8-1-1987

The raising and feeding of red meat animals in the U.S. since 1945: A case study comparing Marxist crisis theories

Scott Hunt
University of Nebraska at Omaha

THE RAISING AND FEEDING OF RED MEAT ANIMALS IN THE U.S. SINCE 1945: A CASE STUDY COMPARING MARXIST CRISIS THEORIES

A Thesis

Presented to the

Department of Sociology

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

University of Nebraska at Omaha

by

Scott Hunt

August 1987

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

THESIS ACCEPTANCE

Acceptance for the faculty of the Graduate College, University of Nebraska, in partial fulfillment of the requirements for the degree Master of Arts, University of Nebraska at Omaha.

Committee

Name	Department
Mark O. Rousseau	Sociology
Willis C. Pratt	Department of History

Michael G. Lacy
Chair

31 Aug 1987
Date

ACKNOWLEDGMENTS

No project is ever the work of one person. This thesis could not have been written if it were not for the "significant others" in my life. The love and support of my parents has always been a source of comfort and inspiration. My surrogate brothers--Joe Foreman, Scott Curran, Richard Christiansen, and Jim Johnson--and everyone in the Sociology Department at the University of Nebraska at Omaha have helped me in some way while I wrote this thesis.

I thank the University of Nebraska at Omaha for awarding me the 1986-1987 Presidential Graduate Fellowship. I owe a special debt of gratitude to Dr. Michael Lacy, Dr. M. O. Rousseau, Dr. Andris Skreija, and Dr. Mary Ann Lamanna for recommending me for the award. I would also like to thank Dr. Lamanna for the use of her library space when I began this project. I am also indebted to Dr. Pelgy Vaz for her advice and encouragement. My fellow graduate students--David Anson, Gloria Combs, Gina Howard, Lise Knowles, John Rice, Donna Wilson, and Matthew "Alex" Yei--have also been very supportive.

My thesis committee deserves special thanks. I appreciate Dr. Bill Pratt's patience as this project evolved into something other than what I first described. I am grateful that Dr. Rousseau has insisted that I see the value of my ideas and research. I am especially thankful for Dr. Lacy's contributions. He has taken great care to help me become a better writer and thinker. Dr. Lacy worked with me on every phase of this thesis, generously giving me his time and efforts. He has read, evaluated, and discussed every word of

every draft. I am forever grateful for Dr. Lacy's assistance with my thesis and his contributions to my intellectual and personal development. I could not be more pleased that Dr. Lacy is my thesis advisor, mentor, and friend.

CONTENTS

List of Tables

List of Tables

List of Tables

List of Figures

CHAPTER I

Contradictory Marxian Crisis Theories and the U.S. Red Meat Industry

Political economists have traditionally treated capitalist crisis as a central theoretical focus. Starting with Marx and Engels, Marxian political economists have viewed crisis as a necessary result of ordinary capitalist economic life. Recent Marxist scholars have argued that capitalist crisis is a predominant feature of contemporary capitalism (see e.g. Sweezy, 1970; Cogoy, 1973; Habermas, 1973; O'Connor, 1973 and 1984; Yaffe, 1973; Bell, 1977; Wright, 1977; Mandel, 1978; Itoh, 1978; Fine and Harris, 1979; Mattick, 1981; Weeks, 1981; Bell and Cleaver, 1982). Non-Marxian political economists have also emphasized crisis in their work (see e.g. the neo-Ricardians Robinson, 1965; Steindl, 1952; Kalecki, 1971). Given the focus on crisis in political economy, and its particular prominence in Marxian theory, the current project centers around that theme. The objective is to systematically evaluate two competing Marxist theories of crisis, contrasting the "Fundamentalist" approach and its emphasis on the tendency for the rate of profit to fall (see e.g. Mattick, 1969; Cogoy, 1973; Yaffe, 1973) with the "Underconsumptionist" perspective (see e.g. Sweezy, 1970; Baran and Sweezy, 1966; Foster, 1986)[1]. Data from raising and feeding cows, calves, hogs, and pigs (the red meat industry) in the United States since 1945 will serve as a case study.

The particular focus of this project raises some important questions. Why is the study of economic crises significant from a Marxian perspective? What is a specifically capitalist economic

crisis? What are the reasons for focusing on the Fundamentalist and Underconsumptionist crisis theories? Why has the red meat industry been chosen for our case study? The following section answers those questions.

THE CHOICE OF A RESEARCH FOCUS

My project focuses on Marxian theory because that theoretical tradition has liberating political change as its guiding interest. This focus does not mean that non-Marxian explanations reveal little about economic crises. Non-Marxian political economists (e.g. Adam Smith, Ricardo, Keynes, Sraffa, etc.) have in fact greatly influenced Marxian theory. What makes Marxian theory preferable is that it presents itself as a lever for radical political change. Presenting some of Jurgen Habermas's work, Trent Schroyer (1970) explains that all scientific inquiry has inherent guiding interests. The particular interest of Marxian theory is to emancipate those subjected to "socially unnecessary modes of authority, exploitation, alienation [and] repression" (Shroyer, 1970: 225).

Analyses of capitalist economic crises hold special significance for the goal of liberating political change. From a Marxian point of view, one comes to see the capitalist economy as the primary source of socially unnecessary forms of authority, exploitation, and repression, and that economic crises potentially put the entire capitalist system at risk. Crisis theory is crucially significant to Marxian theorists because they believe that understanding the causes of economic crises can provide the necessary insights to take practical advantage of those crises and thereby move towards the liberation from capitalism.

A brief definition of capitalist crisis is necessary to show what

Marxian theorists attempt to explain. "Crisis" assumes many forms, varying within and across types of social formations. While Habermas (1973: 45-50) identifies four types of crises in modern capitalism--economic, rationality, legitimation, and motivational--my concern here is with economic crises, which are disruptions in processes of economic accumulation.

"Economic accumulation" refers to the processes by which capitalists appropriate greater and greater wealth. Combining raw materials and labor to produce commodities, capitalists then attempt to sell the product for more than the combined exchange values of the raw materials and labor. To accumulate more wealth, capitalists must invest part of the surplus back into the production process. When, for whatever reason, this cycle of investment-production-surplus-investment-etc. breaks down, so that capitalists do not realize an increase in wealth or do not reinvest, then an economic crisis exists. For capitalists to continue as such, changes must be made to resume the cycle of investment-production-surplus-investment-etc..

Marxists generally agree that understanding crises is pivotal for their theoretical paradigm, but they disagree over which specific Marxian theory most adequately explains economic crises. Hence, much of the contemporary debate about Marxian crisis theory has centered around the disagreements between the Fundamentalist and Underconsumptionist perspectives on crises (e.g. see Bell, 1977;

Wright, 1977; Foster, 1986).

The conflict between the Fundamentalist and Underconsumptionist perspectives stems from Marx's seemingly contradictory views of crisis. Fundamentalists base their perspective on Marx's contention that the falling rate of profit "is in every respect the most important law of modern political economy" (Marx, 1973: 748; see e.g. Yaffe, 1973: 200). Fundamentalists argue that, over time, profits tend to decrease relative to total investment. Production output fails to keep pace with increased investment, resulting in economic crises.

Underconsumptionists, on the other hand, focus on Marx's claim that "the ultimate reason for all real crises always remains the poverty and restricted consumption of the masses" (Marx, 1981: 615; see e.g. Sweezy, 1970: 177). The argument here is that capitalists produce more commodities then can be consumed at prices that return sufficient profits. For Underconsumptionists, relative overproduction causes economic crises. The Fundamentalist and Underconsumptionist views of crisis cannot coexist in the same theoretical paradigm because one cannot argue that the basic cause of crisis is insufficient production and, at the same time, overproduction (Wright, 1977: 222).

Highlighting this contradiction in Marx's work, Fundamentalist and Underconsumptionist proponents attempt to define what is <u>the</u> Marxian paradigm of crisis. Marxist scholars have used theoretical and, to a much lesser extent, empirical criteria to judge Fundamentalist and Underconsumptionist perspectives. While empirical investigations have not consistently substantiated the Fundamentalist thesis of a falling rate of profit (e.g. Gillman, 1957; Hodgson, 1974;

Mandel, 1975; Juttner and Murray, 1983), empirical evidence has supported the Underconsumptionist approach (e.g. Baran and Sweezy, 1966; Szymanski, 1984). The current study contributes to the Fundamentalist and Underconsumptionist debate by presenting an empirical case to test the competing theories. A project of this sort is significant because it supplies the Fundamentalist and Underconsumptionist debate with much needed empirical evidence and, moreover, it modestly contributes to the broader goal of defining the Marxian paradigm of crisis.

The U.S. red meat industry has been chosen as a case study to compare the Fundamentalist and Underconsumptionist approaches. As "the richest and most developed capitalist country" (Baran and Sweezy, 1966: 6), the United States should have an economy that closely typifies capitalism as described in the respective theories, and the red meat industry typifies the agricultural sector of the U.S. economy (Skaggs, 1986: 3-10).[2] To make this project manageable in terms of data collection and presentation, the case study examines only the raising and feeding of red meat animals, which will be defined to include cattle, calves, hogs, and pigs.[3]

So far, based on the value position inherent in "emancipatory science", I have suggested the following: crisis is an important organizing theme in Marxist political economy; the Fundamentalist and Underconsumptionist perspectives represent two important and contradictory variants of Marxian crisis theory; and, the United States red meat industry offers a fair empirical case to evaluate the

competing perspectives. The following section will discuss the major theoretical concepts in Marxian crisis theory and identify the data required to measure them.

THE CONCEPTS

Explaining the causes of economic crises, Fundamentalists and Underconsumptionists present their arguments in terms of relationships between abstract concepts. To make the Fundamentalist and Underconsumptionist arguments accessible to readers unfamiliar with those perspectives, the following summarily defines the major concepts and identifies the data required to measure them.

Concept: Constant Capital (c)

Definition: The value of all labor expended creating the materials and machinery used up in production.

Indicator: The cost of materials and machines used up in production.

Concept: Variable Capital (v)

Definition: The value of all labor necessary to produce and reproduce workers' capacity to labor.

Indicator: Hired labor costs.

Concept: Surplus Value (s)

Definition: The portion of a commodity's value for which workers are not paid and that capitalists appropriate.

Indicator: The difference of revenues from the production of commodities ("gross income"), less the total costs of production (c + v).

Concept: Rate of Profit (r)

Definition: Return on invested capital. Notice that this ratio measures capital efficiency--a higher rate of profit indicates a higher rate of return on invested capital.

Indicator: Surplus value divided by constant plus variable capital (s divided by c + v).

Concept: Organic Composition of Capital (Q)[4]

Definition: The amount of constant capital relative to the total labor expended during the current production process. This reflects the degree to which industry is mechanized or "capital intensive".

Indicator: Constant capital divided by the sum of surplus value plus variable capital (c divided by v + s).

Concept: Rate of Exploitation (e)

Definition: Return relative to labor expenditures. Notice that this ratio measures labor efficiency--a higher rate of exploitation indicates a higher rate of return on labor expenditures.

Indicator: Surplus value divided by variable capital (s divided by v).

Concept: Unrealized Surplus Value

Definition: Unrealized surplus value is value produced but not fully realized as revenue. Relatively greater amounts of unrealized surplus value means that commodities are unsold, or that commodities are exchanged for less than their full value, or both.

Indicator: The full price-value of commodities unsold, plus the full price-value of commodities sold, less actual revenues received.

Concept: Absolute Surplus Value

Definition: Total value produced less production costs. This is a measure of potential profits.

Indicator: Surplus value plus unrealized surplus value.

Concept: Output/Investment Ratio

Definition: Production output relative to capital investment. This ratio measures capital productivity.

Indicator: The number of commodities produced divided by constant plus variable capital. Rather than a price-value measure, the number of commodities produced serves as an indicator of production output. Using the number of commodities produced is a more direct measure than estimating full price-value for production output.

Concept: Consumption/Investment Ratio

Definition: The number of commodities consumed relative to capital investment. This ratio measure capital efficiency--a higher consumption/investment ratio indicates that a greater number of commodities are sold per dollar invested.

Indicator: The number of commodities consumed divided by constant plus variable capital. As above, the number of commodities consumed provides a more direct measure of consumption than an estimated price-value.

Concept: Underutilized Production Capacity

Definition: The difference between the actual number of commodities produced, less maximum output. Lower values indicate greater underutilization of production capacity.

Indicator: The actual number of commodities produced during a given year, less the greatest number of commodities produced in one year (prior to and including the year in question).

Concept: State Subsidies

Definition: State financial assistance to a given sector of the economy. This indicates the level of state involvement in industry. As I will discuss later, relatively greater state involvement in industry counteracts the tendency of underconsumption.

Indicator: Direct state (Federal) payments to an industry.

With these concepts I will outline and clarify the Fundamentalist and Underconsumptionist approaches, eventually deriving testable hypotheses for each perspective.

THE FUNDAMENTALIST APPROACH

According to Fundamentalists, the theory of a falling rate of profit is Marx's only theory of crisis and the most adequate explanation of that phenomenon (see e.g. Cogoy, 1973; Yaffe, 1973;). Proponents of this perspective maintain that, other things being equal, as the organic composition of capital increases, the rate of profit declines. "Other things being equal" means assuming that the rate of exploitation remains constant. Since many factors influence the rate of exploitation--trade unions, government policies, employer organizations, exports, imports, etc.--a declining rate of profit is only a tendency rather than a necessity. Nevertheless, Fundamentalists maintain that the rate of profit tends to decline over time.

Paraphrasing Wright's (1977: 204-206) systematic and succinct outline of the Fundamentalist approach, one can summarize that perspective in six propositions:

1) Because capitalists typically replace workers with machines and materials, the organic composition of capital tends to rise.
2) Unless the rate of exploitation increases sufficiently to counteract the increases in the organic composition of capital,

the rate of profit tends to decline.

3) Eventually the rate of exploitation cannot counteract increases in the organic composition of capital and the rate of profit declines.

4) When a decline in the rate of profit sufficiently impedes the accumulation processes, there is an economic crisis for capital. Thus, underproduction of surplus value promotes the decline of the rate of profit.

5) The crisis conditions serve to restore the accumulation processes.

   a) Only the most efficient and productive capitalists survive the crisis.

   b) Those who do not survive the crisis are forced to sell their stock of constant capital below normal exchange values.

   c) The crisis tends to increase unemployment thereby increasing competition for jobs, driving down wages, and increasing the rate of exploitation.

6) The crises associated with a falling rate of profit take the form of "business cycles". Although the conditions of crises restore accumulation, the cycles tend to become increasingly severe over time.

The assertion that the organic composition of capital and the rate of exploitation determine the rate of profit is a tautology because it can be shown that the rate of profit is a function of the

organic composition of capital and the rate of exploitation. Specifically, the rate of profit can be expressed as e / Q (1 + e) + 1 (see Wright, 1977: 204). This means that the rate of profit depends on the organic composition of capital and the rate of exploitation. More importantly, by definition, the rate of profit increases when the rate of exploitation increases (other things being equal); and, the rate of profit decreases when the organic composition of capital increases (other things being equal).

Because the organic composition of capital and the rate of exploitation define the rate of profit, my task here is to test whether Fundamentalists correctly predict the trends associated with those three variables. Using the above propositions, one can derive three Fundamentalist hypotheses for the red meat industry from 1945 to 1983:

FH1: The organic composition of capital has shown a tendency to increase.

FH2: The rate of profit has shown a tendency to decline.

FH3: The organic composition of capital, rather than the rate of exploitation, is the principal determinant of the rate of profit.

THE UNDERCONSUMPTIONIST APPROACH

Contemporary Marxian Underconsumptionist theorists maintain that underconsumption results from an excess capacity to produce commodities (Bleaney, 1976; Bell, 1977: 179). Paraphrasing Wright's

concise and structured account of the Underconsumptionist approach, one can summarize that perspective in four propositions:

1) Absolute surplus value and the rate of exploitation in capitalist society at large tend to increase.
2) Consumption tends to fall behind the output of commodities. Consequently, some commodities produced remain unsold and others sell for less than their value, creating a "realization problem" for capital. In more conventional terms, supply outstrips effective demand. The portion of absolute surplus value which is unrealized increases over time.
3) Failure to realize full surplus value may lead to a fall in the rate of profit. One response to realization crises is to create new sources of demand. The state usually takes up the task of creating new demand (e.g. state subsidies for crisis industries, imperialist wars that stimulate the economy, etc.). Another response is to produce fewer commodities, thereby underutilizing productive capacity.
4) Tendencies toward underconsumption are present in all stages of capitalist development, but are most characteristic of monopoly capitalism.

If the Underconsumptionist theory is correct, one would expect that (other things being equal) (1) the amount of consumption relative to the sum of constant plus variable capital (consumption/investment ratio) will decline over time; (2) the number of commodities produced

relative to investment (output/investment ratio) will be relatively static; (3) and the unrealized portion of absolute surplus value (the rate of unrealized surplus value) will increase over time (Sweezy, 1970: 183). "Other things being equal" here means holding constant the effects of state created demand and underutilized production capacity.

Using these propositions, one can derive three Underconsumptionist hypotheses for the red meat industry from 1945 to 1983:

UH1: The rate of unrealized surplus value has tended to increase.

UH2: Holding constant the effects of the output/investment ratio, direct state payments to the farm sector, and the utilization of productive capacity, there will be a negative relationship between the consumption/investment ratio and the rate of unrealized surplus value.

UH3: Holding constant the effects of the output/investment ratio, direct state payments to the farm sector, the utilization of productive capacity, and the consumption/investment ratio, there will be a negative relationship between the rate of unrealized surplus value and the rate of profit.

Thus far, I have stated hypotheses for the Fundamentalist and Underconsumptionist perspectives. The Fundamentalist hypotheses focus on trends associated with the organic composition of capital, the rate of exploitation, and the rate of profit. The Underconsumptionist hypotheses, on the other hand, focus on trends associated with the

rate of unrealized surplus value and the relationships between (1) the consumption/investment ratio and the rate of unrealized surplus value and (2) the rate of unrealized surplus value and the rate of profit. Previous empirical studies have tested either Fundamentalist or Underconsumptionist hypotheses (Gillman, 1957; Baran and Sweezy, 1966; Hodgson, 1974; Mandel, 1975; Juttner and Murray, 1983; Szymanski, 1984). The current project goes beyond previous studies by testing the theories against one another.

TESTING THE THEORIES AGAINST ONE ANOTHER

The above discussion suggests that the two competing perspectives view economic crises quite differently. Fundamentalists maintain that a falling rate of profit is an economic crisis, while Underconsumptionists argue that an increasing rate of unrealized surplus value is an economic crisis. This makes it difficult to test the theories against one another because of their disagreement about how to define the central concept of "crisis". Proponents of the Fundamentalist approach have suggested a crucial test of the competing perspectives by arguing that a falling rate of profit causes increases in the rate of unrealized surplus value (Cogoy, 1973: 64). If the Fundamentalists are correct, one would expect that (other things being equal) (1) as the rate of profit decreases, the rate of unrealized surplus value increases; and, (2) taking account of the rate of profit should significantly enhance our ability to predict the rate of unrealized surplus value. Stated as hypotheses:

Test 1: Holding constant the effects of the output/investment ratio, direct state payments to the farm sector, utilization of productive capacity, and the consumption/investment ratio, there will be a negative relationship between the rate of profit and the rate of unrealized surplus value.

Test 2: When taking account of the rate of profit (Test 1 hypothesis), our ability to predict the rate of unrealized surplus value is significantly greater than when we do not take account of the rate of profit (the second Underconsumptionist hypothesis, UH2).

If the second of these hypotheses holds, this would support the Fundamentalist perspective. If that hypothesis is not supported, this would suggest that a declining rate of profit does not necessarily cause the rate of unrealized surplus value to increase, thus failing to substantiate the Fundamentalist argument against the Underconsumptionist perspective.

In this chapter, I have discussed the research focus of the current project, defined the major concepts of the competing theories, outlined the Fundamentalist and Underconsumptionist perspectives of economic crisis, derived hypotheses for both perspectives, and suggested a way to test the theories against one another. In the next chapter, I will specify measures of the concepts identified here.

Chapter II

Empirical Indicators and Measures of the Concepts

The preceding chapter offered three Fundamentalist hypotheses for the red meat industry from 1945 to 1983: (FH1) The organic composition of capital has shown a tendency to increase; (FH2) The rate of profit has shown a tendency to decline; and, (FH3) The organic composition of capital, rather than the rate of exploitation, is the principal determinant of the rate of profit. Three Underconsumptionist hypotheses were identified as well: (UH1) The rate of unrealized surplus value has tended to increase; (UH2) Holding constant the effects of the output/investment ratio, direct state payments to the farm sector, and the utilization of productive capacity, there will be a negative relationship between the consumption/investment ratio and the rate of unrealized surplus value; and, (UH3) Holding constant the effects of the output/investment ratio, direct state payments to the farm sector, the utilization of productive capacity, and the consumption/investment ratio, there will be a negative relationship between the rate of unrealized surplus value and the rate of profit.

To test the theories against one another I also derived two further hypotheses: (Test 1) Holding constant the effects of the output/investment ratio, direct state payments to the farm sector, utilization of productive capacity, and the consumption/investment ratio, there will be a negative relationship between the rate of profit and the rate of unrealized surplus value; and, (Test 2) When

taking account of the rate of profit (Test 1 hypothesis), our ability to predict the rate of unrealized surplus value is significantly greater than when we do not take account of the rate of profit (the second Underconsumptionist hypothesis, UH2).

To permit a test of these hypotheses, this chapter defines measures of the Fundamentalist and Underconsumptionist concepts.

CONCEPTS AND EMPIRICAL INDICATORS

The last chapter identified some general empirical indicators for a number of crisis theory concepts. Making the definitions of the concepts even more concrete, the following identifies several components of these indicators as they apply to the empirical case at hand.

Concept: Constant Capital

Indicator: The costs of materials and machines used up in production.

Components: The costs of feed, livestock, energy, machinery, structures, overhead, and land.

Concept: Variable Capital

Indicator: The costs of labor used in production.

Components: Hired labor costs.

Concept: Surplus Value

Indicator: Total revenues less production costs (constant plus variable capital).

Components: Total revenues from market receipts plus the imputed prices of red meat animals slaughtered for farm consumption ("gross income"), less the price-values of constant and variable capital.

Concept: Rate of Profit

Indicator: The ratio of surplus value to constant plus variable capital.

Components: (As defined above).

Concept: Organic Composition of Capital

Indicator: Constant capital divided by the sum of surplus value and variable capital.

Components: (As defined above).

Concept: Rate of Exploitation

Indicator: Surplus value divided by variable capital.

Components: (As defined above).

Concept: Unrealized Surplus Value

Indicator: The full price-value of commodities unsold, plus the full price-value of commodities sold, less actual revenues received.

Components: An imputed full price-value for those animals unsold (but which are not part of a normal stock withheld from the market), plus an imputed full price-value for red meat animals sold, plus an imputed full price-value for red meat animals slaughtered for farm consumption, less "gross income" (as defined above).

Concept: Absolute Surplus Value

Indicator: Surplus value plus unrealized surplus value.

Components: (As defined above.)

Concept: Output/Investment Ratio

Indicator: The number of commodities produced divided by constant and variable capital.

Components: The number of red meat animals born during the year divided by constant and variable capital.

Concept: Consumption/Investment Ratio

Indicator: The number of commodities consumed divided by constant and variable capital.

Components: The number of red meat animals marketed, plus the number of red meat animals slaughtered for farm consumption divided by constant and variable capital.

Concept: Underutilized Production Capacity

Indicator: The actual number of commodities produced during a given year, less the greatest number of commodities produced in one year (prior to and including the year in question).

Components: The actual number of red meat animals born during a given year, less the greatest number of red meat animals born in one year (prior to and including the year in question).

Concept: State Subsidies

Indicator: Direct state payments to an industry.

Components: Direct Federal payments to the farm sector in constant dollars.

DATA SOURCES AND ASSUMPTIONS

The availability of data has greatly influenced the selection and calculations of empirical indicators. For many years, including 1945 to 1983, the U.S. Department of Agriculture (USDA) has estimated the "value of production" (total production costs) and "gross income" (cash market receipts plus the price-value for red meat animals slaughtered for farm consumption) (Agricultural Statistics). From their figures, one can obtain a surplus value estimate by subtracting the "value of production" from "gross income". Dividing that estimate

of surplus value by the "value of production" would approximate the rate of profit for the red meat industry.

Although the USDA figures permit easy calculation of surplus value and the rate of profit, more detailed data is needed to determine the specific components of total production costs. In particular, the USDA data does not separate total production costs into constant capital (material and machines) and variable capital (labor costs). Such detailed information is necessary for computing the organic composition of capital.

To deal with this problem, the USDA figures for "gross income" have been used to measure total revenue, but I have employed other data sources to separate the components of total production costs (constant and variable capital). Although in recent years the Economic Research Service division of the USDA has reported detailed accounts of the costs of production by commodity (e.g. "fed cattle production", "cow-calf production", "feeder pig production", etc.), such data is not available prior to 1980 (see Economic Indicators of the Farm Sector). Data sources that include all the years since 1945, however, give production costs for the entire farm sector, rather than specific commodities (e.g. red meat animals) (see Lucier, et al.,1986:1-8). Even though we would ideally want finer figures, data for the entire farm sector is the only source that allows us to determine the components of total production costs for all the years since 1945.

Because the best available data reports the costs of production

for the entire farm sector only, one must develop procedures to estimate what portion of those costs belong to the red meat industry. To prevent errors that bias the measures in favor of the hypotheses, I have used assumptions (where necessary) that work against the Fundamentalist and Underconsumptionist hypotheses. For example, evidence showing that the rate of profit has declined since 1945 would support both the Fundamentalist and Underconsumptionist hypotheses. Hence, any measurement assumptions for surplus value and total production costs should purposefully err toward higher figures for surplus value and lower figures for total production costs, thus producing higher rates of profit and making it more difficult to substantiate the Fundamentalist and Underconsumptionist hypotheses.

The following summarizes my measurements and assumptions for developing empirical indicators for the red meat industry. (For a more complete discussion see Appendix A.)

Constant and Variable Capital

Concept: Constant Capital

Component: Feed Costs

Data Source: Based on feed costs for the entire farm sector (Lucier, et al., 1986: 22)

Objective: Determine what portion of the feed costs for the entire farm sector belong to the red meat industry

Formula:

```
  Feed Costs for Red Meat Animals
= Feed Costs for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/  Cash Market Receipts from All Livestock)
```

Assumptions and Problems: Costs are apportioned to the red meat industry according to its share of revenues from the entire farm sector.

Concept: Constant Capital

Component: Livestock Costs

Data Source: Based on feeder livestock costs for the entire farm sector (Lucier, et al, 1986: 22)

Objective: Determine what portion of the feeder livestock costs for the entire farm sector belong to the red meat industry

Formula:
Livestock Costs for Red Meat Animals
= Livestock Costs for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/ Cash Market Receipts from All Livestock)

Assumptions and Problems: Again, costs are apportioned to the red meat industry according to its share of revenues from the entire farm sector. The reader should note that only the costs of feeder livestock are used to estimate total livestock expenses. Such an estimate does not count the costs of breeding stock and, therefore, underestimates total livestock expenses.

Concept: Constant Capital

Component: Energy Costs

Data Source: Based on fuel, oil, and electricity (energy) costs for the entire farm sector (Lucier, et al, 1986: 22)

Objective: Determine what portion of energy costs for the entire farm sector belong to the red meat industry

Formula:
Energy Costs for Red Meat Animals
= Energy Costs for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/ Cash Market Receipts from All Farm Commodities)

Assumptions and Problems: Because feed and livestock costs apply exclusively to livestock production, only the receipts from livestock production are used to determine red meat animals' share of those expenses. Here, however, because energy costs apply to all farm production, it is necessary to use the receipts from all farm commodities for that figure.

Concept: Constant Capital

Component: Machinery Costs

Data Source: Based on the costs of tractors and trucks for the entire farm sector (Lucier, et al, 1986: 26)

Objective: Determine what portion of tractor and truck costs for the entire farm sector belong to the red meat industry

Formula:

Machinery Costs for Red Meat Animals
= Tractor and Truck Costs for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/ Cash Market Receipts from All Farm Commodities)

Assumptions and Problems: Researchers of the red meat industry identify tractors and trucks as the major machinery expenses (Boykin, et al., 1980: 106-109; Van Arsdall, 1978: 1978: 60-62). My estimates therefore restrict the costs of machinery to those two items. As above, because tractor and truck costs apply to all farm production, receipts from all farm production are used to figure the apportioned costs.

Concept: Constant Capital

Component: Structure Costs

Data Source: Based on the costs of service buildings for the entire farm sector (Lucier, et al, 1986: 26)

Objective: Determine what portion of service building costs for the entire farm sector belong to red meat animal production

Formula:

```
  Structure Costs for Swine Production
= Service Building Costs for the Entire Farm Sector
* (Cash Market Receipts from Swine
/  Cash Market Receipts from All Farm Commodities)
```

Assumptions and Problems: Other research supports the assumption that the cost of structures for beef production is negligible (Boykin, et al., 1980: 95). The only applicable costs for red meat animals, then, would be the structure costs for swine production. Again, because service building costs apply to all farm production, the receipts from all farm commodities are used to arrive at the apportioned structure costs.

Concept: Constant Capital

Component: Overhead Costs

Data Source: Based on veterinary, livestock marketing, repairs, operations, telephone, and other miscellaneous costs for the entire farm sector (Lucier, et al, 1986: 24)

Objective: Determine what portion of veterinary, livestock marketing, repairs, operations, telephone, and other miscellaneous overhead costs for the entire farm sector belong to the red meat industry

Formula:

```
  Overhead Costs for Red Meat Animals
= [Veterinary and Livestock Marketing Costs
                for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/  Cash Market Receipts from All Livestock)]
+ [Repairs, Operations, Telephone, and Other
   Miscellaneous Overhead costs for the Entire Farm
                                          Sector
* (Cash Market Receipts from Red Meat Animals
/  Cash Market Receipts from All Farm Commodities)]
```

Assumptions and Problems: The total overhead costs for the entire farm sector consists of two kinds of expenses: 1) those that apply only to livestock production--veterinary and livestock marketing expenses; and, 2) those that apply to all farm production--repairs, operations, telephone, and other miscellaneous expenses. Employing the methods described for the above estimates of feed and energy, my estimates of

livestock overhead use cash receipts from livestock production; and my estimates of general farm overhead use cash receipts from all farm commodities.

Concept: Constant Capital

Component: Land Costs [1]

Data Source: Based on rent, property taxes, and mortgage interest costs from the entire farm sector (Lucier, et al, 1986: 23, 25), land utilization statistics (Agricultural Statistics, 1985: 372), and land value figures (U.S. Census of Agriculture, 1945: 1; 1974: 76-77; 1978: 102-103).

Objective: Determine what portion of rent, mortgage interest, and property taxes ("land costs") for the entire farm sector belong to beef production

Formula:

Land Costs for Beef Production
= Land Costs for the Entire Farm Sector
* (Acres of Private Pasture and Grassland
/ Acres of All Farmland)
* (Average value of an Acre Used for Grazing Livestock
/ Average value of an Acre Used for All Farm Production)
* (Cash Market Receipts from Cattle and Calves
/ Cash Market Receipts from All Grazing Livestock)

Assumptions and Problems: Other research supports the assumption that the cost of land for swine production is negligible (Van Arsdall and Gilliam, 1979: 194-195). The only applicable costs for red meat animals, then, would be the land expenses for beef production. The ratio of acres of land used for grazing animals to total farmland times the ratio of the average value of an acre of land used for livestock production to the average value of an acre of land in all farm production equals the ratio of land costs for grazing animals to total farm land costs. Because the value per acre of land used in livestock production divided by the value per acre of all farm land has been relatively stable since 1945 (61.0% in 1945, 62.2% in 1974, 65.1% in 1978), my estimates set this ratio at 60.0% for all forty years (U.S. Census of Agricultural). Essentially this estimates the total land costs for all grazing animals, and we must now

find the portion of that cost which belongs to beef production. As in estimating feed and livestock expenses, my estimates assume that the ratio of land costs for beef production to land costs for all grazing livestock is the same as the ratio for their respective market receipts.

Concept: Variable Capital

Component: Hired Labor Costs

Data Source: Based on hired labor costs for the entire farm sector (Lucier, et al, 1986: 23) and statistics reflecting labor hours (Economic Indicators of the Farm Sector, 1984: 31)

Objective: Determine what portion of hired labor costs for the entire farm sector belong to the production of red meat animals.

Formula:

```
  Hired Labor Costs for Red Meat Animals
= (Hired Labor Costs for the Entire Farm Sector
/   Total Farm Labor Hours)
*  Hours Spent Raising Meat Animals
*  (Cash Market Receipts from Red Meat Animals
/   Cash Market Receipts from Meat Animals)
```

Assumptions and Problems: The above formula first calculates an average hourly wage for all farm labor. Then, multiplying the average hourly wage by the hours spent raising meat animals produces the hired labor costs for the meat industry. To figure what portion of hired labor costs for the meat industry belongs to red meat animals, the formula multiplies the former by the appropriate cash market receipt ratio.

The sum of these costs approximates total production costs (constant plus variable capital). With the revenue data ("gross income"), one can easily estimate surplus value, the rate of profit, the organic composition of capital, and the rate of exploitation.

Unrealized Surplus Value and Other Underconsumptionist Concepts

Unlike the estimates of production costs, my measures of the central Underconsumptionist concepts do not require apportioning procedures. The following summarizes my measurements for developing indicators for unrealized surplus value, the output/investment ratio, consumption/investment ratio, underutilized production capacity, direct state payments to the farm sector, and absolute surplus value.

Concept: Unrealized Surplus Value (Beef Production)

Component: Imputed Price for Unsold Beef

Data Source: Based on beef inventory and its disposition (*Agricultural Statistics*, 1967: 367, 372; 1983: 265, 272; 1985: 256, 263)

Objective: Determine the overproduction of beef and then estimate its price-value

Formula:

Imputed Price for Unsold Beef
= Total Beef Inventory as of January 1
\+ Cattle Shipped In During the Year
\+ Calves Born During the Year ("calf crop")
\- Cattle and Calves that Die During the Year
\- Following Year's Inventory of Milk Cows (this includes milk cows and milk cow replacements)
\- Cattle Other than Beef Cattle
\- Following Year's Necessary Inventory (includes bulls and other "stocker cattle")
\- Calves Not Ready for Market (this includes calves under 500 pounds)
\- Cattle and Calves Marketed
\- Cattle and Calves Slaughtered for Farm Consumption

* The greatest price received per head from 1945 up to and including the year in question, which is calculated as

The Number of Cattle and Calves Marketed and Slaughtered for Farm Consumption
/ "Gross Income" for Beef Production

Assumptions and Problems: Assuming that all of the following year's inventory of stocker cattle is "necessary" and all calves under 500 pounds are not ready for market may underestimate excess inventory. My calculations assume that surplus value is never greater than the full price-value for red meat animals. When the year in question has a greater return per animal than all preceding years, then surplus value equals full price-value.

Concept: Unrealized Surplus Value (Beef Production)

Component: Difference Between Full Price-Value and Actual Revenue

Data Source: Based on beef inventory and its disposition (Agricultural Statistics, 1967: 372; 1983: 272; 1985: 263)

Objective: Determine the difference between the full price-value for cattle and calves sold and the actual amount received.

Formula:

Full Price-Value Less Actual Beef Revenues
= The greatest price received per head from 1945 up to and including the year in question, which is calculated as
(The Number of Cattle and Calves Marketed and Slaughtered for Farm Consumption
/ "Gross Income" for Beef Production)
* The Number of Cattle and Calves Marketed and Slaughtered for Farm Consumption
- "Gross Income" for Beef

Assumptions and Problems: See the above assumptions concerning surplus value and full price-value.

Concept: Unrealized Surplus Value (Swine Production)

Indicator: Imputed Price for Unsold Swine

Data Source: Based on swine inventory and its disposition (Agricultural Statistics, 1967: 381, 386; 1983: 280, 282; 1985: 271, 274)

Objective: Determine the overproduction of swine and then estimate its price-value

Formula:

Imputed Price for Unsold Swine
= (Total Swine Inventory as of January 1
+ Pigs Born During the Year ("pig crop")
- Hogs that Die During the Year
- Following Year's Necessary Inventory ("stocker swine" which includes sows farrowing plus boars which are estimated as 5% of the number of sows farrowing)
- Pigs Not Ready for Market (this includes five sixths of the pigs)
- Hogs and Pigs Marketed
- Hogs and Pigs Slaughtered for Farm Consumption)

* The greatest price received per swine from 1945 up to and including the year in question, which is calculated as

(The Number of Hogs and Pigs Marketed and Slaughtered for Farm Consumption
/ "Gross Income" for Swine)

Assumptions and Problems:

The data for pig crops already adjust for pigs lost between farrowing and weaning. So as not to overestimate excess inventory, after weaning death loss is set as a certain percentage of the total pig crop. Based on characteristics of the industry, the percentage is as follows: from 1945 to 1950 it equals 2%; from 1951 to 1960 the percentage declines steadily by .07%; from 1960 to 1979, the percentage continues to decrease, but at .01%; from 1970 to 1978, the percentage increases evenly by .065%; and, from 1978 to 1983, the percentage is 1.75% (Van Arsdall, 1978:29). The number of boars kept for breeding is 5% of the farrowing sows (Van Arsdall, 1978:18). Because it takes about six months to ready a pig for market, my calculations assume that five sixths of those pigs born after June 1 were not ready for market, and, therefore, should be excluded from estimated excess inventory (Van Arsdall, 1978:29). See the above assumptions for surplus value. Also see the assumptions for "Imputed Price for Unsold Beef" as they relate to surplus value and full price-value.

Concept: Unrealized Surplus Value (Swine Production)

Component: Difference Between Full Price-Value and Actual Revenue

Data Source: Based on swine inventory and its disposition (Agricultural Statistics, 1967: 381, 386; 1983: 280, 282; 1985: 271, 274))

Objective: Determine the difference between the full price-value of hogs and pigs sold and the actual amount received.

Formula:
Full Price-Value Less Actual Swine Revenues
= The greatest price received per swine from 1945 up to and including the year in question, which is calculated as
(The Number of Hogs and Pigs Marketed and Slaughtered for Farm Consumption
/ "Gross Income" for Swine Production)

* The Number of Hogs and Pigs Marketed and Slaughtered for Farm Consumption
- "Gross Income" for Swine

Assumptions and Problems: See the above assumptions for "Imputed Price for Unsold Beef" as they apply to surplus value and full price-value.

Concept: Output/Investment Ratio

Component: Number of Red Meat Animals Produced/Investment

Data Source: Based on red meat animal inventory and its disposition (Agricultural Statistics, 1967: 372, 381; 1983: 272, 280; 1985: 263, 271))

Objective: Determine the number of red meat animals "produced" relative to investment

Formula:
Output/Investment Ratio
= Number of Red Meat Animals Born During the Year
/ Constant and Variable Capital

Assumptions and Problems: See the assumptions for the components of constant and variable capital.

Concept: Consumption/Investment Ratio

Component: Number of Red Meat Animals Consumed/Investment

Data Source: Based on red meat animal inventory and its disposition (Agricultural Statistics, 1967: 372, 282; 1983: 272, 282; 1985: 263, 274)

Objective: Determine the number of red meat animals "consumed" relative to investment

Formula:
Consumption/Investment Ratio
= Red Meat Animals Marketed
+ Red Meat Animals Slaughtered for Farm Consumption
/ Constant and Variable Capital

Assumptions and Problems: Because they will most likely be marketed at some later time, red meat animals used as inventory replacements are not considered "consumed". This is to avoid overestimating consumption by counting some animals twice.

Concept: Underutilized Production Capacity

Component: Difference Between the Actual Number of Red Meat Animals Produced, Less Maximum Output

Data Source: Based on red meat animal inventory and its disposition (Agricultural Statistics, 1967: 372, 381; 1983: 272, 280; 1985: 263, 271)

Objective: Determine the difference between the actual number of red meat animals born during the year, less the greatest number of red meat animals born in one year (prior to and including the year in question)

Formula:
Underutilized Production Capacity
= The Number of Red Meat Animals Born During the Year
- The greatest number of red meat animals born in one year from 1945 up to and including the year in question

Assumptions and Problems: When the number of red meat animals born for the year in question is greater than those of preceding years, then underutilized production capacity is zero.

Concept:	State Subsidies
Component:	Direct State (Federal) Payments to the Farm Sector
Data Source:	Based on farm income statistics (Lucier, et. al., 1986: 14)
Objective:	Determine the level of state involvement in the red meat industry
Formula:	Convert state payments to the farm sector into constant 1967 dollars (See Appendix A).
Assumptions and Problems:	The portion of direct state payments that belong solely to red meat animals is not calculated because state assistance to other sectors of the farm economy also benefit red meat producers (e.g. assistance to those who raise feed crops makes feed cheaper for producers of red meat animals).

Unrealized surplus value is estimated by adding an imputed price for unsold red meat animals and the difference between full price-value for red meat animals sold and actual revenue received. The sum of unrealized surplus value and surplus value estimates absolute surplus value. Dividing unrealized surplus value by absolute surplus value yields the rate of unrealized surplus value.

All of the preceding measures of Marxian economic concepts rely on a tacit assumption, namely, that price is an adequate indicator for Marx's concepts of value. This immediately raises a validity question: Are empirical indicators based on price acceptable for concepts based on Marx's theory of value?

The theoretical difference between price and value is significant. The Marxist concept of value emphasizes that the capitalist mode of production necessarily exploits the working class,

thus focusing on social relationships between human beings. By contrast, classical economists and their disciples argue that the laws of commodity exchange (supply and demand) determine price, thus stressing relationships between things. One way to bring these conceptions together is to regard price as the phenomenal form of value (Juttner and Murray, 1983: 376). To view price as a phenomenal form of value, one must recognize that value has qualitative and quantitative aspects. The qualitative aspect of value, and what distinguishes it from the classical concept of price, is the emphasis on class relations; the quantitative aspect is the amount of labor time used up in production (Wright, 1977: 197-198). Here price is a quantitative indicator of the amount of labor time used up in production. Using price as a quantitative indicator of value has precedent in the empirical studies of Marxian economists (see e.g. Hodgson, 1974; Baran and Sweezy, 1966; Mandel, 1978; Juttner and Murray, 1983).

Besides the validity problem, another important question is raised by my estimating procedures. How accurate are my estimates of production costs? Ideally, one would check the accuracy of my estimates by comparing them to some other approximation of production costs. At the beginning of this section, I noted that the USDA has estimated total production costs for the red meat industry, but that those figures could not be used because they do not separate total production costs into constant capital and variable capital. Here, nonetheless, we can use the USDA figures for total production costs to check the accuracy of my estimates for total production costs. If

Table 2.1

COMPARISON OF ESTIMATED TOTAL BEEF PRODUCTION COSTS
BILLIONS OF 1967 DOLLARS

YEAR	RESEARCH	USDA	PERCENTAGE DIFFERENCE	YEAR	RESEARCH	USDA	PERCENTAGE DIFFERENCE
1945	2.97	3.02	-1.72%	1965	6.50	6.95	-6.47%
1946	2.76	3.04	-9.34%	1966	7.14	7.60	-6.02%
1947	3.59	3.79	-5.15%	1967	7.56	8.07	-6.33%
1948	3.79	4.06	-6.74%	1968	7.58	8.42	-9.98%
1949	3.65	4.32	-15.46%	1969	7.84	9.14	-14.29%
1950	4.34	5.29	-17.96%	1970	8.38	9.77	-14.24%
1951	4.77	6.21	-23.19%	1971	9.06	10.21	-11.23%
1952	4.44	5.87	-24.38%	1972	9.92	11.57	-14.30%
1953	3.49	4.57	-23.56%	1973	10.22	11.40	-10.36%
1954	3.79	4.53	-16.39%	1974	7.91	8.40	-5.91%
1955	4.06	4.76	-14.76%	1975	6.97	6.95	0.21%
1956	4.05	4.52	-10.48%	1976	7.85	7.55	3.99%
1957	4.40	4.88	-9.76%	1977	8.08	7.40	9.08%
1958	5.30	6.05	-12.30%	1978	10.03	9.46	6.01%
1959	6.00	6.90	-13.06%	1979	11.39	11.42	-0.31%
1960	5.39	6.26	-13.75%	1980	9.74	10.41	-6.45%
1961	5.62	6.48	-13.17%	1981	8.30	9.42	-11.90%
1962	6.24	6.98	-10.53%	1982	7.90	9.09	-13.11%
1963	6.40	7.03	-8.94%	1983	7.91	8.67	-8.73%
1964	5.98	6.74	-11.29%				

FIGURE 2.11 BEEF RESEARCH ESTIMATES

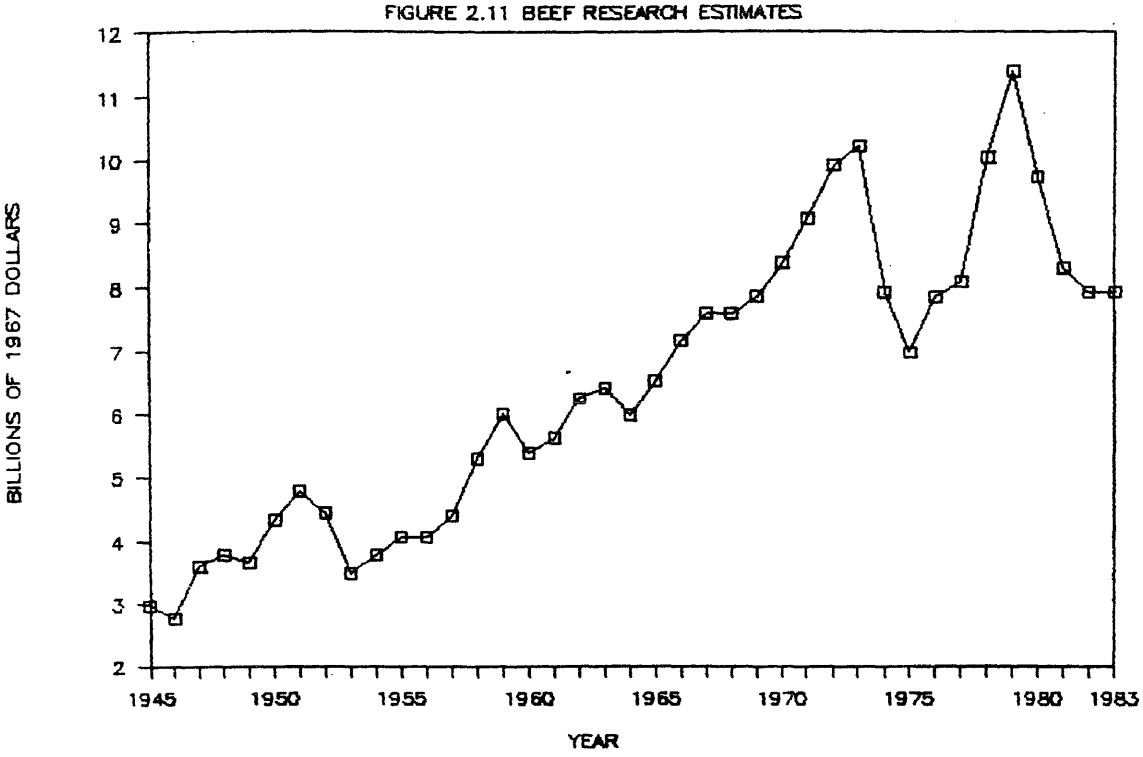


FIGURE 2.12 BEEF USDA ESTIMATES

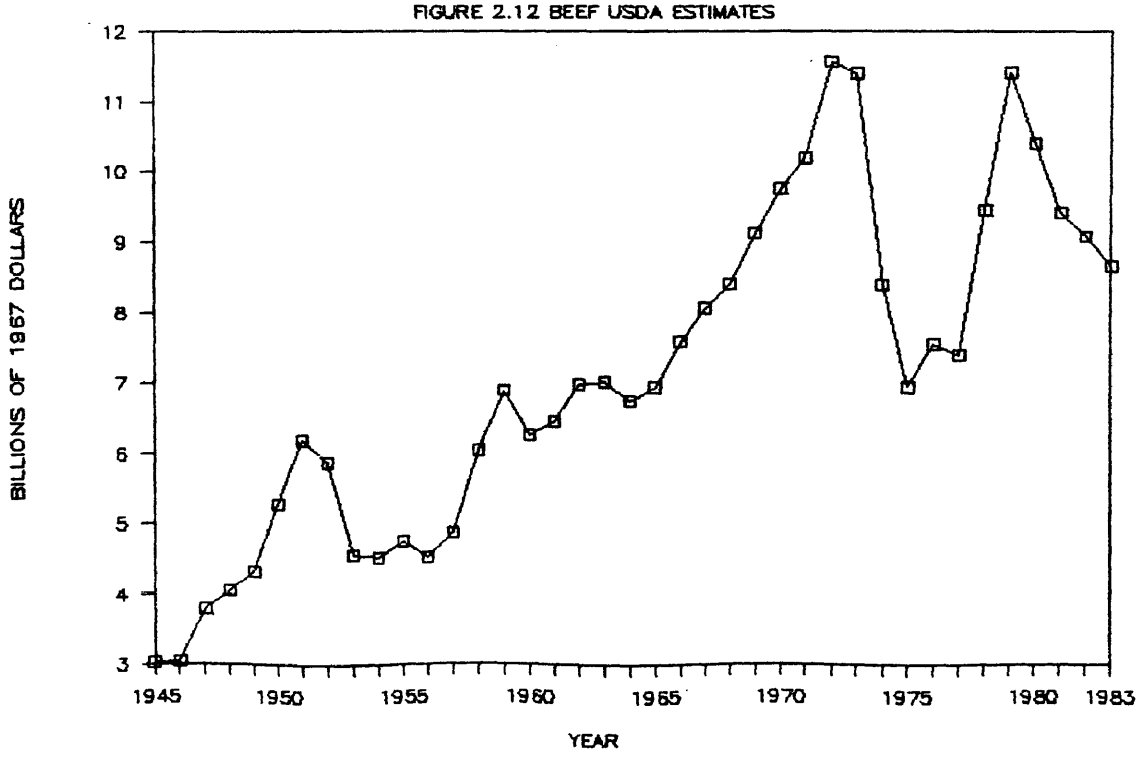


Table 2.2

COMPARISON OF ESTIMATED TOTAL SWINE PRODUCTION COSTS
BILLIONS OF 1967 DOLLARS

YEAR	RESEARCH	USDA	PERCENTAGE DIFFERENCE	YEAR	RESEARCH	USDA	PERCENTAGE DIFFERENCE
1945	1.80	3.36	-46.36%	1965	2.52	3.83	-34.03%
1946	2.03	3.60	-43.48%	1966	2.75	4.21	-34.61%
1947	2.68	4.62	-42.07%	1967	2.66	3.89	-31.65%
1948	2.51	4.14	-39.48%	1968	2.47	3.81	-35.17%
1949	2.25	3.94	-42.83%	1969	2.85	4.22	-32.49%
1950	2.35	3.87	-39.31%	1970	2.67	4.44	-39.77%
1951	2.53	4.01	-36.95%	1971	2.42	3.50	-30.94%
1952	2.35	3.43	-31.31%	1972	2.77	4.29	-35.25%
1953	2.34	3.73	-37.26%	1973	3.27	4.86	-32.78%
1954	2.43	4.12	-41.08%	1974	2.92	3.85	-24.24%
1955	1.98	3.33	-40.48%	1975	3.00	4.21	-28.76%
1956	1.89	3.03	-37.56%	1976	2.94	4.29	-31.38%
1957	2.16	3.49	-38.02%	1977	2.82	3.96	-28.77%
1958	2.32	3.84	-39.52%	1978	3.05	4.39	-30.48%
1959	2.09	3.20	-34.65%	1979	2.88	4.10	-29.86%
1960	2.05	3.14	-34.68%	1980	2.63	3.62	-27.37%
1961	2.28	3.58	-36.41%	1981	2.60	3.79	-31.39%
1962	2.35	3.50	-32.75%	1982	2.63	4.14	-36.40%
1963	2.32	3.33	-30.42%	1983	2.53	3.90	-35.01%
1964	2.25	3.21	-29.82%				

FIGURE 2.21 SWINE RESEARCH ESTIMATES

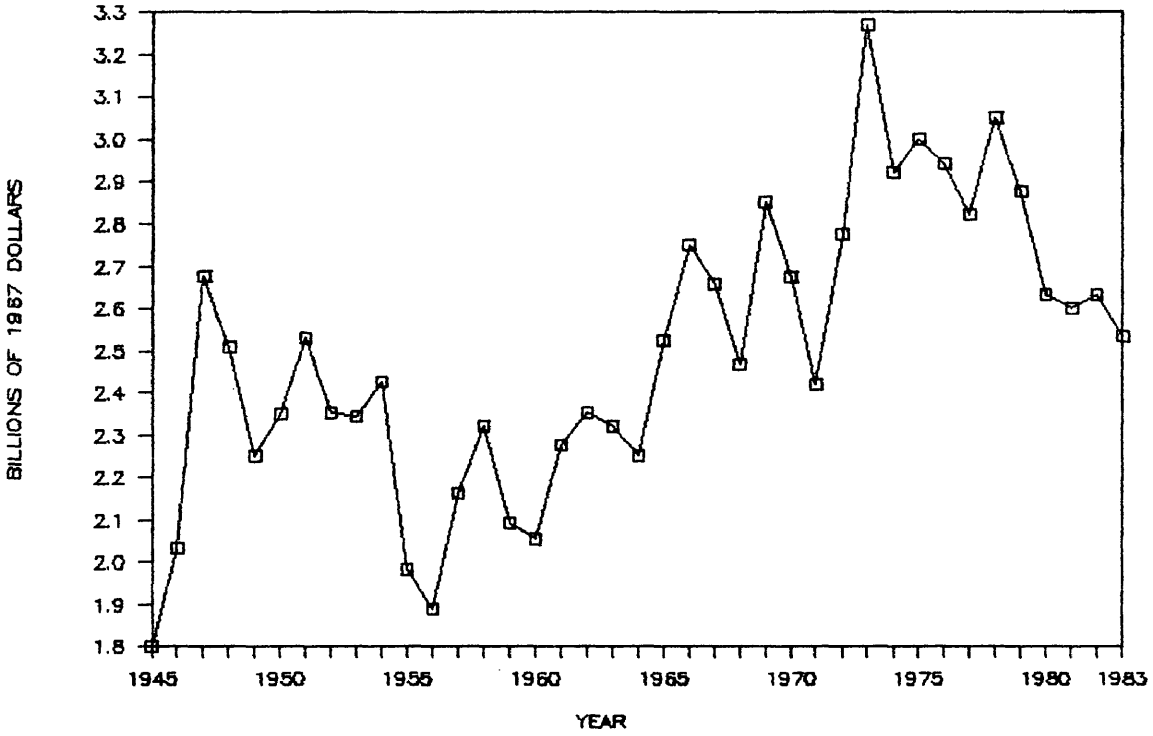
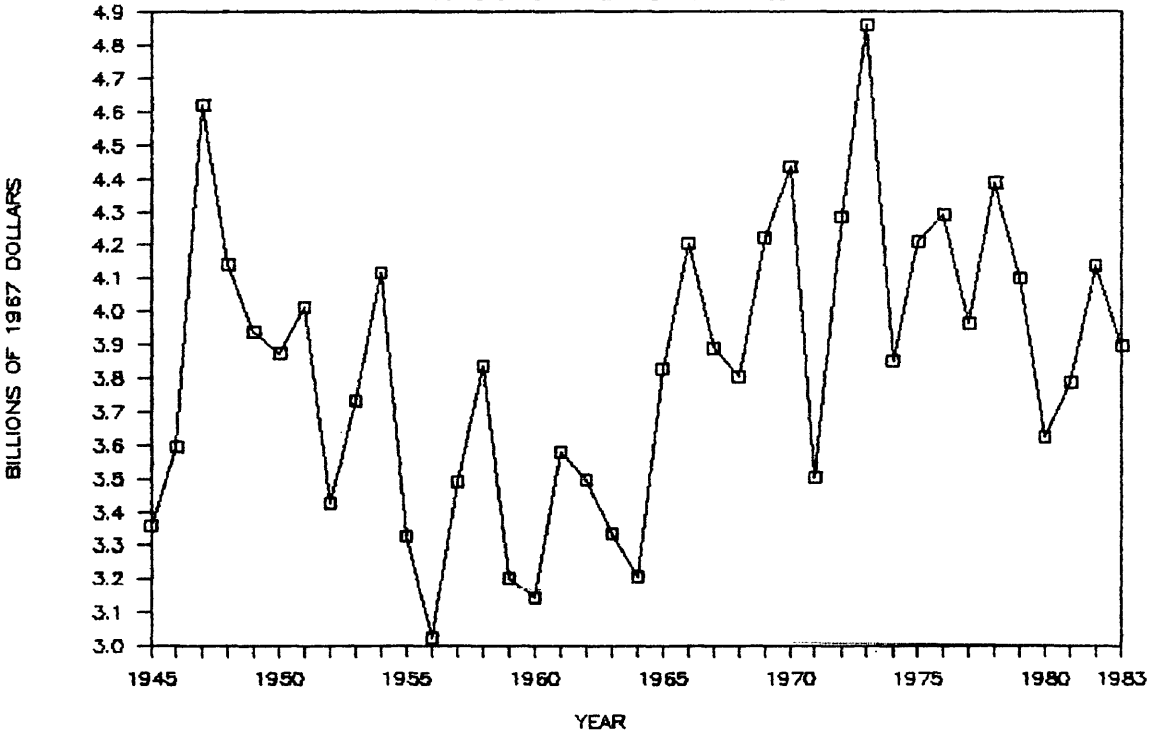


FIGURE 2.22 SWINE USDA ESTIMATES



my estimates of the components of total costs are accurate, they ought to add up to a total comparable to those of the USDA.

Comparing my estimates for total beef production costs with those of the USDA shows that my figures are consistently smaller than the USDA based estimates for all years except 1975 to 1978 (Table 2.1). However, my estimates and the USDA based alternative are highly correlated, r=.974, thus suggesting comparable measurements (Figures 2.11 and 2.12). My estimates for total swine production costs are consistently smaller than the USDA alternative (Table 2.2). Nevertheless, the two estimates are highly correlated, r=.829, indicating comparable measurements (Figures 2.21 and 2.22). Based on these comparisons, my estimates of total production costs appear to be reasonably accurate.

In this chapter, I have specified measures of the economic concepts. In the next chapter, I will use the Fundamentalist and Underconsumptionist variables, as they are defined and measured here, to test their respective hypotheses.

Chapter III

Tests of the Fundamentalist and Underconsumptionist Hypotheses

Using the variables outlined in the preceding chapter, this chapter tests Fundamentalist and Underconsumptionist hypotheses for the red meat industry from 1945 to 1983. Because my objective is to evaluate the competing models, this chapter does not "correct" those perspectives by introducing alternative theoretical explanations of the data. Rather than constructing a post hoc theoretical interpretation of the data, I will determine whether the Fundamentalist and Underconsumptionist hypotheses hold for the case of the red meat industry.

TESTS OF THE FUNDAMENTALIST HYPOTHESES

The Fundamentalist perspective maintains that capitalists typically replace workers with machines and materials, thereby increasing the organic composition of capital. Without an offsetting increase in the rate of exploitation, the rate of profit will decline. The Fundamentalist perspective further asserts that the rate of exploitation eventually cannot counteract increases in the organic composition of capital; so that in the long run, the rate of profit will decline.

The following section will examine economic trends in the red meat industry to determine if the Fundamentalist hypotheses hold. Because the rate of profit is a function of the organic composition of capital and the rate of exploitation, it would be a tautology to

"prove" that the latter two variables determine the rate of profit. Thus, the task of this section is to determine whether the organic composition of capital has increased and the rate of profit has declined, as predicted by the Fundamentalist hypotheses.

Three Fundamentalist hypotheses were identified for the red meat industry from 1945 to 1983. We will examine each in order of presentation. The first Fundamentalist hypothesis states:

FH1: The organic composition of capital has shown a tendency to increase.

Table 3.1

ESTIMATED ORGANIC COMPOSITION OF CAPITAL
BEEF PRODUCTION

Year	CATTLE AND CALVES	Year	CATTLE AND CALVES
1945	1.77	1965	1.87
1946	1.55	1966	1.90
1947	1.73	1967	1.98
1948	2.09	1968	1.76
1949	1.67	1969	1.67
1950	1.99	1970	1.76
1951	2.10	1971	1.80
1952	2.12	1972	1.66
1953	1.71	1973	2.14
1954	1.92	1974	2.58
1955	1.84	1975	2.06
1956	1.69	1976	2.18
1957	1.77	1977	2.30
1958	1.92	1978	2.22
1959	1.96	1979	2.39
1960	1.70	1980	2.39
1961	1.78	1981	2.00
1962	2.00	1982	1.64
1963	2.15	1983	1.94
1964	1.92		

SOURCE: see Tables A1.21 and A1.3

FIGURE 3.11 BEEF ESTIMATES

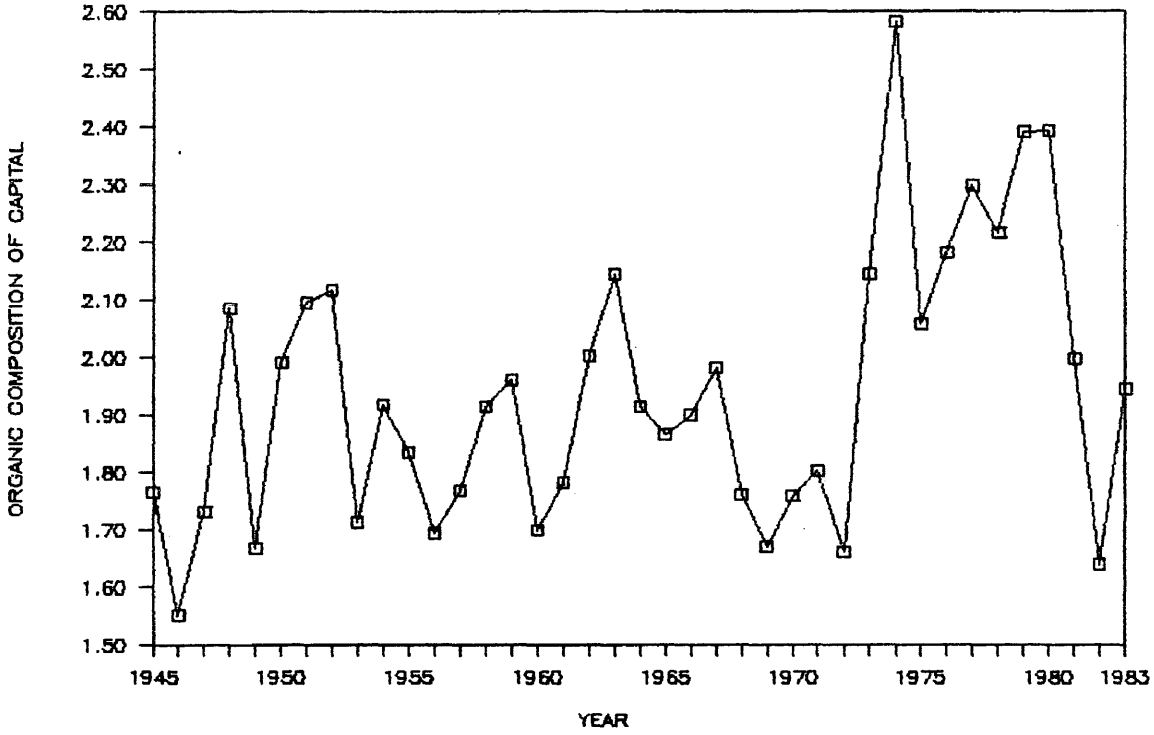


FIGURE 3.12 BEEF TREND

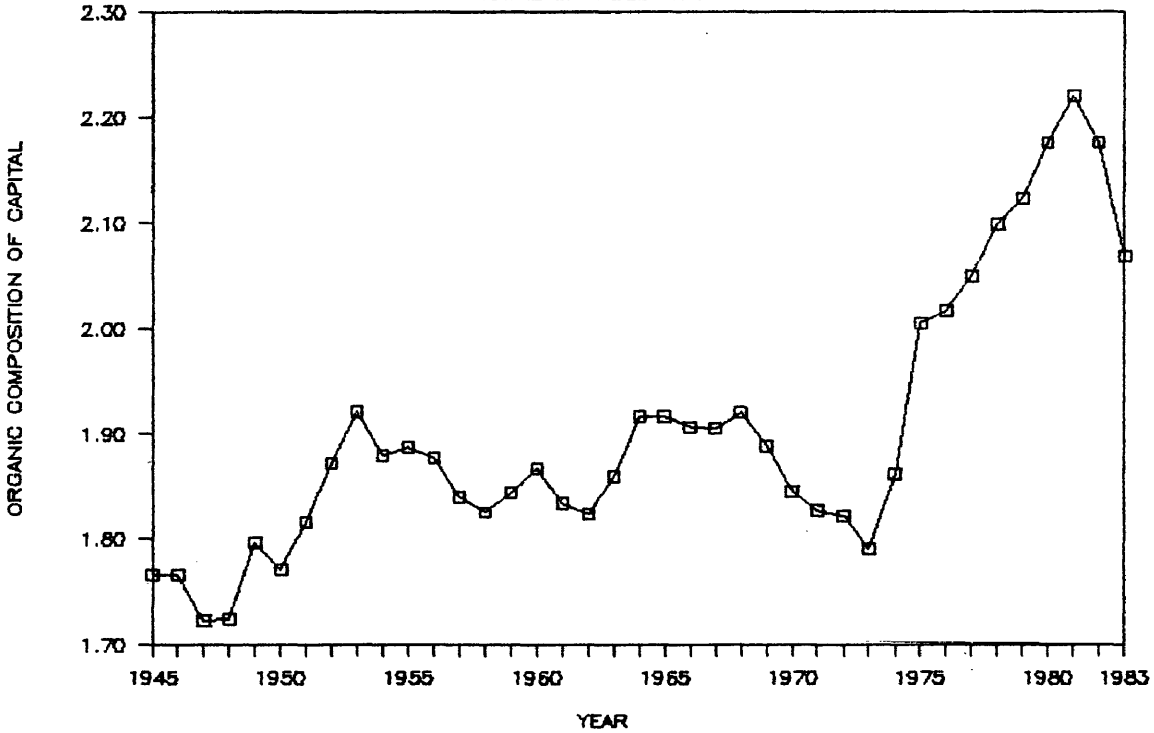


Table 3.2

ESTIMATED ORGANIC COMPOSITION OF CAPITAL
SWINE PRODUCTION

Year	HOGS AND PIGS	Year	HOGS AND PIGS
1945	0.96	1965	1.59
1946	1.01	1966	1.64
1947	1.11	1967	1.76
1948	1.33	1968	1.55
1949	1.17	1969	1.49
1950	1.39	1970	1.57
1951	1.48	1971	1.64
1952	1.49	1972	1.46
1953	1.22	1973	1.79
1954	1.36	1974	2.12
1955	1.35	1975	1.74
1956	1.27	1976	1.90
1957	1.35	1977	2.01
1958	1.43	1978	2.01
1959	1.62	1979	2.15
1960	1.44	1980	2.07
1961	1.50	1981	1.69
1962	1.71	1982	1.37
1963	1.82	1983	1.65
1964	1.64		

SOURCE: see Tables A1.22 and A1.3

FIGURE 3.21 SWINE ESTIMATES

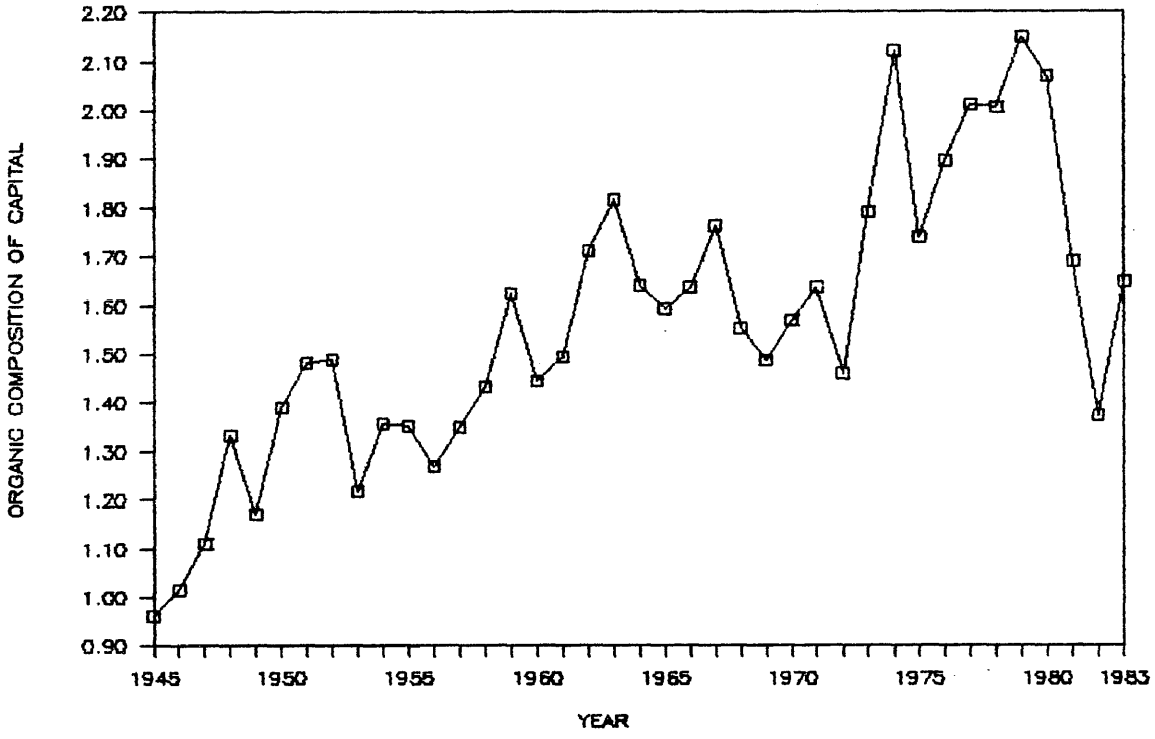
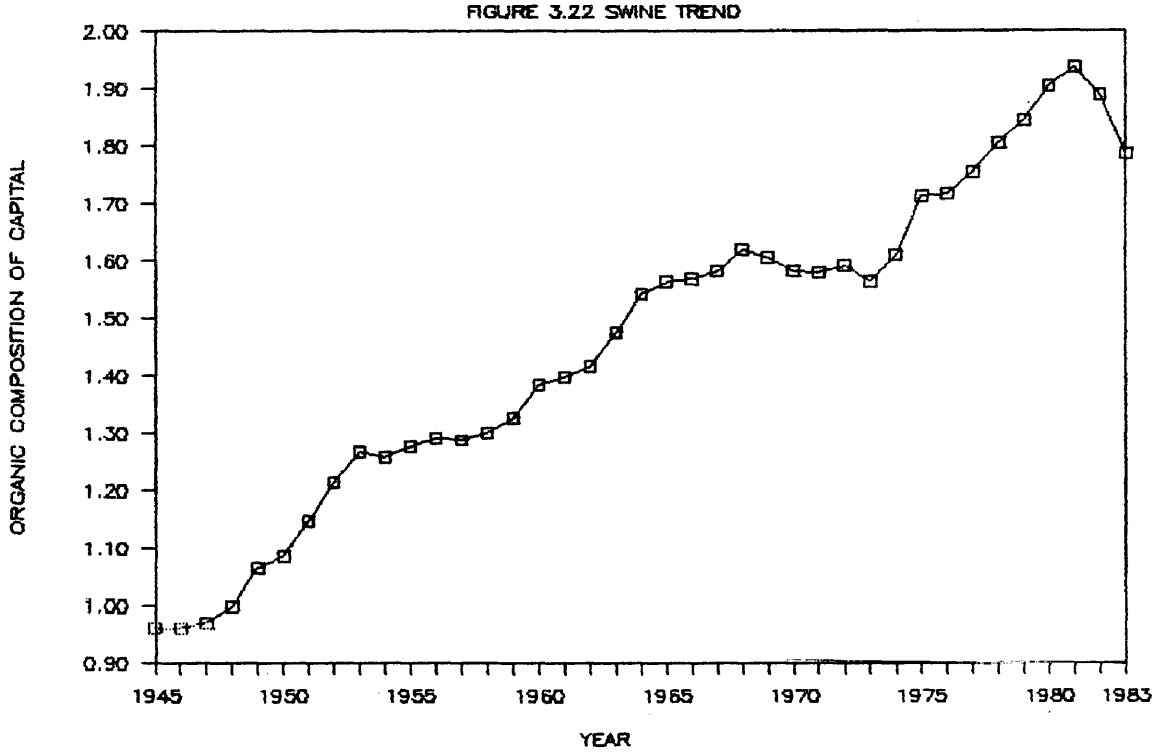


FIGURE 3.22 SWINE TREND



The organic composition of capital for beef production was relatively stable from 1945 to 1973. After 1973, the organic composition of capital increased sharply. Table 3.1 and Figure 3.11 show that the organic composition of capital was the lowest in 1946 (1.55) and the greatest in 1974 (2.58). From 1947 to 1973, the organic composition of capital for beef production fluctuated randomly, ranging from 1.66 in 1973 to 2.15 in 1963. Since 1980, the organic composition of capital has declined, reaching a level in 1982 (1.64) that was actually less than that in 1945 (1.77).

Figure 3.12 plots a "moving average" of the organic composition of capital that minimizes random variations and allows us to see overall trends in the data.[1] The trend line of Figure 3.12 shows that the organic composition of capital for beef production has tended to increase slightly since 1945. The organic composition of capital has increased by less than 10 percent from 1945 (1.77) to 1983 (1.94). Up until the early 1970s, the organic composition of capital was relatively stable for beef production. Only during the 1970s has the organic composition of capital shown a tendency to increase. The organic composition of capital since the 1970s has declined, moving towards the pre-1970 levels. At best, the data seems to weakly support the hypothesis that the organic composition of capital for beef production increased from 1945 to 1983.

Table 3.2, Figure 3.21 and Figure 3.22 show trends in the organic composition of capital for swine production are quite different from those for beef. For swine production, the organic composition of capital was lowest in 1945 (.96) and greatest in 1979

Table 3.3

ESTIMATED RATE OF PROFIT
BEEF PRODUCTION

Year	CATTLE AND CALVES	Year	CATTLE AND CALVES
1945	44.7%	1965	44.1%
1946	52.8%	1966	43.6%
1947	49.3%	1967	41.8%
1948	39.9%	1968	47.5%
1949	50.6%	1969	51.0%
1950	41.6%	1970	48.2%
1951	39.7%	1971	47.7%
1952	38.7%	1972	53.0%
1953	48.3%	1973	40.3%
1954	43.1%	1974	30.8%
1955	44.7%	1975	40.1%
1956	48.9%	1976	37.7%
1957	47.1%	1977	35.8%
1958	43.8%	1978	39.0%
1959	42.6%	1979	36.5%
1960	49.1%	1980	36.2%
1961	46.5%	1981	44.5%
1962	41.2%	1982	54.6%
1963	37.9%	1983	45.5%
1964	42.4%		

SOURCE: see Tables A1.21 and A1.3

FIGURE 3.31 BEEF ESTIMATES

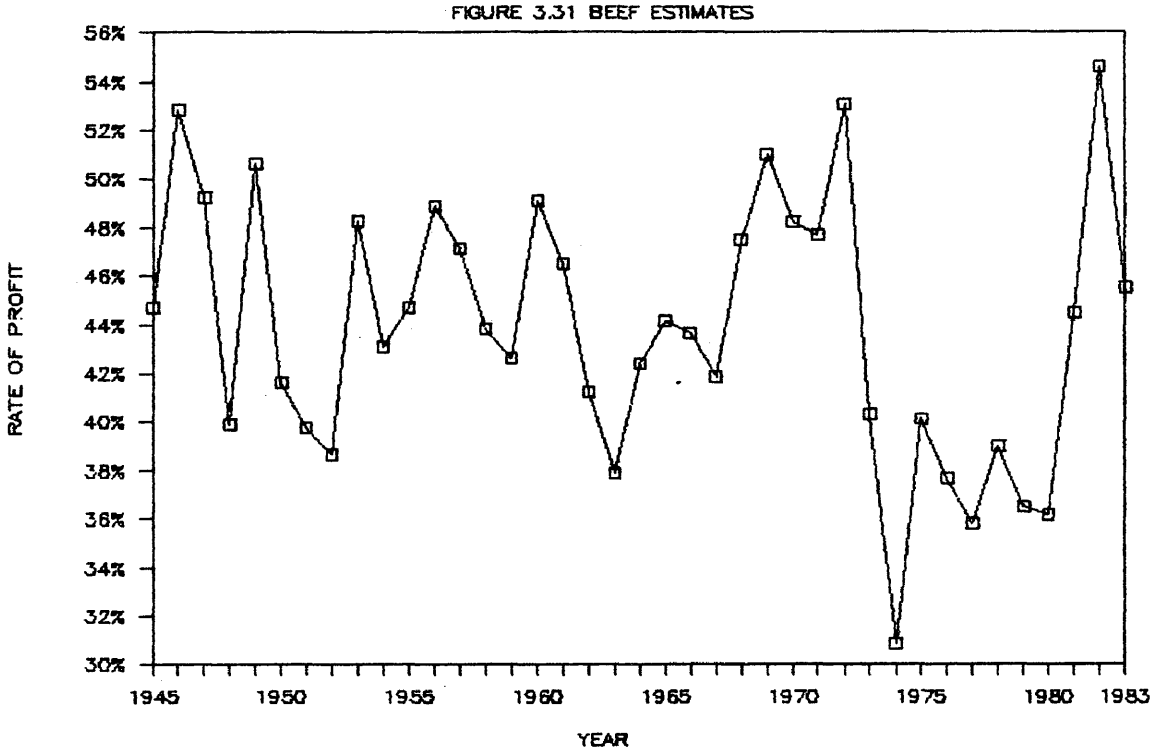


FIGURE 3.32 BEEF TREND

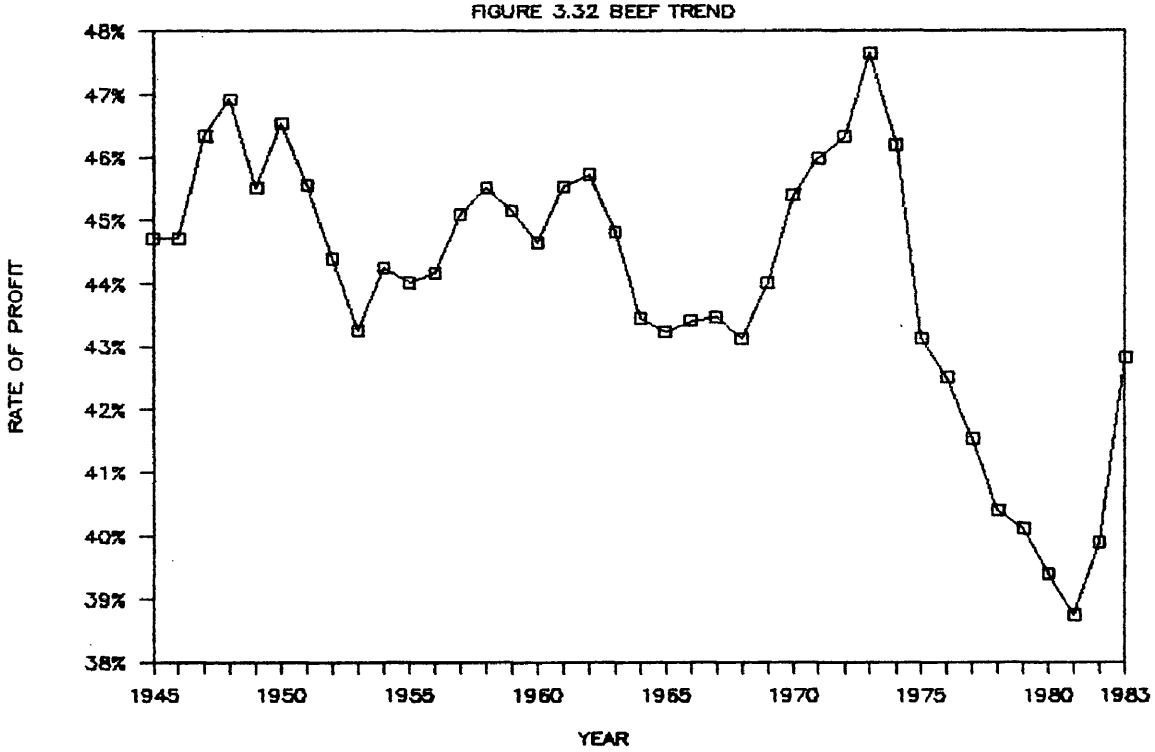


Table 3.4

ESTIMATED RATE OF PROFIT
SWINE PRODUCTION

Year	HOGS AND PIGS	Year	HOGS AND PIGS
1945	86.6%	1965	52.4%
1946	84.0%	1966	51.3%
1947	79.2%	1967	47.5%
1948	65.1%	1968	54.4%
1949	74.1%	1969	57.7%
1950	61.6%	1970	54.4%
1951	58.1%	1971	52.8%
1952	57.0%	1972	60.7%
1953	69.8%	1973	48.7%
1954	62.6%	1974	38.3%
1955	62.5%	1975	48.1%
1956	66.6%	1976	43.9%
1957	63.1%	1977	41.5%
1958	60.0%	1978	43.4%
1959	52.5%	1979	40.9%
1960	58.6%	1980	42.3%
1961	56.3%	1981	52.9%
1962	49.0%	1982	65.5%
1963	45.6%	1983	54.0%
1964	50.2%		

SOURCE: see Tables A1.22 and A1.3

FIGURE 3.41 SWINE ESTIMATES

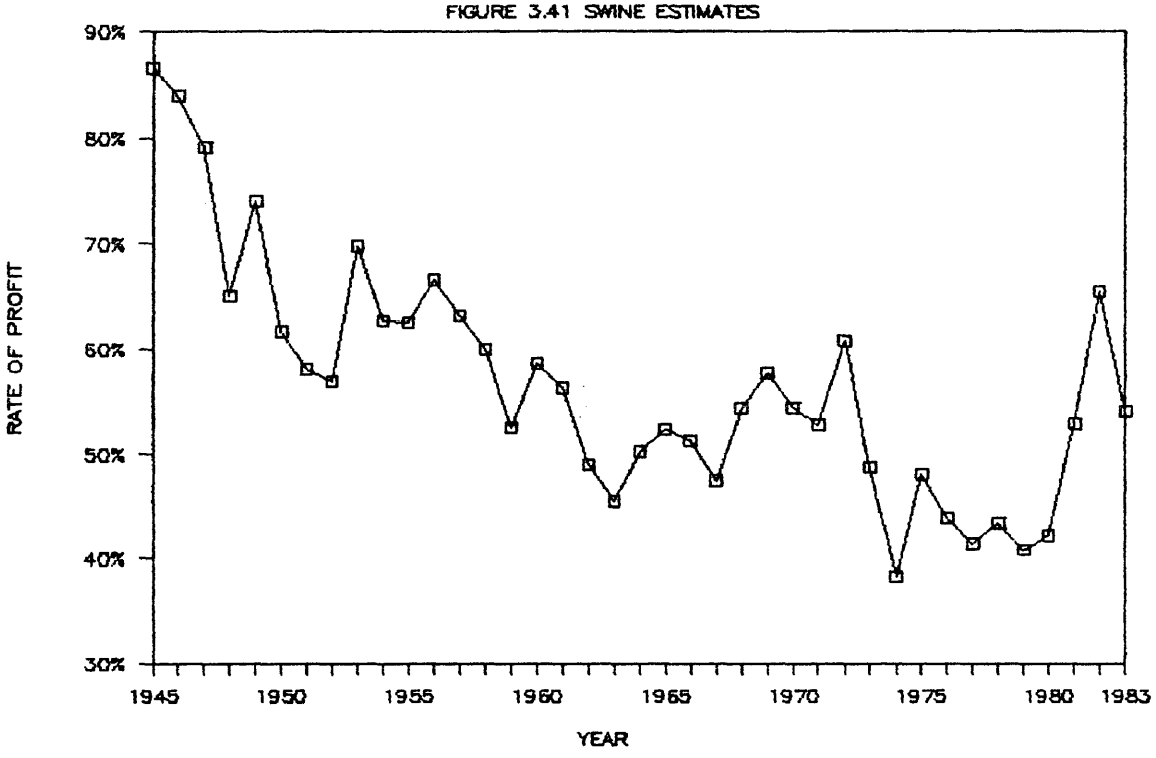
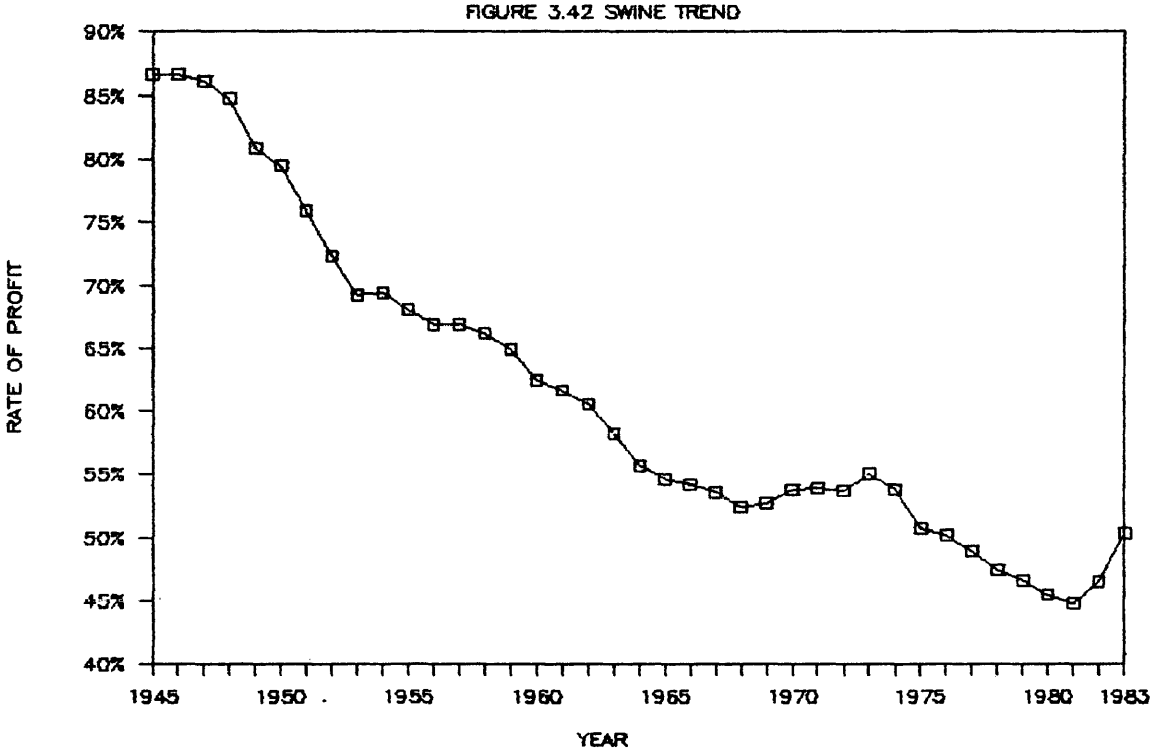


FIGURE 3.42 SWINE TREND



(2.15). The organic composition of capital has increased by about 70 percent from 1945 (.96) to 1983 (1.65). Although the organic composition of capital has declined after 1979, most of the period showed a clearly increasing trend. Excepting 1980 to 1983, swine production data supports the first Fundamentalist hypothesis.

To test the second Fundamentalist hypothesis, one must examine rate of profit trends. The second Fundamentalist hypothesis states:

FH2: The rate of profit has shown a tendency to decline.

The rate of profit for beef production varied only slightly from 1945 to 1983. Table 3.3 and Figure 3.31 show it stayed within a relatively narrow range of 25% (30% to 55%). As Figure 3.32 shows, the rate of profit has generally been stable, excepting the 1970s. The rate of profit has actually increased by about 2 percent from 1945 (44.7%) to 1983 (45.5%). From 1945 to 1972, the rate of profit for beef production randomly fluctuated between 38% and 53%. It declined after 1972, decreasing to a low of 30.8% in 1974. Although the rate of profit was depressed during most of the 1970s, it has increased since 1980. Overall, the data for beef production does not generally support a declining rate of profit hypothesis.

In contrast to those for beef, the rate of profit estimates for swine production has tended to decline. Table 3.4 and Figure 3.41 show that the rate of profit was the lowest in 1974 (38.3%) and the greatest in 1945 (86.6%). Figure 3.42 shows a clearly decreasing trend. The rate of profit has decreased by about 38 percent from 1945 (86.6%) to 1983 (54.0%). Although the rate of profit has increased

since 1980, the data generally support the second Fundamentalist hypothesis.

To test the third Fundamentalist hypothesis, one must see how well the organic composition of capital predicts the rate of profit. Recall the third Fundamentalist hypothesis:

FH3: The organic composition of capital, rather than the rate of exploitation, is the principal determinant of the rate of profit.

If this hypothesis is true, then a linear regression equation should show that changes in the organic composition of capital account for a considerable portion of the variation in the rate of profit.

Table 3.45

REGRESSION OF RATE OF PROFIT ON THE ORGANIC COMPOSITION OF CAPITAL

	RATE OF PROFIT					
	BEEF			SWINE		
INDEPENDENT VARIABLE	REGRESSION COEFFICIENT	STANDARD ERROR	T-RATIO	REGRESSION COEFFICIENT	STANDARD ERROR	T-RATIO
INTERCEPT	.895*	.018	50.350	1.159*	.029	40.188
ORG COM	-.235*	.009	-26.365	-.377*	.018	-21.313
R2	.951			.927		

* p (t) < .0002

Table 3.45 shows the results of time series regressions for the rate of profit on the organic composition of capital.[2] For both beef and swine production, the regression coefficients show a negative

relationship between the organic composition of capital (ORG COM) and the rate of profit. The R^2 values for beef and swine are both quite large. For beef production, R^2 is 95.1% ($F(1,34)=659.913$, $p<.001$), and for the swine industry, it is 92.7% ($F(1,34)=.431.765$, $p<.001$). The regression coefficients substantiate the Fundamentalist hypothesis that the rate of profit declines as the organic composition of capital increases. One can be fairly confident about these results because they all are statistically significant beyond the .0002 level. If one were to include the effects of the rate of exploitation (or, for that matter, the effects of any other variable), R^2 could at most increase 5% for beef and 7% for swine production. One can reasonably conclude that for the red meat industry, the organic composition of capital is the best predictor of the rate of profit, thus supporting the third Fundamentalist hypothesis.

TESTS OF THE UNDERCONSUMPTIONIST HYPOTHESES

Setting aside the Fundamentalist perspective, I will now examine data bearing on the Underconsumptionist hypotheses. The Underconsumptionist perspective argues that, other things being equal, the number of commodities consumed relative to investment tends to decrease and, consequently, the unrealized portion of absolute surplus value has a tendency to increase. (See Appendix A for my calculations

of absolute surplus value and unrealized surplus value.) Chapter I offered three hypotheses with which to test the Underconsumptionist perspective. This section will examine each of those hypotheses in turn:

UH1: The rate of unrealized surplus value has tended to increase.

Table 3.5

ESTIMATED RATE OF UNREALIZED SURPLUS VALUE
BEEF PRODUCTION

Year	CATTLE AND CALVES	Year	CATTLE AND CALVES
1945	21.0%	1965	41.2%
1946	17.0%	1966	28.1%
1947	14.4%	1967	20.2%
1948	24.4%	1968	16.2%
1949	15.5%	1969	12.9%
1950	20.0%	1970	11.1%
1951	27.9%	1971	13.9%
1952	49.5%	1972	10.7%
1953	68.5%	1973	17.7%
1954	71.9%	1974	63.6%
1955	69.1%	1975	73.9%
1956	68.1%	1976	68.6%
1957	62.2%	1977	69.7%
1958	43.2%	1978	41.5%
1959	23.6%	1979	15.0%
1960	37.2%	1980	42.7%
1961	36.3%	1981	53.2%
1962	34.1%	1982	54.8%
1963	36.8%	1983	58.9%
1964	46.1%		

SOURCE: see Tables A2.13 and A2.2

FIGURE 3.51 BEEF ESTIMATES

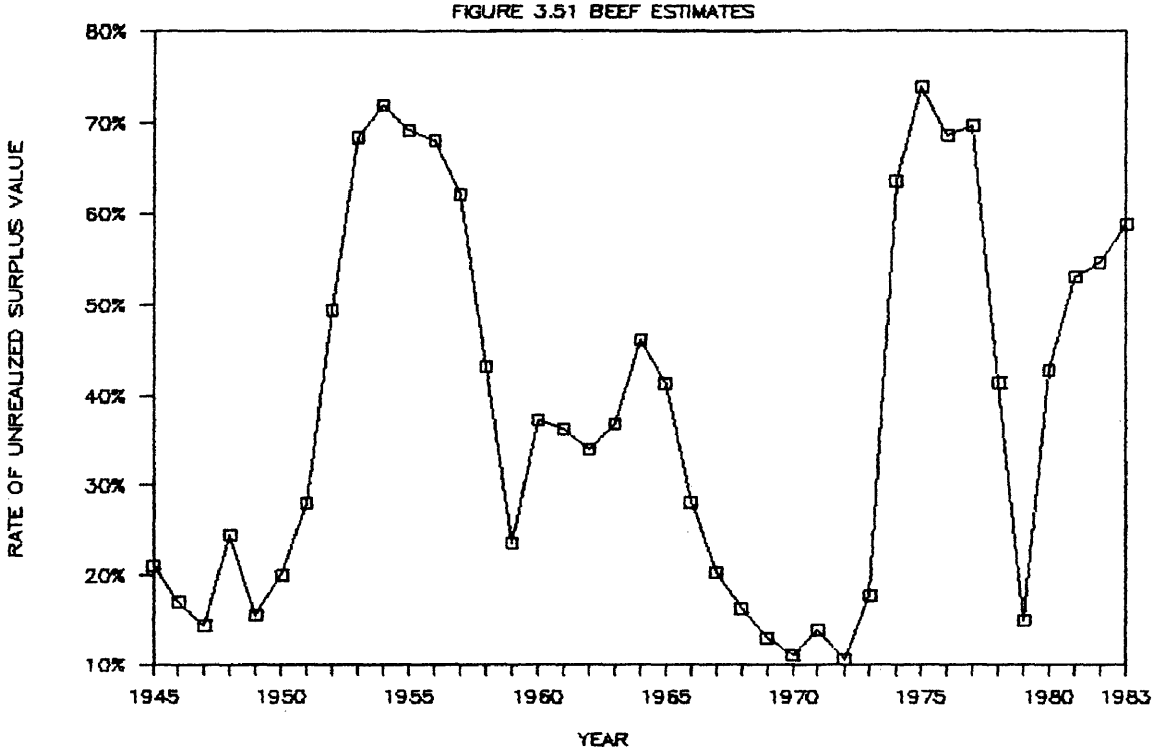


FIGURE 3.52 BEEF TREND

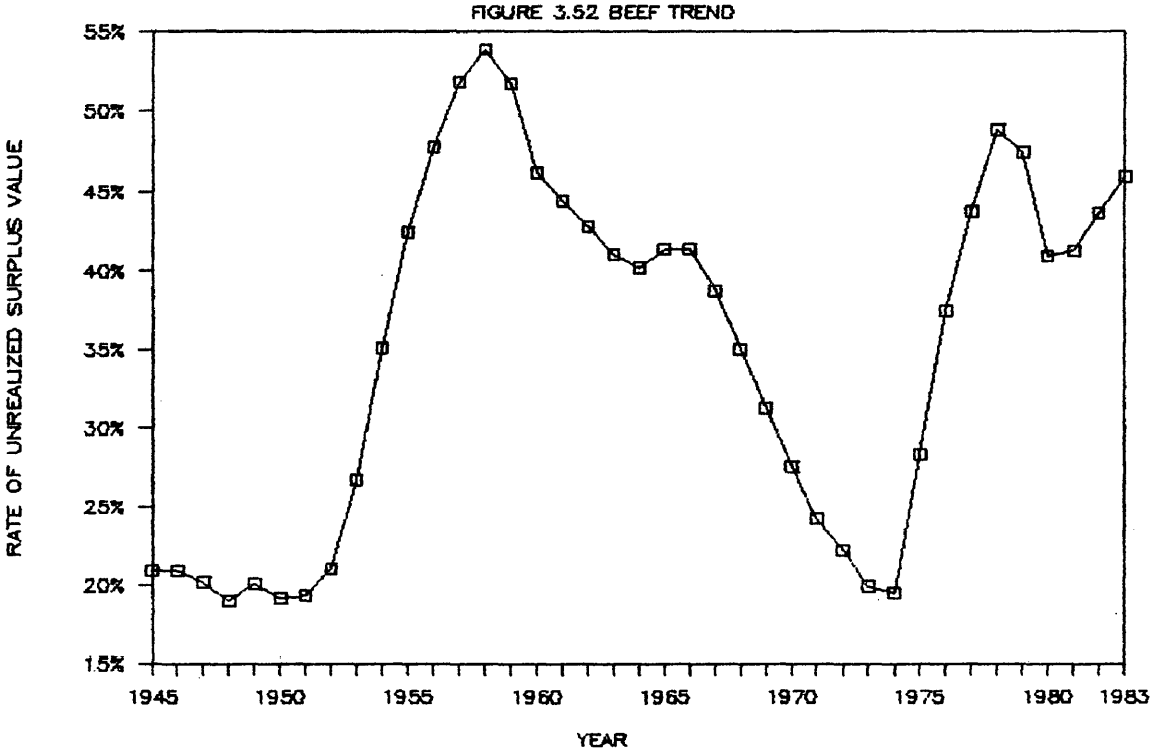


Table 3.6

ESTIMATED RATE OF UNREALIZED SURPLUS VALUE
SWINE PRODUCTION

Year	HOGS AND PIGS	Year	HOGS AND PIGS
1945	44.3%	1965	56.9%
1946	40.9%	1966	45.0%
1947	41.2%	1967	62.0%
1948	52.6%	1968	64.3%
1949	60.2%	1969	51.7%
1950	66.5%	1970	61.7%
1951	68.8%	1971	72.9%
1952	70.7%	1972	55.2%
1953	51.4%	1973	46.6%
1954	55.2%	1974	67.5%
1955	71.4%	1975	35.2%
1956	71.8%	1976	46.0%
1957	64.1%	1977	59.7%
1958	61.6%	1978	49.9%
1959	76.6%	1979	67.9%
1960	71.3%	1980	75.4%
1961	67.5%	1981	66.7%
1962	70.5%	1982	47.3%
1963	74.5%	1983	61.0%
1964	71.8%		

SOURCE: see Tables A2.13 and A2.2

FIGURE 3.61 SWINE ESTIMATES

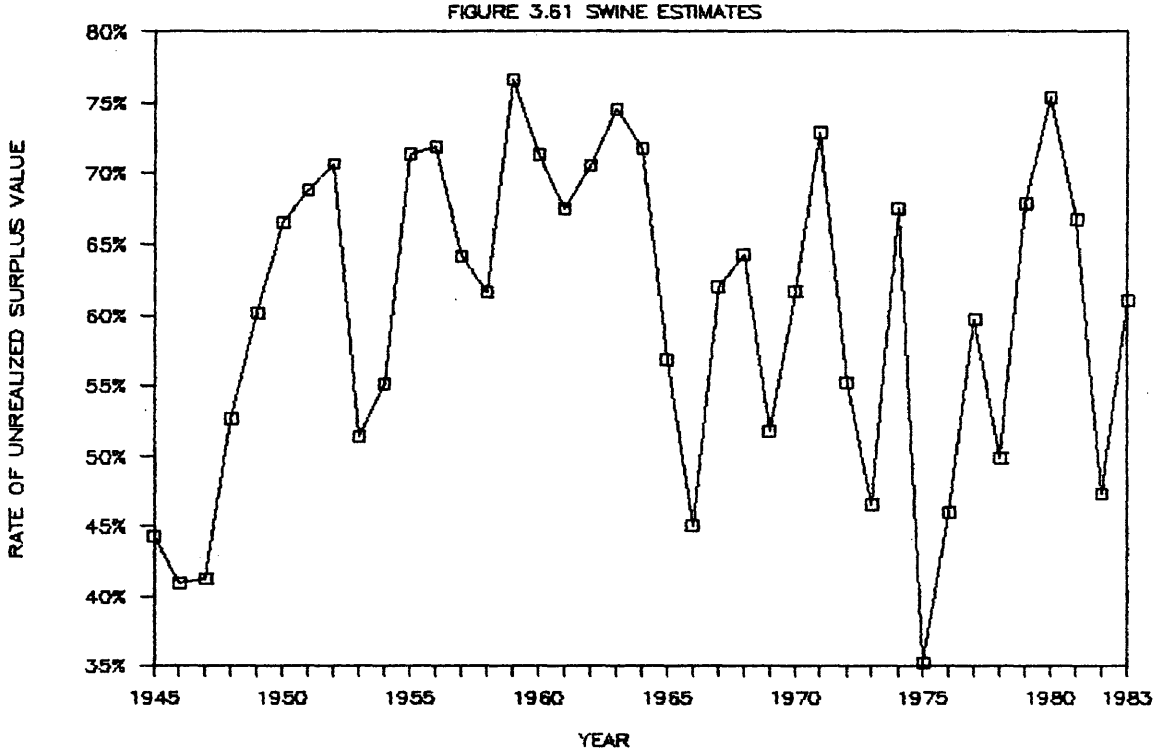
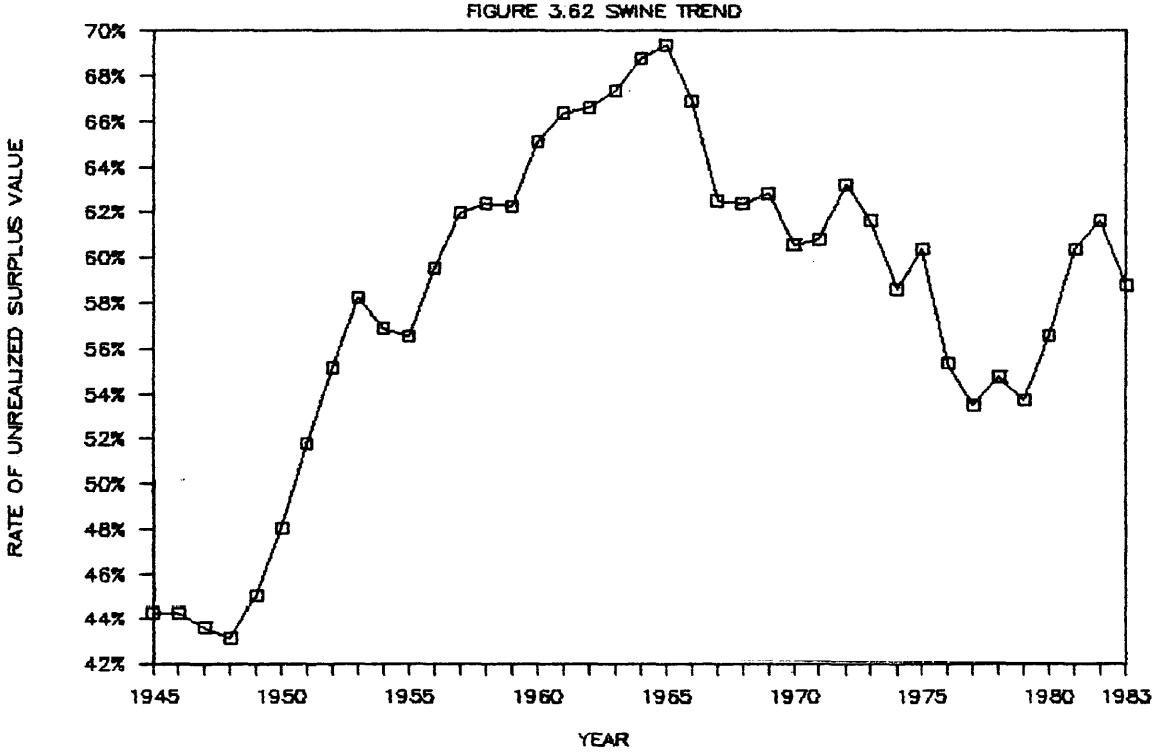


FIGURE 3.62 SWINE TREND



For beef production, the rate of unrealized surplus value has varied considerably, without a consistent trend. Table 3.5 and Figure 3.51 show that it has fluctuated within a broad range (10% to 74%). Figure 3.52 seems to show a cycle rather than an increasing trend. Overall, beef production data do not support the hypothesis that the rate of unrealized surplus value has increased.

Analysis of the rate of unrealized surplus value for swine production show variation like that for beef. Table 3.6 and Figure 3.61 show a considerable range for the rate of unrealized surplus value (35% to 77%). Although Figure 3.62 indicates an increasing trend from 1945 to about 1960, the rate of unrealized surplus value has since declined. In short, swine production data fail to substantiate the first Underconsumptionist hypothesis.

To test the second Underconsumptionist hypothesis, one needs to determine the relationship between the consumption/investment ratio and the rate of unrealized surplus value.

UH2: Holding constant the effects of the output/investment ratio, direct state payments to the farm sector, and the utilization of productive capacity, there will be a negative relationship between the consumption/investment ratio and the rate of unrealized surplus value.

Table 3.7

REGRESSION OF RATE OF UNREALIZED SURPLUS VALUE ON FOUR UNDERCONSUMPTIONIST VARIABLES

	RATE OF UNREALIZED SURPLUS VALUE					
	BEEF			SWINE		
INDEPENDENT VARIABLE	REGRESSION COEFFICIENT	STANDARD ERROR	T-RATIO	REGRESSION COEFFICIENT	STANDARD ERROR	T-RATIO
INTERCEPT	.102	.189	.536	.386***	.145	2.664
OUT/INV	-30.617	61.321	-.499	-13.631****	7.268	-1.876
GOV PAY	-.051	.036	-1.439	-.019	.016	-1.198
UTL PCAP	-.006	.019	-.319	.008**	.003	2.930
CON/INV	63.892	49.191	1.299	23.712*	6.292	3.768
R2	.229			.607		

* p(t) < .0007
** p(t) < .007
*** p(t) < .012
**** p(t) < .07

Table 3.7 shows the results of time series regressions for the rate of unrealized surplus value on four Underconsumptionist variables--the output/investment ratio (OUT/INV), direct state payments to the farm sector (GOV PAY), utilization of production capacity (UTL PCAP), and the consumption/investment ratio (CON/INV).[3] For beef production, none of the parameters has a statistically significant effect. All together they account for less than 25% of the variation in the rate of unrealized surplus value ($F(3,31)=3.069$, $p<.05$). The regression coefficient for the consumption/investment ratio indicates a positive relationship between that variable and the rate of unrealized surplus value, thereby contradicting the second

Underconsumptionist hypothesis. These results clearly fail to support the second Underconsumptionist hypothesis.

For swine production, R^2 indicates that 60.7% of the variation in the rate of surplus value can be explained by changes in the four independent variables, $F(3,31)=15.960$, $p<.001$ (Table 3.7). The regression coefficient for the consumption/investment ratio indicates a positive and significant relationship between that variable and the rate of unrealized surplus value, thus contradicting the second Underconsumptionist hypothesis. Despite the large R^2, these results do not support the hypothesis that decreasing consumption/investment ratios lead to increasing rates of unrealized surplus value.

The third Underconsumptionist hypothesis predicts that increased rates of unrealized surplus value lead to decreased rates of profit. We will specifically test:

UH3: Holding constant the effects of the output/investment ratio, direct state payments to the farm sector, the utilization of productive capacity, and the consumption/investment ratio, there will be a negative relationship between the rate of unrealized surplus value and the rate of profit.

Table 3.8

REGRESSION OF RATE OF PROFIT ON
FIVE UNDERCONSUMPTIONIST VARIABLES

	RATE OF PROFIT					
	BEEF			SWINE		
INDEPENDENT VARIABLE	REGRESSION COEFFICIENT	STANDARD ERROR	T-RATIO	REGRESSION COEFFICIENT	STANDARD ERROR	T-RATIO
INTERCEPT	.288*	.050	5.752	.571*	.117	4.892
OUT/INV	4.470	15.967	.280	6.617	5.614	1.179
GOV PAY	.023**	.011	2.091	-.015	.012	-1.336
UTL PCAP	-.006	.004	-1.300	.001	.002	.370
CON/INV	-12.061	13.755	-.877	9.871***	5.574	1.771
RUSV	-.082***	.046	-1.806	-.924*	.128	-7.224
R2	.384			.677		

* p (t) < .0002 *** p (t) < .09
** p (t) < .05

Table 3.8 shows the results of time series regressions for the rate of profit on five variables--the four independent variables from Table 3.7 plus the rate of unrealized surplus value (RUSV). For beef production, 38.4% of the variation in the rate of profit can be accounted for by changes in the five variables ($F(4,30)=4.675$, $p<.01$). The rate of unrealized surplus value does show a negative relationship with the rate of profit, as predicted. For the case of beef production, this test supports the third Underconsumptionist hypothesis.

For swine production, 67.7% of the variation in the rate of

profit can be explained by changes in the independent variables, $F(4, 30)=15.720$, $p<.001$ (Table 3.8). The regression coefficient for the rate of unrealized surplus value indicates a negative and strongly significant relationship ($p(t)<.0002$) with the rate of profit, as predicted by the third Underconsumptionist hypothesis.

These results could lead one to conclude that Underconsumptionist theorists have not identified the best predictors of the rate of unrealized surplus value, but have adequately explained the relationship between the rate of unrealized surplus value and the rate of profit. Our analyses for beef production also support such a conclusion. If Underconsumptionists have not identified the best predictors of the rate of unrealized surplus value, what would be a better predictor? Proponents of the Fundamentalist perspective would answer that Underconsumptionists misinterpret the causal relationship between the rate of unrealized surplus value and the rate of profit. Fundamentalists maintain that rather than the rate of unrealized surplus value influencing the rate of profit, the rate of profit actually determines the rate of unrealized surplus value. Hence, Fundamentalists argue that the rate of profit is the best predictor of the rate of unrealized surplus value (Cogoy, 1973: 64 cited in Wright, 1977: 212). If true, the rate of profit should significantly enhances our ability to predict the rate of unrealized surplus value, thus contradicting Underconsumptionist theory. The next section takes up this issue.

TESTING THE THEORIES AGAINST ONE ANOTHER

Proponents of the Fundamentalist approach have suggested a critical test by arguing that a falling rate of profit causes increases in the rate of unrealized surplus value. If the rate of profit significantly enhances our ability to predict the rate of unrealized surplus value, this would apparently substantiate the Fundamentalist claim and contradict Underconsumptionist theory.

However, because determining causal relationships is primarily a matter of theoretical interpretation, empirical criteria alone should not lead us to conclude that Underconsumptionist theory is wrong. Empirical evidence can support but never prove a particular theoretical position. This section explores the possibility that the lack of empirical support for the Underconsumptionist hypotheses is due to their misinterpretation of the relationship between the rate of profit and the rate of unrealized surplus value. Specifically:

Test 1: Holding constant the effects of the output/investment ratio, direct state payments to the farm sector, utilization of productive capacity, and the consumption/investment ratio, there will be a negative relationship between the rate of profit and the rate of unrealized surplus value.

Table 3.9

REGRESSION OF RATE OF UNREALIZED SURPLUS VALUE ON FIVE VARIABLES

	RATE OF UNREALIZED SURPLUS VALUE					
	BEEF			SWINE		
INDEPENDENT VARIABLE	REGRESSION COEFFICIENT	STANDARD ERROR	T-RATIO	REGRESSION COEFFICIENT	STANDARD ERROR	T-RATIO
INTERCEPT	.363******	.209	1.738	.496*	.088	5.626
OUT/INV	-55.344	58.393	-.948	.623	4.710	.132
GOV PAY	-.033	.034	-.958	-.016*****	.009	-1.819
UTL PCAP	-.009	.018	-.488	.003*****	.002	1.849
CON/INV	104.212****	48.870	2.132	14.933**	4.161	3.589
ROP	-1.085**	.442	-2.452	-.667*	.087	-7.664
R2	.353			.844		

* p (t) < .0002
** p (t) < .002
*** p (t) < .02
**** p (t) < .05
***** p (t) < .08
****** p (t) < .1

Table 3.9 shows the results for the rate of unrealized surplus value on the four Underconsumptionist variables--(OUT/INV), (GOV PAY), (UTL PCAP), and (CON/INV)--and the rate of profit (ROP). For beef production, R^2 suggests that 35.3% of the variation in the rate of unrealized surplus value can be accounted for by changes in the five variables, $F(4,30)=4.092$, $p<.01$. The rate of profit has a significant negative impact on the rate of unrealized surplus value, as predicted. Beef production data support the hypothesis that decreased rates of profit lead to increased rates of unrealized surplus value.

For swine production, R^2 shows that 84.4% of the variation in the rate of surplus value can be explained by changes in the five variables, $F(4,30)=40.577$, $p<.001$. (Table 3.9). As the "Test 1" hypothesis predicts, the regression coefficient for the rate of profit is negative and significant. The data for swine production strongly support the "Test 1" hypothesis.

By itself, empirical verification of the "Test 1" hypothesis does not necessarily prove the rate of profit significantly enhances our ability to predict the rate of unrealized surplus value. Before we can reach such a conclusion, we must statistically test this hypothesis:

Test 2: When taking account of the rate of profit (Test 1 hypothesis), our ability to predict the rate of unrealized surplus value is significantly greater than when we do not take account of the rate of profit (the second Underconsumptionist hypothesis).

"Test 2" essentially predicts that adding the rate of profit to the UH2 regression equation will significantly increase R^2.

For beef production, R^2 without the rate of profit (UH2) is 22.9% (Table 3.7); with the rate of profit ("Test 1") R^2 is 35.3% (Table 3.9). For swine production, R^2 without the rate of profit is 60.7% (Table 3.7); with the rate of profit it is 84.4% (Table 3.9). For beef production, F for the significance of the difference of R^2's is $F(1,32)=6.132$, $p<.05$, and for swine production, it is $F(1,32)=48.165$, $p<.001$. Basing my judgment on F tests for the

difference of R^2's, I conclude that the rate of profit significantly enhances our ability to predict the rate of unrealized surplus value for both beef and swine production.

CONCLUSIONS

My project here has empirically compared two competing and contradictory Marxian crisis theories with the goal of determining which theory best explains empirical trends in the red meat industry. To accomplish this, I identified and tested several hypotheses for each perspective. What have the results from these tests shown?

The evidence fails to verify the Fundamentalist approach for the case of beef production. For the hypothesis that the organic composition of capital has tended to increase, the data showed less than a 10 percent increase from 1945 to 1983. Thus, beef production data only weakly supported this hypothesis. For the swine industry, the fit of the data and Fundamentalist theory is much better, with approximately a 70 percent increase in the organic composition of capital from 1945 to 1983. By contrast to the beef industry, swine production data strongly supported the first Fundamentalist hypothesis.

Testing the Fundamentalist hypothesis that the rate of profit has tended to decline, I found that the rate of profit varied only slightly for beef production, rising about 2 percent from 1945 to 1983. Although beef production data generally did not support a declining rate of profit hypothesis, swine production data did. For

swine production, the rate of profit clearly decreased, dropping about 38 percent from 1945 to 1983.

The third Fundamentalist hypothesis was that the organic composition of capital, rather than the rate of exploitation, is the principal determinant of the rate of profit. For both beef and swine production, a time series regression of the rate of profit on the organic composition of capital showed strong and significant negative relationships (Beef: $R^2 = .95$, $p(F) < .001$; Swine: $R^2 = .93$, $p(F) < .001$). Both industries' data strongly supported the third Fundamentalist hypothesis.

Except for this last hypothesis, tests of the Fundamentalist hypotheses have produced mixed results. Beef production data strongly supported only the third Fundamentalist hypothesis, while data for the swine industry supported all three hypotheses. Overall, the analysis suggests that the Fundamentalist perspective adequately accounts for swine production trends, but is not satisfactory for beef production.

Reviewing the tests of the three Underconsumptionist hypotheses, we find that the Underconsumptionist approach received little empirical support. For both beef and swine production, the rate of unrealized surplus value has varied considerably, without consistent trend. Neither industry's data supported the first Underconsumptionist hypothesis that the rate of unrealized surplus value has tended to increase.

Similarly, the second Underconsumptionist hypothesis, which posited a negative relationship between the consumption/investment ratio and the rate of unrealized surplus value, was not supported by

beef or swine production data. For both beef and swine production a time series regression showed that the relationship between the consumption/investment ratio and the rate of unrealized surplus value was positive and significant (Beef: $R^2 = .229$, $p(F) < .05$; Swine: $R^2 = .607$, $p(F) < .001$), thus contradicting the Underconsumptionist prediction of a negative relationship between those two variables.

The third Underconsumptionist hypothesis suggested a negative relationship between the rate of unrealized surplus value and the rate of profit. Beef production data did show a negative relationship ($R^2 = .384$, $p(F) < .01$), as did swine production data ($R^2 = .677$, $p(F) < .001$).

Similar to the tests of the Fundamentalist hypotheses, tests of the Underconsumptionist hypotheses produced mixed results. For both beef and swine production, Underconsumptionist theory failed to account for trends in the rate of unrealized surplus value, but correctly predicted the relationship between the rate of unrealized surplus value and the rate of profit. I noted that proponents of the Fundamentalist perspective would argue that Underconsumptionists have misinterpreted the causal relationship between the rate of unrealized surplus value and the rate of profit. Fundamentalists maintain that rather than the rate of unrealized surplus value determining the rate of profit, the rate of profit determines the rate of unrealized surplus value, thus making the rate of profit the best predictor of the rate of unrealized surplus value (Cogoy, 1973: 64 cited in Wright, 1977: 212).

To test this claim, I compared a regression of the rate of unrealized surplus value on four Underconsumptionist variables to a regression of the rate of unrealized surplus value on the rate of profit and the four Underconsumptionist variables. For beef production, the difference between R^2's was .12 (R^2 with the rate of profit was .35 and R^2 without the rate of profit was .23). For swine production, the difference was .23 (R^2 with the rate of profit was .84 and R^2 without the rate of profit was .61). For both beef and swine production, this difference in R^2's was significant (Beef: $F(1,32)=6.132$, $p<.05$; Swine: $F(1,32)=48.165$, $p<.001$), suggesting that the rate of profit significantly enhances our ability to predict the rate of unrealized surplus value. These results fit the Fundamentalist perspective better than the Underconsumptionist approach.

Overall, the Fundamentalist perspective received more empirical support than the Underconsumptionist approach. Beef production data supported two of the three Fundamentalist hypotheses, while swine production data supported all three. I also found that for both the beef and swine industries, the rate of profit significantly enhanced our ability to predict the rate of unrealized surplus value, thus supporting the Fundamentalist perspective. Of the eight Fundamentalist hypotheses, seven were supported by the data. For the Underconsumptionist approach, beef and swine production data supported only two of the six hypotheses. Basing my judgment on this tally, I conclude that the Fundamentalist perspective best explains empirical trends in the red meat industry. However, even the Fundamentalist

perspective does not completely account for the data, as evidenced by the increase in the beef industry's rate of profit from 1945 to 1983.

What could possibly explain the mixed results for the Fundamentalist perspective and the almost complete lack of empirical support for the Underconsumptionist approach? One could answer that the theories are simply inadequate. However, declaring the theories inadequate on the basis of a single study would be a premature and dubious conclusion. A more critical and productive answer would examine how flaws in the research design might account for the results. Developing an error analysis of my research, I will examine two issues: 1) whether the data adequately measure the central concepts; and, 2) whether the red meat industry since 1945 is outside the scope of either theory.

Taking the validity issue first, consider what would have occurred if (for example) my indicators of unrealized surplus value did not really measure unrealized surplus value. If so, the relationships between the rate of unrealized surplus value and other variables--e.g. the consumption/investment ratio, rate of profit, etc.--could differ dramatically from Underconsumptionist predictions. If my measures failed to capture all components of unrealized surplus value, it would have led to a consistent underestimate. This error would work against all of the Underconsumptionist hypotheses, because underestimating unrealized surplus value would hide crisis tendencies. Clearly, invalid measures of a single key concept would invalidate the empirical tests themselves.

Another potentially biasing data problem derives from apportioning production costs on the basis of market revenues. Perhaps one should take account of how efficiently animals convert feed to meat when allocating feed costs, rather than apportioning costs according to shares of market revenues. Cattle convert feed to meat less efficiently than other livestock (Lappe, 1982: 69-71), so that beef production may actually incur a larger share of feed costs than what its share of market revenues would indicate. If so, apportioning feed costs on a revenue basis underestimates beef production costs, thereby inflating the rate of profit and hiding crisis tendencies in the beef meat industry. For the swine industry, because hogs and pigs convert feed to meat more efficiently than beef cattle, apportioning feed costs on a revenue basis might overestimate production costs, thereby exaggerating crisis tendencies. This would explain the absence of a declining rate of profit for beef production and the falling rate of profit for swine production. For the beef industry, apportioning costs on the basis of revenues might therefore have worked against the Fundamentalist perspective, while those procedures might have worked in favor of Fundamentalist theory in the case of swine production. Either one of these possibilities could account for the mixed results associated with the Fundamentalist approach.

The difficulties of allocating production costs is related to the broader problem of using aggregate data. Suppose that, for whatever reason, the majority of red meat producers experienced crisis while the rest of the industry enjoyed great economic success, so that monetary gains on the whole outweighed losses. A minority of larger

producers could have been successful enough to outweigh, in the aggregate, the failures of smaller producers. Aggregate data could thus conceal crisis tendencies, thus explaining why neither theory consistently fit the data.

The "scope issue" concerns whether applying manufacturing crisis theories to an agricultural industry constitutes an unfair empirical test. Agriculture uses less waged labor, depends more upon direct federal assistance in the form of price supports, and is more dependent on non-economic factors (e.g. weather conditions) than traditional manufacturing industries. These dissimilarities suggest that economic crisis in agriculture might require a separate theory. If the red meat industry does not typify capitalist industry as presumed by both theories, expecting Fundamentalist and Underconsumptionist variables to behave as predicted would be unreasonable. Explaining agricultural trends might require taking into account non-economic variables such as weather. Considering weather, we might find that breeding stock die during severe weather, thereby reducing the number of animals born during the year, decreasing the number of unsold animals, restricting demand so that beef and swine sell for more than their value, and, thus, retarding underconsumption tendencies.

One might also argue that the red meat industry is outside the scope of the Fundamentalist and Underconsumptionist perspectives because conjunctural effects have overridden the basic structural processes posited by both theories. Mandel (1975) argues that 1946 to

1966 was a period of general economic expansion for the United States and that agriculture continued to prosper until the end of the Vietnam War (see also Kiser and Drass, 1987: 287-289). The demand generated by the post-World War II and Vietnam booms would have kept profits high, thus suppressing crisis tendencies in the red meat industry. This possibility has some empirical support because depressed rates of profit for the red meat industry in the 1970's coincide with the end of the Vietnam war and a general U.S. economic slump (Mandel, 1975; 1978). The fit between both theories and red meat industry data might have been better if not for exceptional historical circumstances from 1945 to 1983.

The red meat industry might be atypical because of dramatic structural change since 1945. While the red meat industry of the 1940s consisted of a multitude of small producers, the development of feed lot production and the rise of agribusiness have increasingly concentrated this industry (Mason and Singer, 1980: 97-111). Wright (1977) has theorized more generally about such a situation. He suggests that competitive capitalist enterprises tend to suffer from crises associated with declining rates of profit, while monopoly capitalism usually experiences crises of underconsumption. If 1945 to 1983 represented a transitional phase for the red meat industry, during which part of the industry was competitive and part was becoming monopolistic, neither theory could adequately explain the economic trends for the entire period. The two contradictory forms of crisis might then account for the mixed results of this study.

Overall, the empirical evidence presented here supported the Fundamentalist perspective rather than the Underconsumptionist approach. However, the absence of a declining rate of profit for the beef industry means that even the Fundamentalist perspective did not consistently explain the economic trends in the red meat industry. The preceding explanations of this study's mixed results suggest some possibilities for future research. Given the enduring significance of food production and its particular importance to capitalism, current Marxian theories' failure to explain agricultural economic crises is serious. As a remedy, Marxian theorists should develop a theory of the causes and consequences of agricultural crisis as a unique and central form of capitalist production. Fundamentalists and Underconsumptionists alike should focus on how competitive and monopoly agriculture affect economic trends. Such work should also pay special attention to historical circumstances that might affect key crisis indicators (e.g. the effect wars have upon the rate of profit or the rate of unrealized surplus value). In terms of future empirical research, data which is not aggregated would improve our picture of economic trends. In conclusion, this study alone does not warrant the dismissal of either theory, but it has pointed out some problems associated with the Fundamentalist and Underconsumptionist theories which require further revision, rethinking, and empirical testing.

APPENDIX A

Using 1960 data, this appendix illustrates the estimating procedures, and makes data that was not presented in the text accessible to interested readers.

All of the calculations in this appendix and in the text use figures expressed in 1967 dollars, thereby controlling for the effects of inflation. Table A.1 lists the price indexes and deflators used to convert current dollars into constant 1967 dollars (Economic Report of the President, 1986). (All tables are presented at the end of the appendix, for the sake of convenience.) Because 1957 is the first year that an "energy" index is given, some other index had to be used for earlier years. For the years 1945 to 1956, the consumer price index for "all items" was used. Such a makeshift index should not adversely affect my estimates because energy costs are more significant after 1957. The producer price index of "total farm products" was used to convert cash market receipts and farm slaughter values into 1967 dollars (Table A.31 and A.32 respectively); for feed costs, the producer price index of "farm foods and feeds" was employed; the producer price index of "other farm products" was used for livestock costs; for trucks and tractors, the "durable equipment" GNP fixed investment deflator was used; for service buildings, the "structures" GNP fixed investment deflator was used; and, the "total" GNP price deflator was used for overhead, land, and labor costs (Table A.2). (The primary data source for farm sector costs and revenues is Lucier, et al.,1986.) My calculations used the producer price index

for "total farm products" to convert the alternative USDA estimates of total production costs into 1967 dollars (Agricultural Statistics).

Following the presentation in Chapter II, we will first illustrate the computations for the empirical indicators of constant capital. For the first indicator of constant capital, feed, the formula

```
  Feed Costs for Red Meat Animals
= Feed Costs for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
   Cash Market Receipts from All Livestock)
```

was used to determine what portion of feed costs for the entire farm sector belongs to beef and swine production. (The cash market receipts from all livestock include cattle, calves, hogs, pigs, sheep, lambs, poultry and eggs, dairy products, wool, and revenues from all other livestock.) Hence, the 1960 cost of feed in millions of 1967 dollars for beef production is $1,977 ($5,086 times $7,876 divided by $20,266); and, for swine, it is $768 ($5,086 times $3,062 divided by $20,266) (Table A.4).

The next economic indicator presented is the cost of livestock. To determine what portion of livestock costs for the entire farm sector belongs to the red meat industry the following formula was used:

```
  Livestock Costs for Red Meat Animals
= Livestock Costs for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/  Cash Market Receipts from All Livestock)
```

Thus, the 1960 cost of livestock in millions of 1967 dollars for beef is $1,002 ($2,578 times $7,876 divided by $20,266); and, for swine production, it is $390 ($2,578 times $3,062 divided by $20,266) (Table A.5). (The figures may not sum due to rounding error. The figures in the Tables are more precise.)

To estimate energy costs for red meat animal production, this formula was used:

```
  Energy Costs for Red Meat Animals
= Energy Costs for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/  Cash Market Receipts from All Farm Commodities)
```

The 1960 cost of energy in millions of 1967 dollars for beef production is $383 ($1,763 times $7,876 divided by $36,299); and, for swine, it is $149 ($1,763 times $3,062 divided by $36,299) (Table A.6).

For machinery costs, the formula

```
  Machinery Costs for Red Meat Animals
= Tractor and Truck Costs for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/  Cash Market Receipts from All Farm Commodities)
```

was used to determine what portion of tractor and truck costs for the entire farm sector belongs to the red meat industry. Hence, the 1960 cost of machinery in millions of 1967 dollars for beef production is $216 ($997 times $7,876 divided by $36,299); and, swine production, it is $84 ($997 times $3,062 divided by $36,299) (Table A.7).

To estimate structure costs for red meat animal production, this formula was used:

Structure Costs for Swine Production
= Service Building Costs for the Entire Farm Sector
* (Cash Market Receipts from Swine
/ Cash Market Receipts from All Farm Commodities)

As mentioned in Chapter II, the costs of structures for beef production are assumed to be negligible, thus we calculate those costs only for swine production. The 1960 cost of structures in millions of 1967 dollars for swine production is $117 ($1,387 times $3,062 divided by $36,299) (Table A.8).

To calculate overhead costs for the red meat industry, we made the distinction between those overhead costs which belong to all farm production and those which belong to livestock production. The following formula was used to determine what portion of general overhead belongs to the red meat industry:

Veterinary and Livestock Marketing Costs
for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/ Cash Market Receipts from All Livestock Production)

Hence, the 1960 cost of general overhead in millions of 1967 dollars for beef production is $882 ($4,065 times $7,876 divided by $36,299); and, for swine production, it is $343 ($4,065 times $3,062 divided by $36,299). To determine what portion of livestock overhead belongs to the red meat industry, we used this formula:

Repairs, Operations, Telephone, and Other Miscellaneous
Costs for the Entire Farm Sector
* (Cash Market Receipts from Red Meat Animals
/ Cash Market Receipts from All Farm Commodities

Thus, the 1960 cost of livestock overhead in millions of 1967 dollars for beef production is $191 ($491 times $7,876 divided by $20,266); and, for swine production, it is $74 ($491 times $3,062 divided by $20,266). Adding the general and livestock overheads yields the total overhead. For beef production, the 1960 total overhead is $1,073; and, for swine production, it is $417 (Table A.9).

Because we assumed that land costs for swine production are negligible, we estimated those costs only for beef production. Estimating the land costs for beef production, we used this formula:

```
  Land Costs for Beef Production
= Land Costs for the Entire Farm Sector
* (Acres of Private Pasture and Grassland
/  Acres of All Farmland)
* (Average value of an Acre Used for Grazing Livestock
/  Average value of an Acre Used for All Farm Production)
* (Cash Market Receipts from Cattle and Calves
   Cash Market Receipts from All Grazing Livestock)
```

(Receipts from all grazing livestock include cattle, calves, sheep, lambs, dairy, and wool revenues.) As we noted in Chapter II, the ratio of the average value of an acre used for grazing livestock divided by the average value of an acre used for all farm production is set at 60%. Table A1.01 shows the ratios of acres of private pasture and grassland divided by acres of all farmland. Land utilization data are known for the years 1940, 1950, 1959, 1969, 1974, 1978, 1982; the figures for the remaining years are projections based on the known data (Agricultural Statistics, 1985:372). The 1960 cost of land in millions of 1967 dollars for beef production is $413 ($3,811 times 30.8% times 60% times the ratio of $7,876 divided by

$13,418) (Table A1.02).

In addition to constant capital expenditures, variable capital is the other major production cost. To estimate variable capital this formula was used:

```
  Hired Labor Costs for Red Meat Animals
= (Hired Labor Costs for the Entire Farm Sector
/  Total Farm Labor Hours)
* Hours Spent raising Meat Animals
* (Cash Market Receipts from Red Meat Animals
/  Cash Market Receipts from Meat Animals)
```

(Meat animals include cattle, calves, hogs, pigs, sheep, and lambs.) Table A1.11 shows the data for total farm labor hours and the time spent raising meat animals. The 1960 expenditures for hired labor in millions of 1967 dollars for beef production is $331 ($3,559 divided by 9,795 millions of farm labor hours times 1,307 millions of hours raising meat animals times $7,876 divided by $11,285); and, for swine production, it is $129 ($3,559 divided by 9,795 millions of farm labor hours times 1,307 millions of hours raising meat animals times $3,062 divided by $11,285) (Table A1.12).

Summing constant plus variable capital yields total production costs. The estimated 1960 total production costs in millions of 1967 dollars for beef production is $5,395; and, for swine production, it is $2,054 (Tables A1.21 and A1.22). Subtracting total production costs from cash market receipts and the value of farm slaughter for red meat animals (Table A.31 and A.32) leaves surplus value. Estimated 1960 surplus value in millions of 1967 dollars for beef production is $2,647 ($7,876 plus $166 minus $5,395); and, for swine

production, it is $1,203 ($3,062 plus $195 minus $2,054) (Table A1.3).

To estimate the organic composition of capital, we divided constant capital by the sum of surplus value and variable capital. The estimated 1960 organic composition of capital for beef production is 1.70 ($5,064 divided by $2,647 plus $331); and, for swine, it is 1.44 ($1,925 divided by $1,203 plus $129) (see Chapter III, Tables 3.1 and 3.2).

Dividing surplus value by the sum of constant plus variable capital produces the rate of profit. The estimated 1960 rate of profit for beef production is 49.1% ($2,647 divided by $5,395); and, for swine production, it is 58.6% ($1,203 divided by $2,054) (see Chapter III, Tables 3.3 and 3.4).

Dividing surplus value by variable capital yields the rate of exploitation. The 1960 estimated rate of exploitation for beef production is 800% ($2,647 divided by $331); and, for swine production, it is 933% ($1,203 divided by $129) (Table A1.4).

To compute unrealized surplus value, we imputed prices for red meat animals unsold and for those which were sold below their value. The imputed price-value of beef overproduction was estimated with this formula:

Imputed Price for Unsold Beef
= (Total Beef Inventory as of January 1
+ Cattle Shipped In During the Year
+ Calves Born During the Year ("calf crop")
- Cattle and Calves that Die During the Year
Following Year's Inventory of Milk Cows (this includes milk cows and milk cow replacements)
- Cattle Other than Beef Cattle
- Following Year's Necessary Inventory (includes bulls and other "stocker cattle")
- Calves Not Ready for Market (this includes calves under 500 pounds)
- Cattle and Calves Marketed
- Cattle and Calves Slaughtered for Farm Consumption)

* The greatest price received per head from 1945 up to and including the year in question which is calculated as
The Number of Cattle and Calves Marketed and Slaughtered for Farm Consumption
/ "Gross Income" for Beef Production

(see Tables A1.5 through A2.11). The 1960 estimate of beef overproduction is 3,208,000 (96,236,000 plus 5,903,000 plus 39,355,000 minus 4,100,000 minus 29,733,000 minus 56,970,000 minus 46,288,000 minus 1,195,000) (Table A1.9). Multiplying this total by $189.66 (the highest price received per head of beef from 1945 up to and including 1960--Table A2.0) produces $608,000,000--the imputed price for 1960 unsold beef (Table A2.11).

The difference between full price-value and actual revenue for cattle and calves was estimated using this formula:

Full Price-Value Less Actual Beef Revenues
= The greatest price received per head from 1945 up to and including the year in question which is calculated as
The Number of Cattle and Calves Marketed and Slaughtered for Farm Consumption
/ "Gross Income" for Beef Production
* The Number of Cattle and Calves Marketed and Slaughtered for Farm Consumption
- "Gross Income" for Beef (Market Receipts plus Farm Slaughter--Tables A.31 and A.32)

The 1960 estimated difference between full price-value and actual revenues received for beef production is $963,000,000 ([$189.66 multiplied by 47,483,000] minus $8,042,000,000) (Table A2.12). Adding this to the imputed price for unsold beef produces $1,571,000,000--estimated unrealized surplus value (Table A2.13). For beef production, the sum of unrealized surplus value and surplus value equals $4,219,000,000--absolute surplus value (Table A2.2). Dividing unrealized surplus value by absolute surplus value equals 37.2%--the rate of unrealized surplus value (see Chapter III, Table 3.5).

For swine production, the imputed price-value of overproduction was estimated with this formula:

Imputed Price for Unsold Swine
= (Total Swine Inventory as of January 1
+ Pigs Born During the Year ("pig crop")
- Hogs that Die During the Year
- Following Year's Necessary Inventory ("stocker swine" which includes sows farrowing plus boars which are estimated as 5% of the number of sows farrowing)
- Pigs Not Ready for Market (this includes five sixths of the pigs born after June 1
- Hogs and Pigs Marketed
- Hogs and Pigs Slaughtered for Farm Consumption)

* The greatest price received per swine from 1945 up to and including the year in question which is calculated as
The Number of Hogs and Pigs Marketed and Slaughtered for Farm Consumption
/ "Gross Income" for Swine Production

(see Tables A1.5 through A2.11). Chapter II noted that the number of pigs that die during the year is estimated by multiplying the total pig crop by a certain percentage. For 1960, the percentage is 1.3%. Hence, the 1960 estimated overproduction for swine equals 13,485,000 (59,087,000 plus 88,216,000 minus 1,147,000 minus 47,726,000

(necessary inventory and the number of pigs not ready for market) minus 79,831,000 minus 5,114,000 (Table A1.9). Multiplying this total by $63.45 (the greatest price received per swine from 1945 up to and including 1960--Table A2.0) produces $856,000,000--the imputed price for 1960 unsold swine (Table A2.11).

The difference between full price-value and actual revenue for hogs and pigs was estimated using this formula:

Full Price-Value Less Actual Swine Revenues
= The greatest price received per swine from 1945 up to and including the year in question which is calculated as
The Number of Hogs and Pigs Marketed and Slaughtered for Farm Consumption
/ "Gross Income" for Swine Production
* The Number of Hogs and Pigs Marketed and Slaughtered for Farm Consumption
- "Gross Income" for Swine (Market Receipts plus Farm Slaughter--Tables A.31 and A.32)

The 1960 estimated difference between full price-value and actual revenues received for swine production is $2,133,000,000 (($63.45 multiplied by 84,945,000) minus $3,257,000,000) (Table A2.12). Adding this to the imputed price for unsold swine produces $2,989,000,000--estimated unrealized surplus value (Table A2.13). For swine production, the sum of unrealized surplus value and surplus value equals $4,192,000,000--absolute surplus value (Table A2.2). Dividing unrealized surplus value by absolute surplus value equals 71.3%--the rate of unrealized surplus value (see Chapter III, Table 3.6).

To estimate output/investment ratios the following formula was used:

Output/Investment Ratio
= Number of Red Meat Animals Born During the Year
/ Constant and Variable Capital

For beef production, the estimated 1960 output/investment ratio is (88,216,000 divided by $2,054,000,000) (Table A2.3).

To compute consumption/investment ratios this formula was used:

Consumption/Investment Ratio
= Red Meat Animals Marketed
+ Red Meat Animals Slaughtered for Farm Consumption
/ Constant and Variable Capital

For beef production, the estimated 1960 consumption/investment ratio is .009 (47,483,000 divided by $5,395,000,000); for swine, it is .041 (84,945,000 divided by $2,054,000,000) (Table A2.4).

The following formula was used to calculate under-utilized production capacity:

Under-utilization of Production Capacity
= The Number of Red Meat Animals Born During the Year
- The greatest number of red meat animals born from 1945 up to and including the year in question

For beef production, the estimated 1960 under-utilization of production capacity is -3,246,000 cattle and calves (39,355,000 minus 42,601,000); for swine, it is -12,370,000 (88,216,000 minus 100,586,000) (Table A2.5).

As an indicator of state involvement in the red meat industry, direct government payments to the farm sector were converted to constant 1967 dollars. Table A2.6 shows the figures for direct government payments to the farm sector since 1945.

Table A.1

PRICE INDEXES AND DEFLATORS 1967 = 1.000

YEAR	-PRODUCER AND CONSUMER PRICE INDEXES- TOTAL FARM PRODUCTS	FARM FOODS & FEED	OTHER FARM PRODUCTS	ENERGY	---GNP PRICE DEFLATORS--- -FIXED INVESTMENT- DURABLE EQUIPMENT	STRUC-TURES	TOTAL GNP
1945	0.785	0.785	0.785	0.539	0.401	0.423	0.437
1946	0.909	0.909	0.909	0.585	0.474	0.498	0.540
1947	0.943	0.829	1.094	0.669	0.539	0.588	0.616
1948	1.015	0.887	1.175	0.721	0.586	0.649	0.657
1949	0.896	0.806	1.016	0.714	0.625	0.639	0.655
1950	0.939	0.834	1.067	0.721	0.651	0.646	0.666
1951	1.069	0.927	1.242	0.778	0.687	0.725	0.699
1952	1.027	0.916	1.172	0.795	0.701	0.732	0.710
1953	0.960	0.874	1.062	0.801	0.721	0.749	0.721
1954	0.957	0.889	1.047	0.805	0.745	0.735	0.733
1955	0.912	0.850	0.982	0.802	0.763	0.749	0.758
1956	0.906	0.849	0.969	0.814	0.807	0.828	0.783
1957	0.937	0.874	0.995	0.901	0.867	0.866	0.811
1958	0.981	0.918	1.039	0.903	0.885	0.852	0.827
1959	0.935	0.894	0.975	0.918	0.904	0.859	0.847
1960	0.937	0.895	0.972	0.942	0.927	0.866	0.861
1961	0.937	0.910	0.963	0.944	0.935	0.859	0.869
1962	0.947	0.919	0.980	0.947	0.940	0.866	0.889
1963	0.938	0.925	0.960	0.950	0.943	0.876	0.903
1964	0.932	0.923	0.946	0.946	0.943	0.890	0.916
1965	0.971	0.955	0.987	0.963	0.948	0.924	0.942
1966	1.035	1.012	1.059	0.978	0.969	0.969	0.975
1967	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1968	1.024	1.022	1.025	1.015	1.039	1.045	1.050
1969	1.080	1.073	1.091	1.042	1.081	1.131	1.109
1970	1.117	1.121	1.110	1.070	1.125	1.210	1.170
1971	1.139	1.145	1.129	1.112	1.185	1.309	1.237
1972	1.224	1.208	1.250	1.143	1.219	1.395	1.295
1973	1.591	1.481	1.763	1.235	1.232	1.502	1.379
1974	1.774	1.709	1.877	1.597	1.331	1.701	1.504
1975	1.842	1.826	1.867	1.766	1.555	1.880	1.652
1976	1.831	1.780	1.910	1.893	1.677	1.979	1.758
1977	1.888	1.861	1.925	2.073	1.779	2.117	1.875
1978	2.066	2.026	2.125	2.204	1.909	2.333	2.011
1979	2.298	2.225	2.414	2.759	2.047	2.619	2.189
1980	2.447	2.412	2.494	3.611	2.240	2.873	2.387
1981	2.515	2.487	2.549	4.100	2.440	3.199	2.618
1982	2.489	2.515	2.424	4.161	2.604	3.436	2.786
1983	2.539	2.559	2.482	4.193	2.602	3.340	2.891

SOURCE: Economic Report of the President (1986).

Table A.2

COSTS FOR THE ENTIRE FARM SECTOR
MILLIONS OF 1967 DOLLARS

YEAR	FEED	FEEDER LIVE-STOCK	ENERGY	TRUCKS SERVICE TRAC-TORS	BUILD-INGS	--OVERHEAD-- GEN-ERAL	LIVE-STOCK	LAND	LABOR
1945	3,488	1,288	1,083	923	856	3,695	334	4,212	5,257
1946	3,325	1,287	1,186	964	1,509	3,523	291	3,473	4,686
1947	4,519	1,261	1,314	1,692	1,498	3,616	310	3,920	4,521
1948	4,505	1,352	1,501	2,041	1,444	3,666	307	3,663	4,547
1949	3,752	1,505	1,639	2,090	1,388	3,616	328	3,394	4,287
1950	3,936	1,878	1,752	1,952	1,362	3,631	344	3,629	4,222
1951	4,470	1,962	1,729	1,828	1,288	3,915	383	3,779	4,178
1952	4,728	1,637	1,747	1,576	1,297	4,084	384	3,903	4,022
1953	4,314	1,243	1,820	1,525	1,212	3,998	383	3,630	3,792
1954	4,394	1,493	1,850	1,271	1,160	3,826	399	3,568	3,544
1955	4,565	1,567	1,903	1,308	1,139	3,824	401	3,432	3,451
1956	4,587	1,662	1,919	1,053	1,042	3,935	400	3,487	3,374
1957	4,617	1,944	1,771	1,030	1,009	3,970	389	3,396	3,373
1958	4,947	2,601	1,757	1,195	987	3,954	401	3,612	3,435
1959	5,306	2,762	1,753	1,352	1,298	4,283	469	3,635	3,429
1960	**5,086**	**2,578**	**1,763**	**997**	**1,387**	**4,065**	**491**	**3,812**	**3,559**
1961	5,234	2,834	1,809	1,124	1,346	4,025	525	4,189	3,673
1962	5,644	3,167	1,824	1,278	1,482	4,008	539	4,392	3,713
1963	6,151	3,048	1,856	1,410	1,507	3,912	551	4,660	3,767
1964	5,972	2,557	1,894	1,522	1,495	3,896	572	4,807	3,801
1965	5,941	2,950	1,886	1,598	1,500	3,791	567	5,135	3,827
1966	6,325	3,347	1,910	1,775	1,531	3,867	599	5,357	3,777
1967	6,646	3,431	1,907	1,744	1,702	4,009	608	5,329	3,723
1968	6,220	3,586	1,897	1,639	1,530	3,842	612	5,494	3,733
1969	6,617	3,873	1,915	1,517	1,494	3,737	567	5,540	3,744
1970	7,161	3,895	1,883	1,529	1,550	3,587	568	5,479	3,686
1971	7,030	4,538	1,852	1,534	1,463	3,586	572	5,366	3,510
1972	6,951	5,334	1,801	1,715	1,279	3,532	567	6,101	3,496
1973	8,929	4,575	1,851	2,156	1,681	3,649	550	7,290	3,738
1974	8,492	2,734	1,998	2,330	1,910	3,974	537	6,669	4,039
1975	7,068	2,653	2,215	2,279	1,985	4,012	544	6,377	3,987
1976	8,073	3,081	2,548	2,501	2,006	4,139	566	6,111	4,273
1977	7,505	3,674	2,617	2,491	2,093	4,292	592	6,082	4,243
1978	7,915	4,776	2,721	2,678	2,232	4,540	620	6,278	4,117
1979	8,680	5,390	2,567	2,834	2,134	4,651	657	6,802	4,102
1980	8,694	4,278	2,605	2,429	1,815	4,538	671	6,883	3,893
1981	8,386	3,530	2,516	2,156	1,473	4,253	665	7,051	3,411
1982	7,392	4,000	2,364	1,686	1,105	4,183	624	7,142	3,656
1983	8,308	3,551	2,274	1,724	994	4,218	683	6,622	3,385

SOURCE: Lucier, et al. (1986:22-26). See also Table A.1.

Table A.31

MARKET RECEIPTS
MILLIONS OF 1967 DOLLARS

YEAR	ALL FARM COMMODITIES	ALL LIVESTOCK	GRAZING ANIMALS	MEAT ANIMALS	CATTLE CALVES	HOGS PIGS
1945	27,596	15,297	8,642	7,516	4,227	2,883
1946	27,285	15,166	8,748	7,746	4,138	3,209
1947	31,410	17,526	10,060	9,857	5,267	4,163
1948	29,780	16,876	10,042	9,216	5,207	3,606
1949	31,032	17,198	10,098	9,291	5,412	3,488
1950	30,310	17,151	10,560	9,884	6,049	3,423
1951	30,737	18,353	11,187	10,627	6,553	3,638
1952	31,673	17,759	10,990	9,796	6,043	3,373
1953	32,293	17,628	10,094	9,040	5,081	3,628
1954	31,172	17,007	10,090	9,266	5,317	3,610
1955	32,336	17,508	10,821	9,052	5,751	2,954
1956	33,555	18,061	11,338	9,184	5,908	2,912
1957	31,712	18,544	11,785	9,964	6,344	3,268
1958	34,104	19,599	12,547	11,261	7,464	3,432
1959	35,986	20,218	13,775	11,713	8,379	2,978
1960	**36,299**	**20,266**	**13,418**	**11,285**	**7,876**	**3,062**
1961	37,527	20,825	13,766	11,749	8,068	3,364
1962	38,509	21,286	14,229	12,316	8,640	3,339
1963	39,954	21,372	14,285	12,216	8,649	3,233
1964	40,048	21,402	14,209	11,950	8,353	3,255
1965	40,541	22,540	14,834	13,263	9,209	3,715
1966	41,967	24,181	15,843	14,427	10,077	4,028
1967	42,817	24,383	16,669	14,661	10,550	3,809
1968	43,147	24,890	17,195	15,014	11,000	3,706
1969	44,610	26,456	17,760	16,349	11,641	4,391
1970	45,218	26,439	18,398	16,513	12,205	4,009
1971	46,311	26,759	19,449	17,051	13,157	3,610
1972	49,923	29,071	21,065	19,533	14,900	4,344
1973	54,611	28,769	19,444	19,016	14,039	4,732
1974	52,081	23,295	15,640	14,183	10,059	3,916
1975	48,264	23,393	15,137	14,018	9,511	4,298
1976	52,078	25,299	17,033	14,842	10,537	4,090
1977	50,972	25,230	17,182	14,773	10,712	3,856
1978	54,289	28,636	20,088	18,129	13,673	4,237
1979	57,226	30,129	21,857	19,388	15,242	3,942
1980	57,115	27,785	19,922	16,850	13,003	3,655
1981	56,496	27,495	19,146	15,804	11,745	3,894
1982	57,428	28,231	19,511	16,439	11,978	4,282
1983	53,667	27,351	18,877	15,318	11,297	3,854

SOURCE: Lucier, et al. (1986:9-21). See also Table A.1.

Table A.32

FARM SLAUGHTER
IN MILLIONS OF 1967 DOLLARS

YEAR	CATTLE CALVES	HOGS PIGS	YEAR	CATTLE CALVES	HOGS PIGS
1945	73	480	1965	166	132
1946	79	532	1966	178	132
1947	92	632	1967	176	111
1948	95	534	1968	179	103
1949	93	433	1969	192	105
1950	100	378	1970	218	117
1951	115	363	1971	229	87
1952	116	320	1972	279	115
1953	98	350	1973	300	131
1954	107	336	1974	285	123
1955	117	264	1975	249	145
1956	121	236	1976	274	147
1957	130	260	1977	255	139
1958	164	281	1978	273	138
1959	176	216	1979	302	111
1960	166	195	1980	255	88
1961	172	194	1981	239	82
1962	178	165	1982	232	72
1963	175	144	1983	219	49
1964	165	124			

SOURCE: Agricultural Statistics (1945 to 1984)
See also Table A.1.

Table A.4

ESTIMATED FEED COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	964	657	1965	2,427	979
1946	907	703	1966	2,636	1,054
1947	1,358	1,073	1967	2,876	1,038
1948	1,390	963	1968	2,749	926
1949	1,181	761	1969	2,911	1,098
1950	1,388	786	1970	3,306	1,086
1951	1,596	886	1971	3,456	948
1952	1,609	898	1972	3,563	1,039
1953	1,243	888	1973	4,357	1,469
1954	1,374	933	1974	3,667	1,428
1955	1,499	770	1975	2,874	1,299
1956	1,500	739	1976	3,363	1,305
1957	1,579	814	1977	3,187	1,147
1958	1,884	866	1978	3,779	1,171
1959	2,199	781	1979	4,391	1,136
1960	1,977	768	1980	4,069	1,144
1961	2,028	845	1981	3,582	1,188
1962	2,291	885	1982	3,136	1,121
1963	2,489	931	1983	3,432	1,171
1964	2,331	908			

SOURCE: See Tables A.2 and A.31.

Table A.5

ESTIMATED LIVESTOCK COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	356	243	1965	1,205	486
1946	351	272	1966	1,395	557
1947	379	299	1967	1,485	536
1948	417	289	1968	1,585	534
1949	474	305	1969	1,704	643
1950	662	375	1970	1,798	591
1951	701	389	1971	2,231	612
1952	557	311	1972	2,734	797
1953	358	256	1973	2,232	752
1954	467	317	1974	1,180	460
1955	515	264	1975	1,079	487
1956	544	268	1976	1,283	498
1957	665	343	1977	1,560	562
1958	990	455	1978	2,281	707
1959	1,145	407	1979	2,727	705
1960	1,002	390	1980	2,002	563
1961	1,098	458	1981	1,508	500
1962	1,286	497	1982	1,697	607
1963	1,233	461	1983	1,467	500
1964	998	389			

SOURCE: See Tables A.2 and A.31.

Table A.6

ESTIMATED ENERGY COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	166	113	1965	428	173
1946	180	140	1966	459	183
1947	220	174	1967	470	170
1948	262	182	1968	484	163
1949	286	184	1969	500	188
1950	350	198	1970	508	167
1951	369	205	1971	526	144
1952	333	186	1972	538	157
1953	286	205	1973	476	160
1954	315	214	1974	386	150
1955	338	174	1975	437	197
1956	338	167	1976	516	200
1957	354	183	1977	550	198
1958	385	177	1978	685	212
1959	408	145	1979	684	177
1960	383	149	1980	593	167
1961	389	162	1981	523	173
1962	409	158	1982	493	176
1963	402	150	1983	479	163
1964	395	154			

SOURCE: See Tables A.2 and A.31.

Table A.7

ESTIMATED MACHINERY COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	141	96	1965	363	146
1946	146	113	1966	426	170
1947	284	224	1967	430	155
1948	357	247	1968	418	141
1949	364	235	1969	396	149
1950	390	220	1970	413	136
1951	390	216	1971	436	120
1952	301	168	1972	512	149
1953	240	171	1973	554	187
1954	217	147	1974	450	175
1955	233	119	1975	449	203
1956	185	91	1976	506	196
1957	206	106	1977	524	188
1958	262	120	1978	674	209
1959	315	112	1979	755	195
1960	216	84	1980	553	155
1961	242	101	1981	448	149
1962	287	111	1982	352	126
1963	305	114	1983	363	124
1964	317	124			

SOURCE: See Tables A.2 and A.31.

Table A.8

ESTIMATED STRUCTURE COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	N/A	89	1965	N/A	137
1946	N/A	177	1966	N/A	147
1947	N/A	198	1967	N/A	151
1948	N/A	175	1968	N/A	131
1949	N/A	156	1969	N/A	147
1950	N/A	154	1970	N/A	137
1951	N/A	152	1971	N/A	114
1952	N/A	138	1972	N/A	111
1953	N/A	136	1973	N/A	146
1954	N/A	134	1974	N/A	144
1955	N/A	104	1975	N/A	177
1956	N/A	90	1976	N/A	158
1957	N/A	104	1977	N/A	158
1958	N/A	99	1978	N/A	174
1959	N/A	107	1979	N/A	147
1960	N/A	117	1980	N/A	116
1961	N/A	121	1981	N/A	102
1962	N/A	128	1982	N/A	82
1963	N/A	122	1983	N/A	71
1964	N/A	122			

SOURCE: See Tables A.2 and A.31.

Table A.9

ESTIMATED OVERHEAD COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	658	449	1965	1,093	441
1946	614	476	1966	1,178	471
1947	700	553	1967	1,251	452
1948	736	510	1968	1,250	421
1949	734	473	1969	1,225	462
1950	846	479	1970	1,230	404
1951	971	539	1971	1,300	357
1952	910	508	1972	1,345	392
1953	739	528	1973	1,207	407
1954	777	528	1974	1,000	389
1955	812	417	1975	1,012	457
1956	824	406	1976	1,073	417
1957	927	478	1977	1,153	415
1958	1,018	468	1978	1,440	446
1959	1,192	423	1979	1,571	406
1960	1,073	417	1980	1,347	379
1961	1,069	446	1981	1,168	387
1962	1,118	432	1982	1,137	407
1963	1,070	400	1983	1,170	399
1964	1,036	404			

SOURCE: See Tables A.2 and A.31.

Table A1.01

LAND UTILIZATION
IN MILLIONS OF ACRES

YEAR	PRIVATE PASTURE & GRASSLAND	TOTAL PRIVATE FARM AREA	PASTURE GRASSLAND TO TOTAL	YEAR	PRIVATE PASTURE & GRASSLAND	TOTAL PRIVATE FARM AREA	PASTURE GRASSLAND TO TOTAL
1940	718	1,904	37.7%	1964	695	2,268	30.7%
1945	709	1,904	37.2%	1965	694	2,267	30.6%
1946	707	1,904	37.1%	1966	694	2,266	30.6%
1947	705	1,904	37.0%	1967	693	2,265	30.6%
1948	704	1,904	37.0%	1968	692	2,265	30.6%
1949	702	1,904	36.9%	1969	692	2,264	30.6%
1950	700	1,904	36.8%	1970	690	2,264	30.5%
1951	700	1,904	36.8%	1971	688	2,264	30.4%
1952	700	1,904	36.8%	1972	685	2,264	30.3%
1953	700	1,904	36.7%	1973	683	2,264	30.2%
1954	700	1,904	36.7%	1974	681	2,264	30.1%
1955	699	1,904	36.7%	1975	677	2,264	29.9%
1956	699	1,904	36.7%	1976	672	2,264	29.7%
1957	699	1,904	36.7%	1977	668	2,264	29.5%
1958	699	1,904	36.7%	1978	663	2,264	29.3%
1959	699	2,271	30.8%	1979	663	2,264	29.3%
1960	698	2,270	30.8%	1980	663	2,264	29.3%
1961	697	2,270	30.7%	1981	662	2,264	29.2%
1962	697	2,269	30.7%	1982	662	2,265	29.2%
1963	696	2,268	30.7%	1983	662	2,265	29.2%

SOURCE: Agricultural Statistics (1985:372).

Table A1.02

ESTIMATED LAND COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	460	N/A	1965	586	N/A
1946	366	N/A	1966	626	N/A
1947	456	N/A	1967	619	N/A
1948	421	N/A	1968	644	N/A
1949	402	N/A	1969	666	N/A
1950	459	N/A	1970	664	N/A
1951	488	N/A	1971	662	N/A
1952	473	N/A	1972	784	N/A
1953	403	N/A	1973	953	N/A
1954	414	N/A	1974	774	N/A
1955	402	N/A	1975	718	N/A
1956	400	N/A	1976	673	N/A
1957	403	N/A	1977	671	N/A
1958	473	N/A	1978	751	N/A
1959	408	N/A	1979	833	N/A
1960	413	N/A	1980	789	N/A
1961	453	N/A	1981	759	N/A
1962	491	N/A	1982	769	N/A
1963	519	N/A	1983	695	N/A
1964	520	N/A			

SOURCE: U.S. Census of Agriculture (1945:1; 1974:76-77; 1978:102-103). See also Tables A.2, A.31, and A1.01.

Table A1.11

YEAR	ALL FARM WORK (MILLIONS OF LABOR HOURS)	MEAT ANIMALS	YEAR	ALL FARM WORK (MILLIONS OF LABOR HOURS)	MEAT ANIMALS
1945	18,838	1,438	1965	7,335	1,107
1946	18,080	1,408	1966	6,858	1,092
1947	17,196	1,381	1967	6,677	1,078
1948	16,833	1,349	1968	6,416	1,050
1949	16,202	1,386	1969	6,198	1,008
1950	15,137	1,451	1970	5,896	997
1951	15,222	1,520	1971	5,741	962
1952	14,504	1,510	1972	5,433	905
1953	13,966	1,462	1973	5,321	850
1954	13,310	1,479	1974	5,178	812
1955	12,808	1,498	1975	4,975	731
1956	12,028	1,434	1976	4,788	693
1957	11,059	1,368	1977	4,654	653
1958	10,548	1,357	1978	4,446	606
1959	10,301	1,395	1979	4,347	574
1960	9,795	1,307	1980	4,281	547
1961	9,400	1,293	1981	4,202	509
1962	8,979	1,252	1982	4,035	475
1963	8,664	1,236	1983	3,688	456
1964	8,194	1,191			

SOURCE: Economic Indicators of the Farm Sector (1984:31).

Table A1.12

ESTIMATED HIRED LABOR COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	226	154	1965	401	162
1946	195	151	1966	420	168
1947	194	153	1967	433	156
1948	206	143	1968	448	151
1949	214	138	1969	434	164
1950	248	140	1970	461	151
1951	257	143	1971	454	125
1952	258	144	1972	444	130
1953	223	159	1973	441	149
1954	226	153	1974	449	175
1955	256	132	1975	397	180
1956	259	128	1976	439	170
1957	266	137	1977	432	155
1958	293	135	1978	423	131
1959	332	118	1979	426	110
1960	331	129	1980	384	108
1961	347	145	1981	307	102
1962	363	140	1982	314	112
1963	381	142	1983	309	105
1964	386	150			

SOURCE: See Tables A.2, A.31, and A1.11.

Table A1.21

BEEF PRODUCTION PRODUCTION COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CONSTANT CAPITAL	VARIABLE CAPITAL	TOTAL PRODUCTION COSTS	YEAR	CONSTANT CAPITAL	VARIABLE CAPITAL	TOTAL PRODUCTION COSTS
1945	2,745	226	2,971	1965	6,103	401	6,504
1946	2,564	195	2,759	1966	6,720	420	7,140
1947	3,397	194	3,591	1967	7,129	433	7,562
1948	3,583	206	3,789	1968	7,130	448	7,577
1949	3,441	214	3,654	1969	7,402	434	7,835
1950	4,094	248	4,342	1970	7,920	461	8,381
1951	4,515	257	4,772	1971	8,611	454	9,065
1952	4,183	258	4,441	1972	9,475	444	9,919
1953	3,270	223	3,493	1973	9,779	441	10,220
1954	3,564	226	3,790	1974	7,456	449	7,906
1955	3,799	256	4,056	1975	6,569	397	6,966
1956	3,791	259	4,050	1976	7,414	439	7,853
1957	4,134	266	4,400	1977	7,644	432	8,076
1958	5,012	293	5,305	1978	9,610	423	10,033
1959	5,666	332	5,999	1979	10,961	426	11,386
1960	5,063	331	5,395	1980	9,353	384	9,736
1961	5,278	347	5,625	1981	7,989	307	8,296
1962	5,882	363	6,245	1982	7,584	314	7,898
1963	6,019	381	6,400	1983	7,604	309	7,913
1964	5,597	386	5,983				

SOURCE: See Tables A.4, A.5, A.6, A.7, A.8, A.9, A1.02, and A1.12.

Table A1.22

SWINE PRODUCTION COSTS
MILLIONS OF 1967 DOLLARS

YEAR	CONSTANT CAPITAL	VARIABLE CAPITAL	TOTAL PRODUCTION COSTS	YEAR	CONSTANT CAPITAL	VARIABLE CAPITAL	TOTAL PRODUCTION COSTS
1945	1,648	154	1,802	1965	2,363	162	2,525
1946	1,882	151	2,033	1966	2,583	168	2,751
1947	2,523	153	2,676	1967	2,502	156	2,658
1948	2,365	143	2,507	1968	2,316	151	2,467
1949	2,114	138	2,252	1969	2,688	164	2,851
1950	2,211	140	2,351	1970	2,521	151	2,672
1951	2,388	143	2,531	1971	2,295	125	2,420
1952	2,209	144	2,353	1972	2,645	130	2,775
1953	2,183	159	2,343	1973	3,121	149	3,269
1954	2,273	153	2,427	1974	2,745	175	2,920
1955	1,849	132	1,981	1975	2,820	180	3,000
1956	1,762	128	1,889	1976	2,774	170	2,944
1957	2,026	137	2,163	1977	2,669	155	2,824
1958	2,186	135	2,321	1978	2,920	131	3,051
1959	1,976	118	2,094	1979	2,766	110	2,876
1960	1,925	129	2,054	1980	2,523	108	2,631
1961	2,132	145	2,277	1981	2,499	102	2,600
1962	2,212	140	2,352	1982	2,519	112	2,631
1963	2,178	142	2,320	1983	2,429	105	2,534
1964	2,100	150	2,251				

SOURCE: See Tables A.4, A.5, A.6, A.7, A.8, A.9, A1.02, and A1.12.

Table A1.3

ESTIMATED SURPLUS VALUE
MILLIONS OF 1967 DOLLARS

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	1,328	1,561	1965	2,871	1,322
1946	1,458	1,708	1966	3,115	1,410
1947	1,769	2,119	1967	3,164	1,262
1948	1,512	1,632	1968	3,601	1,341
1949	1,850	1,669	1969	3,997	1,644
1950	1,807	1,450	1970	4,042	1,454
1951	1,896	1,470	1971	4,322	1,277
1952	1,717	1,340	1972	5,260	1,684
1953	1,686	1,635	1973	4,119	1,594
1954	1,633	1,520	1974	2,438	1,119
1955	1,813	1,238	1975	2,794	1,443
1956	1,980	1,259	1976	2,959	1,292
1957	2,074	1,365	1977	2,892	1,171
1958	2,323	1,393	1978	3,913	1,324
1959	2,556	1,100	1979	4,157	1,176
1960	2,648	1,203	1980	3,522	1,112
1961	2,615	1,281	1981	3,688	1,376
1962	2,574	1,152	1982	4,312	1,723
1963	2,424	1,057	1983	3,602	1,369
1964	2,535	1,129			

SOURCE: See Tables A.31, A.32, A1.21, and A1.22.

Table A1.4

ESTIMATED RATE OF EXPLOITATION

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	588.6%	1014.3%	1965	715.9%	817.1%
1946	748.0%	1130.0%	1966	741.7%	839.6%
1947	911.7%	1382.0%	1967	731.5%	808.0%
1948	734.5%	1145.0%	1968	804.6%	889.5%
1949	866.2%	1212.5%	1969	921.9%	1005.4%
1950	729.5%	1034.2%	1970	877.4%	961.1%
1951	737.0%	1029.4%	1971	952.2%	1025.7%
1952	664.9%	929.7%	1972	1184.2%	1300.7%
1953	755.4%	1026.3%	1973	934.5%	1072.4%
1954	722.9%	990.9%	1974	542.7%	640.0%
1955	706.8%	939.4%	1975	702.8%	803.3%
1956	765.0%	987.1%	1976	673.8%	758.5%
1957	780.7%	997.6%	1977	670.0%	753.6%
1958	793.1%	1033.8%	1978	924.7%	1009.8%
1959	769.5%	931.4%	1979	976.2%	1068.1%
1960	798.9%	934.1%	1980	917.4%	1030.3%
1961	753.8%	885.7%	1981	1201.2%	1351.2%
1962	708.6%	820.6%	1982	1375.1%	1536.7%
1963	637.2%	743.1%	1983	1166.9%	1299.8%
1964	656.6%	750.3%			

SOURCE: See Tables A1.3 and A1.12.

Table A1.5

LIVESTOCK INVENTORY AS OF JANUARY 1
THOUSAND HEAD

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	89,419	59,373	1965	116,485	50,792
1946	86,798	61,306	1966	116,811	47,414
1947	84,534	56,810	1967	115,731	53,249
1948	80,945	54,590	1968	117,429	55,275
1949	80,369	56,257	1969	117,636	60,829
1950	82,469	58,937	1970	119,238	57,046
1951	86,734	62,269	1971	124,481	67,285
1952	92,202	62,117	1972	128,781	62,412
1953	96,846	51,755	1973	131,240	59,017
1954	100,216	45,114	1974	132,248	60,614
1955	100,692	50,474	1975	141,923	54,201
1956	100,580	55,354	1976	136,277	48,922
1957	97,930	51,897	1977	133,563	54,659
1958	97,894	51,517	1978	126,598	56,313
1959	99,861	58,045	1979	119,912	60,356
1960	102,139	59,087	1980	119,534	67,353
1961	104,413	55,560	1981	121,667	64,512
1962	108,432	56,619	1982	126,115	58,688
1963	110,968	57,933	1983	122,160	53,935
1964	113,653	56,777			

SOURCE: Agricultural Statistics (1967: 367, 372; 1983: 265, 272; 1985: 256, 263).

Table A1.6

ADJUSTMENTS TO LIVESTOCK INVENTORY
THOUSAND HEAD

Year	CATTLE AND CALVES: CALF CROP	DEATH LOSS	MILK COWS	STOCKER CATTLE	HOGS AND PIGS: PIG CROP	DEATH LOSS	STOCKER SWINE
1945	35,155	4,315	38,549	35,959	86,827	1,737	42,251
1946	34,643	4,096	37,683	35,762	82,694	1,654	39,494
1947	34,703	3,930	36,169	34,330	83,289	1,666	39,446
1948	33,123	3,635	35,270	34,290	83,826	1,677	42,895
1949	33,748	3,840	35,455	35,703	93,244	1,865	46,078
1950	34,899	3,742	35,398	39,656	97,381	1,948	49,050
1951	35,825	3,863	35,235	44,437	100,586	1,941	46,774
1952	38,273	4,034	35,921	49,173	88,829	1,652	40,167
1953	41,261	4,060	36,161	51,289	77,914	1,395	38,285
1954	42,601	4,063	35,342	52,806	86,830	1,493	38,782
1955	42,112	4,052	34,209	52,208	95,729	1,580	45,231
1956	41,376	3,912	33,391	50,578	89,426	1,413	43,161
1957	39,905	3,801	31,962	49,962	87,362	1,319	43,897
1958	38,860	3,810	30,708	52,683	93,533	1,347	49,965
1959	38,938	3,876	30,181	55,481	99,395	1,362	48,884
1960	39,355	4,100	29,733	56,970	88,216	1,147	47,726
1961	40,180	4,018	29,114	60,152	92,715	1,196	49,025
1962	41,441	4,125	28,022	64,215	93,608	1,198	50,453
1963	42,268	4,040	26,734	68,500	94,056	1,195	48,802
1964	43,809	4,232	25,564	71,316	87,544	1,103	44,646
1965	43,928	4,248	23,998	72,115	78,940	987	40,669
1966	43,473	4,047	22,879	72,879	85,526	1,061	48,135
1967	43,647	4,040	23,215	71,336	91,310	1,123	49,206
1968	44,315	4,012	22,470	72,640	94,155	1,149	50,221
1969	45,177	4,123	22,103	75,001	88,676	1,073	49,797
1970	45,871	4,297	21,865	77,105	101,714	1,221	55,562
1971	46,738	4,442	22,003	79,862	97,924	1,244	51,418
1972	47,682	5,126	21,926	83,062	90,574	1,205	48,784
1973	49,194	6,487	22,090	87,940	88,123	1,243	47,365
1974	50,873	6,110	21,825	93,872	83,744	1,239	42,868
1975	50,183	6,992	22,418	88,469	71,186	1,099	41,910
1976	47,384	5,190	22,933	82,994	84,395	1,361	47,830
1977	45,931	6,000	22,731	76,777	86,162	1,448	49,041
1978	43,818	5,800	22,167	72,255	88,512	1,549	53,567
1979	42,596	5,600	22,049	73,144	102,792	1,799	58,305
1980	44,938	5,413	22,471	76,360	101,720	1,780	54,520
1981	44,666	5,059	22,723	77,225	93,853	1,642	50,650
1982	44,200	5,429	23,557	75,231	85,189	1,491	49,431
1983	43,925	5,494	23,492	73,837	93,155	1,630	50,226

SOURCE: Agricultural Statistics (1967: 381, 386; 1983: 280, 282; 1985: 271, 274).

Table A1.7

LIVESTOCK MARKETED
THOUSAND HEAD

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	40,763	61,035	1965	56,086	76,079
1946	39,293	64,409	1966	57,491	76,504
1947	40,874	63,499	1967	57,337	85,528
1948	36,024	61,790	1968	58,602	87,726
1949	35,532	69,249	1969	58,157	88,074
1950	34,692	72,673	1970	58,962	86,919
1951	33,966	79,142	1971	61,229	98,644
1952	35,898	80,448	1972	63,207	89,555
1953	42,738	68,572	1973	60,021	82,419
1954	46,136	66,012	1974	57,897	85,504
1955	47,295	75,400	1975	66,554	73,627
1956	49,733	79,091	1976	67,879	75,747
1957	47,595	74,087	1977	68,999	80,939
1958	44,284	73,419	1978	66,675	81,271
1959	44,107	84,379	1979	58,509	92,499
1960	46,288	79,831	1980	56,528	100,651
1961	47,036	80,326	1981	57,030	95,986
1962	48,585	81,743	1982	60,109	86,972
1963	49,781	86,163	1983	58,532	89,129
1964	52,832	86,086			

SOURCE: Agricultural Statistics (1967: 381, 386; 1983: 280, 282; 1985: 271, 274).

Table A1.8

FARM SLAUGHTER
THOUSAND HEAD

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	1,672	13,631	1965	1,196	2,613
1946	1,709	13,721	1966	661	1,319
1947	1,584	12,072	1967	621	1,301
1948	1,402	11,200	1968	568	1,262
1949	1,322	10,236	1969	486	1,134
1950	1,241	9,720	1970	462	1,235
1951	1,192	9,479	1971	456	1,210
1952	1,263	8,882	1972	503	1,158
1953	1,392	7,455	1973	570	1,095
1954	1,396	6,668	1974	729	1,321
1955	1,352	6,835	1975	750	1,193
1956	1,380	6,551	1976	722	1,181
1957	1,285	6,041	1977	700	1,144
1958	1,236	5,857	1978	550	1,086
1959	1,181	6,024	1979	430	1,070
1960	1,195	5,114	1980	401	1,100
1961	1,218	4,039	1981	398	897
1962	1,194	4,093	1982	395	654
1963	1,213	3,793	1983	410	517
1964	1,242	3,269			

SOURCE: Agricultural Statistics (1967: 381, 386; 1983: 280, 282; 1985: 271, 274).

Table A1.9

ESTIMATED OVERPRODUCTION
THOUSAND HEAD

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	3,316	27,546	1965	2,770	9,384
1946	2,898	24,722	1966	2,327	5,921
1947	2,350	23,416	1967	2,829	7,401
1948	3,447	20,855	1968	3,452	9,072
1949	2,265	22,073	1969	2,943	9,427
1950	2,639	22,927	1970	2,418	13,824
1951	3,866	25,519	1971	3,227	12,694
1952	4,186	19,796	1972	2,639	12,285
1953	2,467	13,962	1973	3,326	15,019
1954	3,074	18,989	1974	2,688	13,425
1955	3,688	17,158	1975	6,923	7,558
1956	2,962	14,564	1976	3,943	7,198
1957	3,230	13,915	1977	4,287	8,250
1958	4,033	14,462	1978	2,969	7,352
1959	3,973	16,792	1979	2,776	9,475
1960	**3,208**	**13,485**	1980	3,299	11,022
1961	3,055	13,689	1981	3,898	9,190
1962	3,732	12,740	1982	5,594	5,329
1963	2,968	12,037	1983	4,320	5,588
1964	2,276	9,217			

SOURCE: See Tables A1.5, A1.6, A1.7, and A1.8.

Table A2.0

ESTIMATED VALUE PER HEAD
1967 DOLLARS

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	101.32	45.04	1965	163.66	48.88
1946	102.84	47.89	1966	176.35	53.46
1947	126.23	63.45	1967	185.07	45.15
1948	141.65	56.72	1968	188.93	42.80
1949	149.36	49.33	1969	201.77	50.39
1950	171.13	46.13	1970	209.05	46.81
1951	189.66	45.15	1971	217.01	37.03
1952	165.73	41.34	1972	238.25	49.16
1953	117.36	52.33	1973	236.66	58.23
1954	114.10	54.30	1974	176.44	46.52
1955	120.63	39.13	1975	145.01	59.38
1956	117.97	36.76	1976	157.60	55.07
1957	132.44	44.03	1977	157.36	48.67
1958	167.57	46.84	1978	207.46	53.12
1959	188.90	35.33	1979	263.72	43.31
1960	169.38	38.34	1980	232.89	36.78
1961	170.77	42.18	1981	208.67	41.04
1962	177.15	40.82	1982	201.80	49.69
1963	173.04	37.55	1983	195.36	43.53
1964	157.53	37.82			

SOURCE: See Tables A.31, A.32, A1.7, and A1.8.

Table A2.11

IMPUTED PRICE-VALUE FOR UNSOLD INVENTORY
MILLIONS OF 1967 DOLLARS

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	336	1,241	1965	525	595
1946	298	1,184	1966	441	376
1947	297	1,486	1967	537	470
1948	488	1,323	1968	655	576
1949	338	1,401	1969	594	598
1950	452	1,455	1970	505	877
1951	733	1,619	1971	700	805
1952	794	1,256	1972	629	779
1953	468	886	1973	792	953
1954	583	1,205	1974	640	852
1955	699	1,089	1975	1,649	480
1956	562	924	1976	939	457
1957	613	883	1977	1,021	523
1958	765	918	1978	707	467
1959	754	1,065	1979	732	601
1960	608	856	1980	870	699
1961	579	869	1981	1,028	583
1962	708	808	1982	1,475	338
1963	563	764	1983	1,139	355
1964	432	585			

SOURCE: See Tables A1.9 and A2.0.

Table A2.12

ESTIMATED FULL PRICE-VALUE LESS ACTUAL REVENUES
MILLIONS OF 1967 DOLLARS

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	0	0	1965	1,489	1,146
1946	0	0	1966	774	777
1947	0	0	1967	266	1,589
1948	0	491	1968	43	1,838
1949	0	1,123	1969	0	1,165
1950	0	1,427	1970	0	1,467
1951	0	1,622	1971	0	2,639
1952	889	1,975	1972	0	1,297
1953	3,191	846	1973	96	436
1954	3,592	665	1974	3,624	1,470
1955	3,358	2,000	1975	6,275	305
1956	3,664	2,286	1976	5,533	645
1957	2,797	1,556	1977	5,638	1,213
1958	1,005	1,317	1978	2,070	850
1959	34	2,542	1979	0	1,884
1960	963	2,133	1980	1,755	2,714
1961	912	1,795	1981	3,161	2,171
1962	623	1,943	1982	3,746	1,206
1963	847	2,330	1983	4,029	1,785
1964	1,737	2,290			

SOURCE: See Tables A.31, A.32, A1.7, A1.8, and A2.0.

Table A2.13

ESTIMATED UNREALIZED SURPLUS VALUE
MILLIONS OF 1967 DOLLARS

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	336	1,241	1965	2,015	1,742
1946	298	1,184	1966	1,215	1,153
1947	297	1,485	1967	803	2,059
1948	488	1,815	1968	698	2,413
1949	338	2,523	1969	594	1,763
1950	452	2,882	1970	506	2,344
1951	733	3,241	1971	700	3,444
1952	1,683	3,231	1972	629	2,076
1953	3,658	1,732	1973	889	1,389
1954	4,175	1,870	1974	4,264	2,321
1955	4,057	3,088	1975	7,925	784
1956	4,226	3,210	1976	6,472	1,101
1957	3,409	2,439	1977	6,659	1,736
1958	1,770	2,234	1978	2,777	1,317
1959	788	3,608	1979	732	2,485
1960	1,571	2,988	1980	2,625	3,413
1961	1,491	2,663	1981	4,189	2,754
1962	1,331	2,751	1982	5,222	1,544
1963	1,410	3,094	1983	5,168	2,140
1964	2,169	2,875			

SOURCE: See Tables A2.11and A2.12.

Table A2.2

ESTIMATED ABSOLUTE SURPLUS VALUE
MILLIONS OF 1967 DOLLARS

Year	CATTLE AND CALVES	HOGS AND PIGS	Year	CATTLE AND CALVES	HOGS AND PIGS
1945	1,664	2,802	1965	4,885	3,064
1946	1,756	2,892	1966	4,331	2,563
1947	2,065	3,605	1967	3,967	3,321
1948	2,000	3,447	1968	4,300	3,755
1949	2,189	4,192	1969	4,591	3,407
1950	2,259	4,331	1970	4,547	3,799
1951	2,629	4,711	1971	5,022	4,721
1952	3,401	4,571	1972	5,889	3,761
1953	5,344	3,367	1973	5,008	2,982
1954	5,808	3,390	1974	6,702	3,441
1955	5,870	4,326	1975	10,718	2,227
1956	6,206	4,469	1976	9,431	2,394
1957	5,483	3,804	1977	9,552	2,908
1958	4,094	3,627	1978	6,691	2,641
1959	3,344	4,707	1979	4,889	3,662
1960	4,219	4,192	1980	6,147	4,524
1961	4,106	3,945	1981	7,877	4,130
1962	3,904	3,903	1982	9,534	3,267
1963	3,835	4,151	1983	8,770	3,509
1964	4,705	4,004			

SOURCE: See Tables A1.3 and A2.13.

Table A2.3

ESTIMATED OUTPUT/INVESTMENT RATIO

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	0.012	0.048	1965	0.007	0.031
1946	0.013	0.041	1966	0.006	0.031
1947	0.010	0.031	1967	0.006	0.034
1948	0.009	0.033	1968	0.006	0.038
1949	0.009	0.041	1969	0.006	0.031
1950	0.008	0.041	1970	0.005	0.038
1951	0.008	0.040	1971	0.005	0.040
1952	0.009	0.038	1972	0.005	0.033
1953	0.012	0.033	1973	0.005	0.027
1954	0.011	0.036	1974	0.006	0.029
1955	0.010	0.048	1975	0.007	0.024
1956	0.010	0.047	1976	0.006	0.029
1957	0.009	0.040	1977	0.006	0.031
1958	0.007	0.040	1978	0.004	0.029
1959	0.006	0.047	1979	0.004	0.036
1960	0.007	0.043	1980	0.005	0.039
1961	0.007	0.041	1981	0.005	0.036
1962	0.007	0.040	1982	0.006	0.032
1963	0.007	0.041	1983	0.006	0.037
1964	0.007	0.039			

SOURCE: See Tables A1.21, A1.22, and A1.6.

Table A2.4

ESTIMATED CONSUMPTION/INVESTMENT RATIO

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	0.014	0.041	1965	0.009	0.031
1946	0.015	0.038	1966	0.008	0.028
1947	0.012	0.028	1967	0.008	0.033
1948	0.010	0.029	1968	0.008	0.036
1949	0.010	0.035	1969	0.007	0.031
1950	0.008	0.035	1970	0.007	0.033
1951	0.007	0.035	1971	0.007	0.041
1952	0.008	0.038	1972	0.006	0.033
1953	0.013	0.032	1973	0.006	0.026
1954	0.013	0.030	1974	0.007	0.030
1955	0.012	0.042	1975	0.010	0.025
1956	0.013	0.045	1976	0.009	0.026
1957	0.011	0.037	1977	0.009	0.029
1958	0.009	0.034	1978	0.007	0.027
1959	0.008	0.043	1979	0.005	0.033
1960	0.009	0.041	1980	0.006	0.039
1961	0.009	0.037	1981	0.007	0.037
1962	0.008	0.036	1982	0.008	0.033
1963	0.008	0.039	1983	0.007	0.035
1964	0.009	0.040			

SOURCE: See Tables A1.21, A1.22, A1.7, and A1.8.

Table A2.5

ESTIMATED UNDERUTILIZED PRODUCTION CAPACITY
THOUSAND HEAD

YEAR	CATTLE AND CALVES	HOGS AND PIGS	YEAR	CATTLE AND CALVES	HOGS AND PIGS
1945	0	0	1965	0	-21646
1946	-512	-4133	1966	-455	-15060
1947	-452	-3538	1967	-281	-9276
1948	-2032	-3001	1968	0	-6431
1949	-1407	0	1969	0	-11910
1950	-256	0	1970	0	0
1951	0	0	1971	0	-3790
1952	0	-11757	1972	0	-11140
1953	0	-22672	1973	0	-13591
1954	0	-13756	1974	0	-17970
1955	-489	-4857	1975	-690	-30528
1956	-1225	-11160	1976	-3489	-17319
1957	-2696	-13224	1977	-4942	-15552
1958	-3741	-7053	1978	-7055	-13202
1959	-3663	-1191	1979	-8277	0
1960	-3246	-12370	1980	-5935	-1072
1961	-2421	-7871	1981	-6207	-8939
1962	-1160	-6978	1982	-6673	-17603
1963	-333	-6530	1983	-6948	-9637
1964	0	-13042			

SOURCE: See Tables A1.6.

Table A2.6

DIRECT STATE PAYMENTS TO THE FARM SECTOR

Year	MILLIONS OF 1967 DOLLARS	Year	MILLIONS OF 1967 DOLLARS
1945	1,697	1965	2,616
1946	1,429	1966	3,361
1947	510	1967	3,079
1948	391	1968	3,297
1949	283	1969	3,422
1950	425	1970	3,177
1951	409	1971	2,543
1952	387	1972	3,058
1953	295	1973	1,891
1954	351	1974	352
1955	302	1975	489
1956	708	1976	418
1957	1,253	1977	970
1958	1,316	1978	1,507
1959	805	1979	628
1960	816	1980	539
1961	1,718	1981	738
1962	1,966	1982	1,254
1963	1,879	1983	3,215
1964	2,380		

SOURCE: Lucier, et al. (1986:14). See also A.1.

NOTES

Chapter I

[1] The terms "Fundamentalist", which has been borrowed from Fine and Harris (1979), and "Underconsumptionist" refer to two Marxist schools of thought on crises. Neither my presentation of the Fundamentalist approach nor my account of the Underconsumptionist perspective is taken entirely from any one theorist. Rather, my work here compares two broad traditions within the Marxian paradigm, relying on a variety of representative works for each perspective.

[2] Those who have argued for the Fundamentalist perspective on theoretical grounds include Mattick (1969), Cogoy (1973), and Yaffe (1973), to name just a few. The principal Underconsumptionist theorists are Baran and Sweezy (Sweezy, 1970; Baran, 1957; Baran and Sweezy, 1966).

[3] Admittedly, raising and feeding livestock are two distinct economic enterprises (see e.g. Martin, 1979: 85-118; Boykin, et al., 1980; Van Arsdall and Gilliam, 1979: 190-254; Van Arsdall, 1978). This study considers the two processes as one to simplify the collection and reporting of data. For similar reasons, sheep are excluded from my definition of red meat animals.

[4] Even though there are several different expressions for the organic composition of capital, the expression used here (c / v + s) is the

most useful (see Wright, 1977: 203-204). For a theoretical criticism of this expression see Fine and Harris (1979: 58-75).

Chapter II

[1] Because my estimating procedures for land may not be immediately comprehensible, the following illustration will perhaps assist the reader. For this example, let us say that we have complete knowledge of land costs and market receipts.

a)	Total Land Costs for the Entire Farm Sector	= $280.00
b)	Total Private Farmland	= 28 Acres
c)	Total Private Grazing and Pasture Land	= 16 Acres
d)	Total Private Farmland Devoted to Beef	= 12 Acres
e)	Beef Market Receipts	= $6.00
f)	Grazing Animals Market Receipts	= $8.00
g)	Average Value of All Farmland / Acre	= $10.00
h)	Average Value of Grazing and Pasture / Acre	= $2.50
i)	Total Land Costs for Beef Production	= $30.00 (d * i)

In reality we do not know the total farmland devoted to beef (d) for all years since 1945. One could use the procedures presented in the text to find the unknown cost of land for beef production: Total land costs for the entire farm sector * (acres of private pasture and grassland / acres of all farmland)--$280.00 * (16 / 28) = $160.00. Multiplying this by the average value of all grazing and pasture per acre / average value of all farmland per acre ($160.00 * $2.50 / $10.00) equals $40.00. Taking that product and multiplying it by beef market receipts / market receipts from grazing animals ($40.00 * $6.00 / $8.00) finds the portion of livestock land costs that belongs to beef production, $30.00.

mos l . For retical criticism of

th ss 1979: 5

r II

1 s for la not be immediately

c sib llustrat l perhaps assist the

r Fo say tha ave complete knowledge

ost

al re Farm r	=	$280.00
al	=	28 Acres
al sture La	=	16 Acres
al ed to Be	=	12 Acres
f M	=	$6.00
azin pts	=	$8.00
rag d / Acre	=	$10.00
rag d Pasture e	=	$2.50
al roduction	=	$30.00 (d * i)

lity otal farm devoted to beef (d) for s si use the dures presented in the find land for production: Total land or or * (acr private pasture and d / and)--$280. (16 / 28) = $160.00. ing value of grazing and pasture per ave armland pere ($160.00 * $2.50 / equa that product multiplying it by beef ecei ts from gra animals ($40.00 * $6.00) f livestock costs that belongs to duct

Chapter III

[1] I used "exponential smoothing" to calculate a "moving average" that minimizes random fluctuations in the data and allows us to visualize serial trends. The exponential smoothing technique employed here is as follows: the plotted trend value for a given year equals the plotted trend value for the previous year plus a portion of the difference between the actual value for the previous year and the plotted trend for that year. The portion of the difference between the actual value for the previous year and the plotted trend value for that year is set at 20%. For example, the plotted trend value of 1960 equals the plotted trend value of 1959 plus 20% of the difference between the actual value for 1959 and the plotted value for 1959. See SAS Institute Inc., 1984: 314-315.

[2] Because the ordinary least squares method yields inflated statistical correlations for serial variables, the Yule-Walker regression technique is used to attain more accurate results. All of the regression equations reported here use the Yule-Walker technique. See SAS Institute Inc., 1984: 183-219.

[3] The results for "utilization of productive capacity" (UTL PCAP) and "direct state payments to the farm sector" (GOV PAY) are reported in millions and billions of dollars respectively.

BIBLIOGRAPHY

Agricultural Statistics
1984 Agricultural Statistics 1945 to 1984. Washington D.C.: U.S. Department of Agriculture.

Baran, Paul A.
1957 The Political Economy of Growth. New York: Monthly Review Press.

Baran, Paul A. and Paul M. Sweezy
1966 Monopoly Capital. New York: Monthly Review Press.

Bell, Peter F.
1977 "Marxist theory, class struggle, and the crisis of capitalism." Pp. 170-94 in Jesse Schwartz (ed.). The Subtle Anatomy of Capitalism. Santa Monica: Goodyear Publishing.

Bell, Peter F. and Harry Cleaver
1982 "Marx's crisis theory as a theory of class struggle." Research in Political Economy 5:189-261.

Bleaney, Michael
1976 Underconsumption Theories. New York: International Publishers.

Boykin, Calvin C., Henry C. Gilliam, and Ronald A. Gustafson
1980 Structural Characteristics of Beef Cattle Raising in the United States. Washington D.C.: U.S. Department of Agriculture.

Cogoy, Mario
1973 "The fall in the rate of profit and the theory of accumulation: a reply to Paul Sweezy." Bulletin of the Conference of Socialist Economists 7:52-67.

Economic Indicators of the Farm Sector
1984 Economic Indicators of the Farm Sector. Washington D.C.: U.S. Department of Agriculture.

Economic Report of the President
1986 Economic Report of the President. Washington D.C.: U.S. Government Printing Office.

Fine, Ben and Laurence Harris
1979 Rereading Capital. New York: Columbia University Press.

Foster, John Bellamy
1986 The Theory of Monopoly Capitalism. New York: Monthly Review Press.

Gillman, J.
1957 The Falling Rate of Profit. London: Dobson.

Habermas, Jurgen
1973 Legitimation Crisis. Tr. Thomas McCarthy. Boston: Beacon Press.

Hodgson, Geoff
1974 "The falling rate of profit." New Left Review 84: 55-82.

Itoh, Makoto
1978 "The formation of Marx's theory of crisis." Science and Society 42: 129-55.

Juttner, D. Johannes and John H. Murray
1983 "Notes and numbers on Marx's falling rate of profit." The Economic Record 59: 375-383.

Kalecki, Michael
1971 Selected Essays On the Dynamics of the Capitalist Economy. Cambridge: Cambridge University Press.

Kiser, Edgar and Kriss A. Drass
1987 "Changes in the core of the world-system and the production of utopian literature in Great Britain and the United States, 1883-1975." American Sociological Review 52: 286-293.

Lappe, Frances Moore
1982 Diet For A Small Planet. New York: Random House.

Lucier, Gary, Agnes Chesley, and Mary Ahearn
1986 Farm Income Data: A Historical Perspective. Washington D.C.: U.S. Department of Agriculture.

Mandel, Ernest
1975 Late Capitalism. London: New Left Books.

1978 The Second Slump. Tr. Jon Rothschild. London: New Left Books.

Marx, Karl
1973 Grundrisse. Tr. Martin Nicolaus. New York: Vintage Books.

1981 Capital. Volume III. Tr. David Fernbach. New York: Vintage Books.

Mason, Jim and Peter Singer
1980 Animal Factories. New York: Crown Publishers.

Martin, Rod J.
1979 "Beef." Pp. 85-118 in Lyle P. Schertz (ed.). Another Revolution in U.S. Farming? Washington D.C.: U.S. Department of Agriculture.

Mattick, Paul
1969 Marx and Keynes. Boston: Porter Sargent.

1981 Economic Crisis and Crisis Theory. Tr. Paul Mattick Jr. White Plains, New York: M.E. Sharpe.

O'Connor, James
1973 The Fiscal Crisis of the State. New York: St. Martin's Press.

1984 Accumulation Crisis. New York: Basil Blackwell.

Robinson, Joan
1965 The Accumulation of Capital. London: Macmillan.

SAS Institute Inc.
1984 SAS/ETS User's Guide, Version 5 Edition. Cary, North Carolina: SAS Institute Inc.

Shroyer, Trent
1970 "Epilogue: the critical paradigm". Pp. 210-34 in Hans Peter Dreitzel (ed.). Recent Sociology Number 2. New York: Macmillan.

Skaggs, Jimmy M.
1986 Prime Cut: Livestock Raising and Meatpacking in the United States, 1607-1983. College Station, Texas: University of Texas A & M Press.

Statistical Abstract of the United States
1986 Statistical Abstract of the United States. Washington D.C.: U.S. Department of Commerce.

Steindl, Joseph
1952 Maturity and Stagnation in American Capitalism. Oxford: Blackwell.

Sweezy, Paul M.
1970 The Theory of Capitalist Development. New York: Monthly Review Press.

Szymanski, Al
1984 "Productivity growth and capitalist stagnation." Science and Society 48: 295-322.

U. S. Census of Agriculture
1978 U. S. Census of Agriculture. Washington D. C.: U. S. Department of Agriculture.

Van Arsdall, Roy N.
1978 Structural Characteristics of the U. S. Hog Production Industry. Washington D. C.: U. S. Department of Agriculture.

Van Arsdall, Roy N. and Henry Gilliam
1979 "Pork." Pp. 190-254 in Lyle P. Schertz (ed.). Another Revolution in U. S. Farming? Washington D. C.: U. S. Department of Agriculture.

Weeks, John
1981 Capital and Exploitation. Princeton: Princeton University Press.

Wright, Erik Olin
1977 "Alternative perspectives in marxist theory of accumulation and crisis". Pp. 195-231 in Jesse Schwartz (ed.). The Subtle Anatomy of Capitalism. Santa Monica: Goodyear Publishing.

Yaffe, David S.
1973 "The marxian theory of crisis, capital and the state." Economy and Society 80: 186-232.