This strategy is usually associated with charging a premium price for the product often to reflect the higher production costs and extra value-added features provided for the consumer. Differentiation is about charging a premium price that more than covers the additional production costs, and about giving customers clear reasons to prefer the product over other, less differentiated products.

4.3.4. Differentiation and Vertical Integration

In this competition era differentiation through vertical integration strategy is required because:

1. Hyper competition (Focuses is now on increasing and retaining market share)
2. Globalization
3. Effective management information system (MIS) availability
4. Open access to resource (Cost of entry is low and substitute available readily, so choosing multiple option serves better).
5. Diverse opportunity
6. Strategic partners availability (More and more entrepreneurs are coming up to provide at low cost and hence possibility of outsourcing is increasing)
7. Availability of fund (Venture funds, angel funds, financial institutions, stock market)
8. Business sustainability (Multiple options and hence risks mitigation)

Summary

Vertical integration within agricultural and food sector is one of the decisive factors influencing market structure and competitiveness of agriculture. In this subtopic we have seen that vertical integration increase the possibility that output goods are differentiated. Moreover, this occurs when the cost to differentiate the input is high. On the other hand, vertical integration is detrimental for brand variety if the cost to differentiate inputs is negligible.

Exercises

1. What is outsourcing? How is it related to vertical integration? Explain.

2. How is asset specificity related to vertical integration? Explain.
3. What is competitive advantage? How is it related to product differentiation?
4. Why do firms have the incentives to integrate when the differentiation of final goods has a feedback on upstream supply decisions? Explain.
5. Explain some of the challenges that firms who integrated vertically have in product differentiation.

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SUBTOPIC 4.4 POLICY IMPLICATIONS

Introduction

Historically, policies have reflected a variety of methods and approaches to address the effects of consolidation and concentration. Some, such as antitrust laws, seek to affect directly the consolidating activity or the use of market power resulting from the concentration. Other measures, often seemingly quite attenuated from consolidation, serve to ameliorate its effects. Policy makers have to be selective when deciding which causes of consolidation and concentration to address at least directly. For instance, there has been virtually no interest in restraining technological change, even though it can be a major factor in consolidation, especially in an industry like agriculture. Yet policy makers have to be willing to address certain activities associated with consolidation and concentration. The basic premise for direct action has almost entirely been actual, attempted or potential for abuse of economic or market power to the detriment of other individuals or firms, consumers or society more generally. The question for policy makers is what are the appropriate measures to deal with the real possibility of market impacts and detrimental consequences stemming from consolidation and economic concentration?

Objectives

At the end of this subtopic the students are able to:

- State the different policy options of consolidation and concentration; and
- Formulate the policy measures to be taken to reduce the effects of consolidation and concentration in the agricultural sector.

4.4.1 Policy Implications of Horizontal and Vertical Integration

The following outline describes and analyzes different policies enacted or proposed to affect economic balance in the food and agriculture sector as a whole. The first two approaches attempt to equalize bargaining power of the players, either by (1) reducing the power of the

stronger party by affecting the structure of the industry, or (2) increasing the power of the weaker party such as by encouraging collective bargaining. The second two approaches are closely related, but essentially accept the fact that the power imbalance exists. These approaches try to minimize the negative consequences of accumulation of market power by (3) regulating the behavior of market participants, and (4) improving the enforcement of competition or trade practice laws.

1. Affect the structure of the industry. The main argument in support of this approach is that it will decrease the power of one of the players because it will provide more choices in the market. These laws do this by limiting what certain firms may own or control. The main arguments against this policy are that the government might hinder the most efficient means of production, and in any case, that the government should not dictate who owns what or the structure of businesses. Because these policies tend to have the greatest effect on the market participants, they can also be the most controversial.

A number of policy approaches have been devised to address the openness and functioning of markets.

a. Prohibit certain types of businesses from owning certain types of other businesses or assets: An example for this is prohibiting packers from owning livestock. This policy attempts to prevent possible price manipulation stemming from consolidation or concentration combined with vertical integration. A similar approach can be used to force packers to agree no longer to own or control the critical elements of the marketing channels of that day, including the railroads and stockyards. A variation of this approach is to attempt to encourage family farm ownership of agricultural assets by prohibiting certain types of corporations from owning or controlling agricultural land.

b. Merger review: A similar approach concerning the ownership and control of assets is to block a merger or require that for a firm to acquire another firm, it must first sell certain assets.

c. Break up firms: This approach may be the most drastic because it forces firms to deprive interests that it already owns. Thus the law requires that an actual antitrust violation be proven before this remedy can be utilized. In reliance on the law, the justice department can exercise its power to break up firms or require divestment of interests and can take the matter to court for enforcement.

2. Increase bargaining rights or market position of weaker party. Instead of limiting the power of a more dominant firm, this approach attempts to increase the bargaining power of the party who traditionally has relatively few options in the marketplace. This can be done by providing agricultural producers the ability and right to join together to bargain with their suppliers or buyers.

a. Cooperative bargaining: This is to have laws that enable producers to bargain collectively and, in essence, agree to prices among themselves, so long as the agreement does not “unduly enhance” prices. To qualify for this limited immunity, (1) the cooperative must operate in a democratic manner, i.e., one member-one vote, regardless of the amount of investment or (2) the return on investment must not exceed 8 percent a year. In any case, the majority of the cooperative’s business must come from members. Beyond the antitrust exemption, another advantage enjoyed by cooperatives and their members is that the income

for a cooperative is taxed on either the cooperative or producer level. Nevertheless, critics of cooperatives complain that some cooperatives are not responsive to producer's needs.

b. Protecting producers' rights to form cooperatives and associations: This is having laws to protect a producer's right to join an association of producers. The law should generally prohibit processors from discriminating against or intimidating producers who want to join or are members of an association.

3. Regulate the behavior of market participants. This approach does not affect the actual structure of the industry, but tries to limit the negative consequences of a consolidated or concentrated industry structure by regulating the behavior of market participants. Policymakers have to use this approach in a myriad of other industries to address inequities in the commercial relationship. One need only look to federal and state regulation of insurance, advertising, car sales or home improvement to find examples of policies centered on protecting the weaker or less-informed party from onerous practices. This approach should address the problem of lack of bargaining equality because it regulates what can or cannot occur within the business relationship. As outlined below, these provisions can be very prescriptive, such as requiring a three-day period for a party to review a contract, or somewhat broad, such as a general prohibition against unfair conduct. These more general prohibitions have often been narrowed by court decisions in recent years that make it more difficult to prove violations of law. The result has been renewed interest on the federal and state levels in revamping these laws to protect agricultural producers.

a. Prohibit unfair practices: This Act should generally prohibit packers, live poultry dealers, swine production contractors, livestock auction markets and livestock dealers from engaging in unfair, unjustly discriminatory or unduly preferential practices. The scope of this law has to be narrowed by federal court decisions applying the "rule of reason" to determine what is unfair in specific cases. Essentially, this rule looks at the intent behind a practice and the likelihood that the practice will cause competitive injury in order to decide whether it violates the Act. This rule assigns the plaintiff the daunting task of proving likelihood of injury, while the defendant can rebut the plaintiff's case by showing that the practice is simply a legitimate business practice. For example, a smaller producer may argue that a packer unduly prefers another producer when it provides the other producer premiums based solely on volume. The packer would argue that the practice is justified because it wants a large, consistent supply for its plants.

b. Contract regulation: State and federal policy makers should look into some ideas on how to regulate agricultural contracting. Some of the issues to be dealt with in contract regulation are listed below:

i. Implied obligation of good faith. This obligation generally requires that the parties to the contract deal with each other honestly. For example, some state laws include a promise of good faith by all parties to an agricultural contract.

ii. Disclosure of risks. The contract must be accompanied by a clear written disclosure statement setting forth certain contractual rights and obligations of the producer. For instance, the contract might need to make clear the factors to be used in determining payment or who bears responsibility for possible environmental liability.

iii. Readability. The drafter of the contract must avoid overly complex language so that a person of average education and intelligence can understand the terms of the contract.

iv. Right to review the contract. The producer must have some days to review and cancel the contract. The producer is protected from being pressured into a binding contract without the ability to seek advice. This approach may work well for production contracts and longer-

term marketing contracts, but it may not suit spot market sales, since the buyer may need to hedge in the futures market at the same time as the purchase or may want to sell the product within the three-day window.

v. Confidentiality provision prohibited. This section prohibits the use of any type of confidentiality clause. For example, the 2002 farm bill in US included a provision stating that parties to certain poultry and livestock contracts have the right to share their contract with family, close advisors, and federal and state agencies, no matter what the contract says about confidentiality.

vi. Production contract liens. The producer is allowed to file a lien that will have a priority over other liens filed by the contractor's creditors, much like a veterinarian's or mechanic's lien). As with most laws that provide lien protections, the key to this provision is that the farmer must take the affirmative step of filing the lien.

vii. Investment requirements. If the producer makes a certain minimum amount of investment in relation to the contract (\$10,000), the contractor may not terminate the contract without providing at least 90 days notice. If the contractor does terminate the contract, it would have to reimburse the farmer for his or her lost investment.

viii. Right to join associations. Producers may not be discriminated against for choosing to join a bargaining association.

c. Limit the types or terms of contracts a firm may enter into: For instance, a law could provide that a firm cannot buy more than a certain percentage of its supplies through forward contracts or similar arrangements; i.e., the firm must buy a certain amount on the cash (or spot) market. This approach attempts to ensure a market for producers who choose not to use contracts. The legislation should also address concerns that the spot market is becoming so thin that it is susceptible to manipulation and is no longer a reliable measure of supply and demand.

d. Provide more transparency in the marketplace: One of the essential elements in any competitive market is access to information. Given increasing consolidation and vertical integration, many producers fear that they may no longer have access to critical market information. This law should provide a fairly specific regime of reporting and public dissemination of price information for agricultural products.

4. Improve enforcement. Many argue that adequate laws should exist and that the most effective approach to improving competition policy is not to change the substantive law, but to improve the enforcement regime. This can be done by handing over enforcement of certain laws to different agencies based on expertise in the area, by encouraging private parties to bring actions to enforce the law and developing strict state or federal policies on how a matter is resolved if a dispute arises.

Summary

The structure of the food and agriculture sector is quickly changing as a result of the dual forces of horizontal and vertical integration. Even though they are beneficial in terms of cost reductions and increased bargaining power, they may increase the disparity of bargaining power and affect the functioning of competitive markets. They may also negatively affect certain market participants, including particularly agricultural producers and consumers. To address the resulting inequality in bargaining power and impacts upon the competitiveness of markets, policymakers may choose to ratify policies that: reduce the power of the stronger party by affecting the structure of the industry; increase the power of the weaker party by

encouraging collective bargaining; regulate the behavior of market participants; or improve the enforcement of competition and trade practice laws.

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TOPIC 5 MARKET ORGANIZATIONAL FORMS UNIQUE TO AGRICULTURE

Introduction

Small-scale farmers participation in input or output markets are usually constrained with market structures that are much more concentrated than the farming industry itself. In other words, sellers of inputs or buyers of farm products are usually few in number and much larger firms than the smallholders themselves. These larger firms have more bargaining power and more resources available for market research, innovation and/or rapidly adjusting to changing economic and political environments. Therefore, marketing through rural producers' organizations can be a means to overcome the constraints faced by individual small-scale farmers. Cooperatives offer small agricultural producers opportunities and a wide range of services, including improved access to markets, natural resources, information, communications, technologies, credit, training and warehouses. They also facilitate smallholder producers' participation in decision-making at all levels, support them in securing land-use rights, and negotiate better terms for engagement in contract farming and lower prices for agricultural inputs such as seeds, fertilizer and equipment. Cooperatives are certainly not the only organizations that support market access for smallholder farmers. Many organizations exist that prefer to distinguish themselves from cooperatives, for several reasons, but that often adopts the main principles and characteristics of cooperatives. An example can be farmers' bargaining associations which are more flexible than a cooperative and easier to create. Low bargaining power is strongly related to poor access to information, to alternative options, to dependency relationships, as well as to the perishable character of the product. Their lack of bargaining power may lead them to under-value their production and obtain a smaller share of the added value created in the commodity chain. Smallholders have particularly low bargaining power when they operate in processed products supply chains where the economies of scale in the product transformation (processing) stage lead to the creation of oligopsony.

Objectives

After completing this topic, the students are able to:

- Define cooperatives, agricultural cooperatives and agricultural marketing cooperatives;
- Identify the different models of agricultural marketing cooperatives;
- Understand the role that cooperatives play in improving market performance; and
- Identify the different farmer bargaining models and apply them to practical farmers' problem in developing countries.

SUBTOPIC 5.1 FARMERS COOPERATIVES

Introduction

This subtopic provides a comprehensive summary of the basic information on the cooperative way of organizing and operating a business. It covers the different models of agricultural marketing cooperatives, compares different models of agricultural marketing cooperatives, discuss the competitive effect of cooperatives compared to other market structures.

Objectives

After completing this subtopic, the students are able to:

- Define agricultural cooperatives;
- State the benefits and pitfalls of agricultural cooperatives;
- Identify the different models of agricultural marketing cooperatives;
- Compare and contrast the different models of agricultural marketing cooperatives; and
- Explain why cooperatives improve the competitiveness of markets.

5.1.1 What are Agricultural Cooperatives?

The number of definitions of cooperatives is large. The most widespread definition of cooperatives is that of Barton (1989): “A cooperative is a user owned and user controlled business that distributes benefits on the basis of use”. Others define cooperative as an autonomous association of people, who unite voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise. It is a business enterprise that seeks to strike a balance between pursuing profit and meeting the needs and interests of members and their communities. Cooperatives not only provide members with economic opportunities, but also offer them a wide range of services and opportunities. The cooperative enterprise model exists in many sectors, including agriculture, consumer issues, marketing and financial services and housing. Cooperatives provide 100 million jobs worldwide and have more than one billion members. Agriculture which includes farming, forestry, fisheries and livestock is the main source of employment and income in rural areas, where most of the world’s poor and hungry people live. Agricultural cooperatives play an important role in supporting small agricultural producers and marginalized groups such as young people and women. They empower their members economically and socially and create sustainable rural employment through business models that are resilient to economic and environmental shocks.

Agricultural cooperatives can be classified into three broad categories according to their main activity, namely marketing cooperatives (which may bargain for better prices, handle, process or manufacture, and sell farm products), farm supply cooperatives (which may purchase in volume, manufacture, process or formulate, and distribute farm supplies and inputs such as seed, fertilizer, feed, chemicals, petroleum products, farm equipment, hardware, and building supplies), and service cooperatives (which provide services such as trucking, storage, ginning, grinding, drying, artificial insemination, irrigation, credit, utilities, and insurance) (Cropp and Ingalsbe, 1989; USDA, 2004).

5.1.2 Benefits of Agricultural Cooperatives

Agricultural cooperatives have both economic and social benefits.

1. Economic benefits: Among the economic benefits attributed to the cooperative are increased competitiveness, economies of scale, credit opportunities, innovation and member education. We will look at these potential advantages of cooperatives except its competitive effects which will be presented under subsection 5.1.3.

Economies of scale: Processing and marketing of agricultural products are usually characterized by economies of scale. Activities such as transport, processing and acquisition of information about market opportunities are performed more efficiently if the farmers form a group than if each one acts alone. A cooperative is the best way for a farmer to capture the

profit that exists in selling the produce directly to an international trader or a retailer instead of selling it to middlemen. Members of a cooperative can also benefit from economies of scale in activities other than those directly related to marketing.

Credit provision: Credit provision is one example of how a cooperative can benefit its members. A formal credit market for small-scale farmers often does not exist in rural areas of developing countries, and cooperatives can therefore be useful. They are important since they can serve as providers of information about the creditworthiness of borrowers, and because it is more profitable for banks and marketing firms to transact in large quantities. In addition, if they operate with a system of joint liability, the risk of default is reduced. However, such credit programs can only be run if the cooperative manages to obtain the resources for it which can often be problematic in developing countries.

Innovation and member education: Cooperatives may increase innovation because they channel technical information about production to farmers. This role is particularly important in cases where farmers' knowledge base is deficient, government funds are limited, and the economic potential to be realized by adopting agricultural innovation is high. Educating the members on production methods is one way of improving the quality of their produce; another way is to adapt a quality-dependent payment system that would give an economic incentive to the members to provide higher quality products.

2. Social benefits: The social benefits of cooperatives are also very important. As grassroots organizations they can become an important part of the country's civil society, contributing to the formation of social capital, and furthering a process of empowerment and democratization. Cooperatives that function as democratic organizations, where members actively participate in decision making processes, can have the spin-off effect of creating social capital such as trust, norms, and networks that improves the efficiency of society by facilitating coordinated action.

Social capital is essential for the creation of a civil society, and a well-developed civil society is one of the preconditions for democracy. Through local organizations individuals can come together and work towards a common goal. Their primary goal might be something practical and immediately profitable, such as the common marketing of their produce. But as an organized group, they become a part of civil society, and their voices, joined together, are more likely to be heard by the decision-makers. Effective cooperation is thus the key to a successful intervention of civil society in the development process. Moreover, in the process, networks are formed, people start trusting each other more and participation becomes the norm. This might increase the welfare of the local community, as it enables people to join forces in other beneficiary activities.

Cooperatives can also play significant roles in empowering its members. People living in poverty and isolation are voiceless and powerless in relation to the state and the market. A producer organization can become part of a process of empowerment, by increasing social capital, and thereby improving democracy.

Its democratization role has also been accepted by many. Generally, the participation of all the inhabitants of a country is an important part of a democratic process. Without citizen participation there will be no control over the rulers of the country, and the needs of the inhabitants might not be taken sufficiently into account. One outcome of such a situation could be policies in favor of some pressure groups, at the expense of the interests of other, more marginalized and unorganized groups.

5.1.3 Potential Problems of Agricultural Cooperatives

In many cases, the formation of agricultural cooperatives has not led to success, whether economic, social or political. The causes of this are the following:

1. Free riding: One of the lessons drawn from previous cooperative experience is that without the active participation of the members involved there is little chance of long term success. In collective farms the entire production level depends on the members' participation in productive activities, and participation as such is vital for the survival of the members. Related to this is the free-rider problem. Managing the cooperative should be the joint responsibility of the members, and if members fail to engage in the monitoring of the leadership, there are greater chances of mismanagement and corruption.

Free riding may be tempting, letting other members do the work, and enjoying the benefits without having participated in the process of creating these. This is a Prisoner's Dilemma situation: the optimal situation for an individual is where all the others follow the rules and provide the goods, while he himself shirks, or free rides. Since all individuals face this situation, everyone will shirk, and nobody will provide the goods, although the social optimum is for everyone to participate.

2. Costs of control: The problem with costs of control is related to that of free riding. Several theorists have argued that since a successfully functioning cooperative requires the active participation of its members, it is less efficient than private firms. The reason for this is that the control mechanisms of management are different for a private firm and a cooperative, including one that is financed by the members. The cooperative is a democratic institution, usually applying the one-member one-vote system, which means that each member has an equal say in matters of management. The managers of a cooperative can be a few elected members, staff hired externally, or a mixture of both. A private firm is owned by the investors, and their votes are distributed according to their shares in the firm. In both organizations, there is separation between ownership and managerial control. This means that the daily manager is hired and paid by someone whose profit depends on how fruitful these decisions are. Here we have a principal-agent situation, where the principal must create, monitor, and enforce a contract that will induce the agent to maximize the principal's objective function.

3. Investments: Much of the critique of cooperatives is based on the claim that their planning horizon is too short to conform to the requirements for Pareto optimality. An important dimension of cooperative finance is that co-operative share capital is not permanent. Because cooperative shares cannot appreciate in value, and cannot be sold on the open market, and because the claims on benefits from any investments made by the cooperative usually end with the termination of membership, the investment level of a cooperative is assumed to be less efficient than that of private firm. The 'horizon problem' implies that members approaching retirement undervalue investments, which makes the cooperatives vulnerable since distributive or short run view is often applied to activities that require a long run perspective for successful implementation.

This attribute of the cooperative is said to make it more likely that members will prefer to receive the surplus of the cooperative as patronage refunds or interests distributed immediately, rather than making profitable investments. In developing countries the problem

is often that people are living close to absolute poverty, and therefore the satisfaction of their immediate basic needs is weighted heavily against prospects of increased future consumption.

4. Conflicting objectives: While private firms, theoretically, have profit maximization as their only motive, agricultural cooperatives will usually also have others, of both an economic and social character. Many of these objectives cannot be simultaneously enforced, and conflict will arise, both among the members, who have different preferences, and in management, since attention has to be paid to more than one objective simultaneously.

Within a democratic organization where everyone has an equal say, it might be difficult to agree upon a common strategy, since cooperatives are complex structures combining a number of different groups whose interests may not always harmonize. There are many sources of disagreements that might occur within a heterogeneous group. Pricing of different services to members, including the possibility of differential pricing based on members' patronage, and the location of facilities. Members might also disagree on whether to have full distribution of profits, or profit retention to finance collective services and reserves. Furthermore, a cooperative might also have many non-economic goals, such as member education, democracy and equity.

Task 5.1: Can you give your own suggestions on how to control some of these problems of agricultural cooperatives?

5.1.4 Competitive Effects of Cooperatives

It is now widely accepted that it is part of the duty of the modern governments to maintain free and open competition. Fostering competition between firms is intended to safeguard the interests of consumers. This is accomplished by preventing one provider of goods or services from exploiting a situation by colluding with other firms to restrict competition and thus increase prices and profits artificially. Regulatory authorities seek to prevent the development of price-fixing agreements and cartels and to place limits on enterprises that have achieved a dominant position in any specific market. However, in most cases it is not possible to demonstrate that the activities of regulatory authorities have actually resulted in lower prices for the consumers.

The way cooperatives interact with private firms in the market is an important aspect of their function, particularly in market situations characterized by imperfect competition. Very often, agricultural cooperatives have been formed as a response to market failure, to counterbalance monopsony or oligopsony power in the processing sectors. According to Sexton (1995), agricultural markets are often oligopsonistic, because of high transport costs which limit the farmers' access to buyers, and because of the farmers' investments in sunk assets, which creates exit barriers. If the farmers own their own processing company, and run it as a cooperative, they can retain the market margins otherwise held by private processors. This should have the effect of both raising the members' income and pushing the private firms towards more competitive pricing. The latter is what Sexton refers to as the 'competitive yardstick effect'. This positive role attributed to the cooperative has often been used as an argument for continued government support to agricultural co-operatives.

Cooperatives often become the target for competition legislation because the very act of cooperation involves the collaboration of individuals who agree to act in unison. Such activity is usually an attempt to bring their joint power in the market-place up to the level achieved by private firms that are operating for the benefit of other stakeholder groups.

Primary producers (farmers, fishermen, craftsmen, etc.) cooperate in order to get a fair deal from the large-scale buyers of their products; consumers cooperate to get a better deal from manufacturers and suppliers; and credit unions are often formed to counter the power of large financial institutions. Governments must recognize the essential difference between the collaboration of individuals who are comparatively “small players” in the market (cooperatives) and the anti-competitive practices of large investor-driven enterprises.

Primary producer cooperation is significantly different from the collusion that can take place among large companies. However, conflicts between cooperatives and competition-promoting authorities are quite common, often because the relevant legislation does not properly distinguish between cooperatives and cartels. Many of those administering the applicable legislation simply do not comprehend the cooperative model of enterprise.

However, there are situations in which the governing bureaucracy of a cooperative seeks to gain advantage from a dominant position in the market. As a result, cooperatives should expect to be subject to the general rules of competition policy. At the same time, however, they can reasonably expect their normal joint activities to be differentiated from collaboration with intent to exploit a dominant position in any market. When cooperatives insist upon excluding those who should be eligible for membership, but at the same time trade with them, then the competition authorities should take action against them. This is particularly true if they engage in an excessive proportion of non-member trade. Cooperation should never be equated with exploitation. Cooperatives must ensure that they never take unfair advantage in their marketplace or else they will forfeit their right to be treated as cooperatives.

5.1.5 Models of Marketing Cooperatives

Marketing is the process that an agricultural product goes through on its way from the producer to the consumer. Traditional marketing involves several intermediary stages within this process. The result is, of course, that the consumer pays an exorbitant price and the producer receives a very low price for his production. Naturally, it is in the interests of both producer and consumer that the number of steps in the marketing process be reduced as much as possible so that the producer will earn more and the consumer will pay less.

The first form of marketing is the traditional marketing chain where the farmer sells his product at a local market. The intermediary who buys this production transports it to a regional market. Another intermediary will buy these goods and transport them to an urban market. The product will then be sold and distributed at the neighborhood markets where the retailers will come to get the product for sale to the consumers. This way agricultural produce has undergone too many stages from producer to consumer. All intermediaries have benefited from this process, but not the producer nor the consumer.

The solution to this state of affairs is the formation of a marketing cooperative owned by the producers. This cooperative's aims are to reduce to a minimum the number of marketing stages between producer and consumer. There are many marketing cooperatives having largest turnover, by collecting, transporting, storing, processing and sale approximately 75% of agricultural output. The setting up of these cooperatives has reduced the number of steps in the marketing chain, but not enough. Agricultural produce leaves the farm, passes through the cooperatives and is then sold in the local market and in various small shops.

Another alternative reduces the number of steps even more. This alternative involves direct contact between the marketing cooperative owned by the farmers and the consumer

cooperative owned by the consumers. Thus, the sale of agricultural products takes place from one cooperative to another, and in principle, the profitability for the producer increases while the purchase price for the consumer decreases. This situation, though far removed from the traditional marketing chain, does not go far enough. It is still necessary to try to eliminate superfluous steps in the marketing circle. Two solutions have been found:

The first consists of consumer sale centers, belonging to the marketing cooperative itself. These sale centers link producers directly to consumers. The second solution consists in supply centers for agricultural produce, which are owned by the consumer cooperatives, the latter belonging to the consumers. In this case consumers have organized themselves in order to acquire their consumer goods directly from the producers.

Another cooperative marketing model, concerns the organizations which belong to the farmers and the government and which deal with the export of agricultural products.

The last stage in our model is the stage at which selling takes place directly from the producer to the consumer. This is the most preferable stage because it produces the best results of all for both producers and for the consumers. An example of this is direct selling outlets where goods are sold to the public at roadsides all over the country. This solution is plagued with problems and difficult to implement, however this is the solution we strive for.

Summary

Smallholder producers are faced with a number of problems. They are based in rural areas in poor countries; infrastructure is poor and service provision low. Furthermore, local markets are often characterized by imperfect competition. Cooperatives have the potential to increase the farmers' market margins and thereby their incomes and standard of living. Cooperatives may have a pro-competitive role in market situations with imperfect competition and play an important part in social development by informing and empowering marginalized producers. Because of these attributes, attempts have been made to form and support agricultural co-operatives in developing countries. But many of these co-operatives failed, either because of the particular co-operative structure, or because of certain external conditions and events that prevented their success.

Exercises

1. Discuss the major problems of developing countries farmers and how cooperatives overcome some of these problems.
2. Explain why public policies in many counties are in favor of the establishment of farmer cooperatives.
3. Discuss about the notion of the "competitive yardstick" effect of cooperatives.
4. How do cooperatives improve the performance of markets? Discuss.
5. Currently, the idea of New Generation Cooperatives has evolved in cooperative theory. Refer to literature on cooperative and discuss about it.

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SUBTOPIC 5.2 FARMERS BARGAINING ASSOCIATIONS

Introduction

One of the most recent types of bargaining activity in agriculture is that represented by cooperative bargaining associations. Increasing concentration in food processing has led to fewer buyers of raw agricultural commodities who depress prices for the farmers. This in turn heightened interest in grower bargaining associations. Increasing farmers' bargaining power, as a means of improving the income position of farmers, is presently receiving considerable attention by the producers of many commodities, especially in perishable products such fruit, vegetable and fluid milk. These producers have turned to cooperative bargaining associations and various types of contractual arrangements as a means of improving their bargaining power and income position. In contract farming, it is essential that growers know and understand the importance of relevant economic relationships and the effect of these relationships on price and other contract terms. In addition, the growers must be aware of the legal, institutional and political opportunities and limitations. Interest in forming cooperative bargaining associations has grown in the past decade. Fewer and larger processing firms, greater emphasis on uniform quality and growth of contract farming are related factors which make many farmers believe that it is necessary to organize to improve their bargaining power in the market. Under this Subtopic, we will define bargaining associations, look at their roles and finally present the different bargaining models starting with the simplest one called bilateral monopoly and then proceed to other theoretical bargaining models.

Objectives

The objectives of this subsection are the following:

1. Define what farmers' bargaining associations are;
2. State the roles of cooperatives in farmers bargaining associations;
3. Identify the difference between agricultural marketing cooperatives and farmers' bargaining associations;
4. Develop a theory of bargaining, resting on the theory of bilateral monopoly, which can be applied to group bargaining between producers of agricultural commodities and processors and/or retailers on price and quantity.

5. State the economic, legal, institutional and political limitations which must be recognized if group bargaining efforts are to be successful.

5.2.1 What is Bargaining?

Bargaining can mean different things to different people. According to Clodius (1957), bargaining has at least three different meanings. He places the types of bargaining into three categories:

Type 1: This type of bargaining refers to bilateral competition or the market power relationships establishing the terms of exchange between buyer and seller. Special cases of this kind of competition are designated as bilateral monopoly or bilateral oligopoly. A general term growing in usage to designate bilateral competition is “countervailing power”, and an earlier term used mostly by institutional economists was simply “bargaining power”.

Type 2: A less commonly accepted concept of bargaining refers to interfirm competition or to the market power relationships existing between buyer and buyer and seller and seller, which establish the term of behavior among rivals and realized market results. The special cases of this type carry familiar designations such as pure competition, monopolistic competition, pure and differentiated oligopoly, single firm monopoly and their counterparts on the buying side.

Type 3: Bargaining may also be applied in the political economy to the efforts of any group to use its power to influence an outcome where government is one of the participants. Lobbying activity by a pressure group to secure particular legislation would be an example. Or, once the legislation becomes law, the appearance of organized groups in hearings to persuade administrative officials to make certain findings and determinations would be a form of bargaining.

Bargaining cooperatives are generally organizations of agricultural producers that negotiate terms of trade with processor-buyers of their raw product. They are distinguished from processing cooperatives that can process the produce of their members and market the processed products. Hence, bargaining cooperatives usually do not become involved with the handling of raw product, nor do they usually have mechanisms to control producer supply, although some exceptions occur. The primary objective of bargaining cooperatives is to increase grower returns through providing market power for its members in the marketplace. This action is referred to as “countervailing power” and challenges the market power of buyers. The extent to which this power may be achieved depends on the nature and structure of the market in which a bargaining cooperative operates.

5.2.2 The Roles of Cooperatives in Farmers’ Bargaining Power

Clodius (1957) noted that farmer cooperatives are found in all three types of bargaining categories attempting to enhance their market power. They countervail the forces of firms who buy from them or sell to them. Cooperative associations compete with one another and with non-cooperative enterprises in buying and in selling their products. Cooperatives also conduct lobbying activities in their individual or collective interests. The literature on cooperatives contains no explicit recognition that Type 3 bargaining is a subject for research. Published research on the behavioral results of cooperatives in Type 2 bargaining also seems hard to obtain although considerable space is devoted to statements that cooperatives should be ‘pace-setters’ and competitive ‘yardsticks’.

With respect to Type 1 bargaining activities of cooperatives, some studies have been made of individual associations, but most of the published writings are in the form of narrative reports rather than economic analysis.

Ladd and Strain (1961) offer a different approach to a discussion of the role of cooperatives in bargaining. They suggest two kinds of bargaining power. The first kind stems from advantages that can be offered to the other party for accepting your terms. The second kind stems from the ability to make the other party worse off if he accept your offer. Most current discussions of bargaining power possibilities in agriculture center around the second type of power. They conclude that farm cooperatives have employed both kinds of bargaining to achieve their objectives. There is some doubt in their minds as to the effectiveness of the first kind of bargaining, that is, offering advantages.

If a satisfactory agreement cannot be reached using the first kind of bargaining power, then how can a bargaining group impose economic pressure on the other party to bring about desired results? Ladd and Strain (1961) list the following conditions which must be met if a farm group or organization is to use the second kind of bargaining power successfully:

1. The organization must control something that the other party wants or needs to obtain from the members of the organization.
2. The organization must have cohesion and disciplinary power over its members.
3. If the second kind of bargaining power is to be used in bargaining, the other party must recognize a group's ability to impose inconvenience or loss.
4. The members must be able and willing to bear the cost of withholding their products or purchases from the party or firm they wish to influence.

5.2.3 Bilateral Monopoly Model

Bilateral monopoly is the case where there is a single seller in the upstream market and a single buyer, who is also a monopolist, in the downstream market. If the buyer is able to make take-it-or-leave-it offers to the seller, then the outcome will be the same as pure monopsony. The monopsonist would set the monopsony price and the upstream firm would act as a price taker. If the upstream monopolist can make a take-it-or-leave-it offer, then it will maximize profit by setting the profit-maximizing price, and the downstream firm would act as a price-taker and choose how much to buy. However, both of these outcomes fail to maximize joint profits. When the upstream monopolist is able to make a take-it-or-leave-it offer, the downstream firm does not take into account that for every unit it sells downstream, the upstream monopolist makes a positive margin. Likewise, when the downstream monopolist makes a take-it-or-leave-it offer, the upstream firm does not take into account that for every unit it sells at that price, the downstream firm makes a positive margin.

Given their mutual interdependency and the fact that neither is likely to be in a position to make a take-it-or-leave-it offer, the two firms are likely to instead behave very differently. The hypothesis is that they will maximize joint profits, by appropriate choice of quantity, and then negotiate a transfer price that allocates the surplus. The quantity that maximizes joint surplus sets marginal revenue downstream equal to marginal cost upstream. If the upstream firm has all of the bargaining power, then the maximum price the downstream firm would pay would give it zero profits: this is its average value product. Alternatively if the downstream firm has all of the bargaining power, then the minimum price the upstream firm will accept is that which gives it zero profits: this is its average cost of production.

When the two firms jointly maximize profit, they internalize the lost margins of the other firm in determining the optimal amount of the input to trade. This means that joint profit maximization will involve an output level for the input that exceeds either of the take-it-or-leave-it offer possibilities discussed above. This increase in output increases both efficiency and, since it corresponds to an increase in output downstream, the welfare of final consumers. It is important to observe that in the standard models of monopsony, the decrease in input price from the exercise of monopsony power is not passed onto consumers. The exercise of monopsony power is inefficient and harms consumers in the downstream market. The bilateral monopoly model suggests, however, that it might be the case that monopsony power, created in response to upstream monopoly power, might be efficiency enhancing and beneficial to consumers downstream.

Relative to monopoly upstream and competitive buyers, if the buyers were to merge or otherwise coordinate to act like a monopsonist, it is possible that output upstream, and hence output downstream, might increase. The monopolist upstream would profit-maximize by setting its marginal revenue (based on the derived demand of the competitive buyers) to its marginal cost. If the buyers were to coordinate and exercise monopsony power, then it is hard to see why they would do worse. After all, they could just accept the monopoly price. However, if they are able to coordinate and exercise monopsony power they will be able to do better if they can negotiate a lower price and increased output in the upstream market.

This expansion in output in the upstream market would lead to greater output in the downstream market, lower prices, and hence be both efficiency enhancing and beneficial to downstream consumers.

The creation of opposing market power in response to original market power described in the preceding paragraph suggests that the creation of opposing market power can be socially beneficial because it is a countervailing force that offsets, at least in part, the original market power of the upstream monopolist.

There are, however, at least four conditions to be met before accepting that the creation of countervailing power enhances efficiency and benefits downstream consumers:

- i) Negotiation failures:** If the monopolist and monopsonist are not able to come to an agreement on the division of joint profits, negotiation and trade can break down.
- ii) Spillovers into other markets:** The coordination among the buyers will not necessarily be contained in the input market that is monopsonized. Instead the coordination in that market may reduce the costs of coordinating in other input markets or in downstream markets, thus creating original market power downstream or in another input market. This is particularly likely to be a problem if the upstream product is required as an input for all products in the downstream market and the geographic market downstream is similar to the geographic market upstream, so that the set of buyers upstream is similar to the set of sellers downstream.
- iii) Containing bilateral monopoly:** Monopoly rents are not the only rents that may be transferred with the exercise of monopsony power. Coordination by buyers might result in successful attempts to capture quasi-rents or Ricardian rents, both of which can easily result in a reduction in trade in the upstream market and harm consumers in downstream markets.
- iv) Schumpeterian competition:** If the monopoly position upstream is attributable to successful innovation or is otherwise the outcome of the competitive process, then monopoly profits are the reward for superior competitive performance. Efforts to reduce the extent of those rewards (i.e. through effective coordination by buyers), will reduce the incentives for firms to compete to become monopolists on the basis of being more efficient or having a

superior product. While the creation of monopsony power might enhance short-run efficiency, the long-run costs may well be greater.

5.2.4 General Bargaining Model

There are two basic features of price determination under bargaining that distinguish it from the typical market equilibrium analysis. First, the equilibrium price under bargaining cannot be determined by supply and demand equations alone because the bargaining activities play a role in price determination. Second, estimation of the usual neoclassical demand and supply equations will be biased and inconsistent since actual price observations are generally not located on either the demand or supply curves.

The supply and demand curves can be considered as defining the lower and upper price boundaries for the price bargaining process, respectively. The equilibrium price under bargaining for a given quantity to be traded can be defined as a convex combination of the inverse supply and demand functions evaluated at the given equilibrium quantity, Q^* . We refer to the parameter defining the convex combination weights as the relative bargaining power coefficient, α , which takes a value between 0 and 1. Hence, an economic model of price discovery under bargaining under the current market assumptions can be represented by:

$$P_d = P_d(Q_d, Z_d) \quad \text{Buyer's inverse demand} \quad (1)$$

$$P_s = P_s(Q_s, Z_s) \quad \text{Seller's inverse supply} \quad (2)$$

$$Q_d = Q_s = Q^* \quad \text{Quantity equilibrium} \quad (3)$$

$$P^* = (1-\alpha)P_s + \alpha P_d \quad \text{Price equilibrium under bargaining} \quad (4)$$

where: Q^* = the agreed quantity to be traded; P^* = the equilibrium price under bargaining; Z_d = inverse demand shifters; Z_s = inverse supply shifters; and α = coefficient of relative bargaining power. Note that:

1. Under monopoly, $\alpha = 1$ and $P^* = P_d$
2. Under monopsony, $\alpha = 0$ and $P^* = P_s$
3. Under perfect competition, α is indeterminate and $P^* = P_d = P_s$
4. Under bargaining, $\alpha \in (0,1)$ and $P_s < P^* < P_d$

Solving this market equilibrium bargaining model for the final bargained price yields:

$$P^* = (1-\alpha)P_s(Q^*, Z_s) + \alpha P_d(Q^*, Z_d) = f(Q^*, \alpha, Z_s, Z_d) \quad (5)$$

For purposes of estimation, represent both the sellers' inverse supply function and the buyers' inverse demand functions in stochastic form as follows:

$$P_s = P_s(Q_s, Z_s) + \varepsilon_s = f_s(X) + \varepsilon_s \quad \text{Sellers' inverse supply} \quad (6)$$

$$P_d = P_d(Q_d, Z_d) + \varepsilon_d = f_d(X) + \varepsilon_d \quad \text{Buyers' inverse demand} \quad (7)$$

$$E(\varepsilon_s) = E(\varepsilon_d) = 0 \quad \text{Zero mean of error terms} \quad (8)$$

where ε_s and ε_d are the random terms for the inverse supply and demand functions, respectively.

To simplify the notation let X represents the set of explanatory variables affecting supply and demand and we treat the parameters as being implicit in the representation of these functions and in other functions below. Some of the entries in X will then be ghosts in either the demand or supply functions. All other variables retain their earlier definitions.

First-round bargaining

Since the sellers' opening offer will be above their supply curve if they are not price-takers, the sellers' opening or first price offer, say $P_{s,1}$, can be represented as the inverse supply function plus some positive increment $\Delta P_{s,1}$ which is related to the sellers' perceptions of market conditions and bargaining power, as:

$$\begin{aligned} P_{s,1} &= [P_s + \Delta P_{s,1}] + \varepsilon_{s,1} \\ &= [f_s(X) + \varepsilon_s] + [\Delta f_{s,1}(X) + \Delta \varepsilon_{s,1}] + \varepsilon_{s,1} \\ &= [f_s(X) + \Delta f_{s,1}(X)] + [\varepsilon_s + \Delta \varepsilon_{s,1} + \varepsilon_{s,1}] \\ &= f_{s,1}(X) + \varepsilon_{s,1}^* \end{aligned} \quad (9)$$

where $E(\varepsilon_{s,1}^*) = 0$ and $f_{s,1}(X)$ represents the expectation of the sellers' first price offer.

In making a decision regarding the acceptability of any price offer, buyers must have a threshold price in mind. If the sellers' offer is less than or equal to this threshold, the buyers will accept the price offer. If the offer is higher, the buyers will reject it. The buyers' threshold price, $P_{d,1}$, can be defined as the buyers' inverse demand, P_d , less an increment, $\Delta P_{d,1}$, that is a function of the buyers' perceptions about market conditions and bargaining power, as:

$$\begin{aligned} P_{d,1} &= [P_d - \Delta P_{d,1}] + \varepsilon_{d,1} \\ &= [f_d(X) + \varepsilon_d] - [\Delta f_{d,1}(X) + \Delta \varepsilon_{d,1}] + \varepsilon_{d,1} \\ &= [f_d(X) - \Delta f_{d,1}(X) + [\varepsilon_d - \Delta \varepsilon_{d,1} + \varepsilon_{d,1}]] \\ &= f_{d,1}(X) + \varepsilon_{d,1}^* \end{aligned} \quad (10)$$

where $E(\varepsilon_{d,1}^*) = 0$ and $f_{d,1}(X)$ is the expectation of the buyers' threshold price.

The difference between the sellers' first price offer and the buyers' threshold price, Y_1^* can be used to characterize the outcome of price bargaining at the first stage. The criterion function for the bargaining outcome will be:

$$Y_1^* = P_{s,1} - P_{d,1} = [f_{s,1}(X) - f_{d,1}(X)] + [\varepsilon_{s,1} - \varepsilon_{d,1}] = f_1(X) + \varepsilon_1^* \quad (11)$$

where $E(\varepsilon_1^*) = 0$. If $Y_1^* \leq 0$, which implies $P_{s,1} \leq P_{d,1}$, then the buyers accept the sellers' opening price offer and the bargaining process ends with a bargained price of $P^* = P_{s,1}$. The final price, P^* , can then be represented as:

$$P^* = P_{s,1} = f_{s,1}(X) + \varepsilon_{s,1}^* \quad (12)$$

The criterion variable Y_1^* is unobservable since the buyers' threshold price is not made public. However, information about the buyers' decision during the bargaining process is available in terms of the growers' price offers, the buyers' acceptance or rejection decision, and the final bargained price. Thus, whether the final price equals $P_{s,1}$ or not can be modeled via a limited dependent variable procedure by defining an observed indicator variable Y as:

$$Y = 0 \text{ if } Y_1^* \leq 0 \text{ which implies the offer } P_{s,1} \text{ was accepted} \quad (13)$$

$$Y = 1 \text{ if } Y_1^* > 0 \text{ which implies the offer } P_{s,1} \text{ was rejected.}$$

Second-round bargaining

If $Y_1^* > 0$, so that $P_{s,1} > P_{d,1}$, then the buyers will reject the sellers' opening price offer. In this case, the bargaining process will continue and the seller must make a second price offer in order to reach a price agreement. Viewing the sellers' second price offer as an adjustment to his or her first price offer, it can be expressed as the sellers' supply price plus an adjustment increment that is assumed to be less than or equal to the increment added to P_s in the previous offer.

$$\begin{aligned} P_{s,2} &= [P_s + \Delta P_{s,2}] + \varepsilon_{s,2} \\ &= [f_s(X) + \varepsilon_s] + [\Delta f_{s,2}(X) + \Delta \varepsilon_{s,2}] + \varepsilon_{s,2} \end{aligned} \quad (14)$$

$$\begin{aligned}
 &= [f_s(X) + \Delta f_{s,2}(X) + [\varepsilon_s + \Delta \varepsilon_{s,2} + \varepsilon_{s,2}]] \\
 &= f_{s,2}(X) + \varepsilon_{s,2}^* \\
 &\text{where } E(\varepsilon_{s,2}^*) = 0 \text{ and } Y_1^* > 0.
 \end{aligned}$$

Similarly, the buyers' second threshold price can be defined as an adjustment of the first-round threshold price. It can be represented as the buyers' demand price less an increment that is assumed to be greater than or equal to the increment in the previous threshold price function, as:

$$\begin{aligned}
 P_{d,2} &= [P_d - \Delta P_{d,2}] + \varepsilon_{d,2} \\
 &= [f_d(X) + \varepsilon_d] - [\Delta f_{d,2}(X) + \Delta \varepsilon_{d,2}] + \varepsilon_{d,2} \\
 &= [f_d(X) - \Delta f_{d,2}(X) + [\varepsilon_d - \Delta \varepsilon_{d,2} + \varepsilon_{d,2}]] \\
 &= f_{d,2}(X) + \varepsilon_{d,2}^*
 \end{aligned} \tag{15}$$

where $E(\varepsilon_{d,2}^*) = 0$ and $Y_1^* > 0$.

While it is impossible to know if there is any change in the buyers' threshold price during the bargaining process since the threshold price cannot be observed, it is reasonable to assume that the buyers will consider adjusting their threshold price based on previous bargaining outcomes. If the buyers' second threshold price is the same as the first in the bargaining process, then $\Delta P_{d,2} = \Delta P_{d,1}$, and the threshold price will be:

$$P_{d,2} = P_{d,1} = f_{d,1}(X) + \varepsilon_{d,1}^* \tag{16}$$

The criterion function for the second round price negotiation can be defined as the difference between the sellers' second price offer and the buyers' second threshold price:

$$Y_2^* = P_{s,2} - P_{d,2} = f_2(X) + \varepsilon_2^* \tag{17}$$

If $Y_2^* > 0$, so that $P_{s,2} > P_{d,2}$, then the buyer will reject the sellers' second price offer. In this case, the price discovery process continues. If $Y_2^* \leq 0$, then the sellers' second price offer will be accepted and the final price will be the sellers' second price offer, given by equation (14).

Summary

Many markets for farm output are plausibly characterized by some degree of imperfect competition. This is certainly true in most fruit and vegetable markets where growers are numerous, and where intermediation (e.g., processing or shipping/packing) is relatively concentrated. Cooperative bargaining among farmers may in some instances be institutional responses to these market imperfections which can enhance their bargaining position in price negotiations with non-cooperative intermediaries. In this Subtopic, we discussed the main constraints that smallholder farmers' face when entering markets or to strengthen their competitiveness in markets through the formation of cooperative or bargaining associations. We particularly discussed policies that may remove or reduce the constraints on smallholder farmers to market access. Compared with their larger colleagues, smallholders may be disadvantaged by their inability to benefit from scale economies and bargaining power. The bundling of produce as well as provision of services has usually been taken up by middlemen that therefore take a relative large share of the added value created in the producer-consumer chain. Alternatively, producers' organizations in the form of cooperatives or bargaining associations can and do take up this role in the supply chain.

Exercises

1. Why does bargaining occur primarily in markets for perishable products?

2. Discuss what the bargaining association “can do” and “cannot do”.
3. What do we mean when we say bargaining is more than simply “price enhancement”? Explain.

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