Family farming: persistence, decline or transformation?

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Family farming:
Persistence, decline or transformation?

by
Curtis Warren Stofferahn

A Dissertation Submitted to the
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To my great-great-grandparents and great-grandparents who left Germany and Norway to become family farmers in a new land, to my grandparents who passed on the family farming tradition, and to my parents who fought to maintain that tradition.
MARXIST PERSPECTIVES ON FAMILY FARMING

Introduction

Family farming usually has been considered a form of simple commodity production (SCP) left untouched by capitalist development. Under this perspective, the family farmer is considered an independent producer owning both the means of production and the product of his labor. However, all SCP forms are transitional according to Marx's theory of capitalist development, which sees them as organizational residues of a former stage. Eventually, the family farm will be replaced by capitalist forms of production based upon the hired employment of landless laborers, Marx's theory argues. Therefore, the persistence of family farming within advanced capitalism has presented a problem for a Marxian analysis of agricultural development.

Capitalist forms of production dominate almost all sectors of the U.S. economy; however, agricultural production is still predominantly based upon the family farm. Consequently, American agriculture has been considered an aberration, "a production system that is in capitalist society without being of it -- a productive sector that has somehow resisted the intrusion of capitalist relations" (Davis, 1980:135). The persistence of family farming is used as evidence for the lack of capitalist development and has called Marx's theory of the transitional nature of SCP and the universality of capitalism into question. It also has been offered as evidence of the inapplicability of Marx's theory of capitalist development to agriculture (Soth, 1957:24).
In general, Marxist theories assume that the analysis of capitalism is relevant to agricultural development. Therefore, the persistence of the family farm does not invalidate Marx's theory (Davis, 1980:136). From this, one may posit two possible outcomes: the orthodox perspective, which predicts the imminent demise of family farming; and the revisionist perspective, which predicts the persistence of family farming.

The "imminent demise" perspective finds support for Marx's theory of capitalist development in the changing structure of American agriculture. Under this perspective, the survival of the family farm is only temporary; i.e., its institutional extermination by capitalism has been retarded but not prevented.\(^2\)

The "persistence" perspective finds its support in two theoretical approaches. One explains the persistence of family farming by the barriers to capitalist development of agriculture;\(^3\) the other explains it through family farming's integration into the larger capitalist sphere of exploitation and control.

Under the first perspective, one assumes a lack of capitalist development in agriculture; this idea is common to both the orthodox Marxist and barriers to capitalist development perspectives. The second perspective assumes universal capitalist development but does not assume that family farming and capitalist development are incompatible. Instead, this perspective holds that family farming persists because it has been the basis of capitalist agricultural development,\(^4\) serves the primary objectives of capitalist production,\(^5\) or is otherwise necessary
to the accumulation of urban capital.\textsuperscript{6}

These perspectives are representative of the diversity of Marxist theory in explaining family farming. Denis (1982) suggested clarifying the issue by regrouping the literature on the basis of its theoretical approach. This classification consists of three broad categories, each reflecting a somewhat different perspective. The first (orthodox Marxism) is based on Marx's law of value and his analysis of ground rent. The second (specificity of dominated forms) corresponds to the more recent literature on the articulation of modes of production. The third (integration and exploitation) focuses on exploitation of agriculture. This introduction reviews the three perspectives and comments upon their limitations. From this examination, theoretical questions are examined and a revised perspective posed.

Three Perspectives

**Orthodox Marxism**

Orthodox Marxism predicts the eventual differentiation and ultimate demise of SCP. Marx's theory of capitalist development argues that all SCP forms, including the family farm, are transitional. Simple commodity producers eventually will be differentiated into two classes, a bourgeoisie and a landless proletariat, through the forces of concentration and centralization of capital.

While the unique characteristics of agriculture tend to modify the general laws of capitalist development, they do not transcend them, Marx argued. Land is a unique factor in the capitalist development of
agriculture: the existence of ground rent, a surplus-product of agricultural development, is acquired by a landowning class. Therefore, land is both a property and a natural monopoly, he asserts (Marx, 1967:614-618).

Marx based his analysis of ground rent on four crucial working assumptions (Marx, 1967:515-539): (1) both agriculture and industry are capitalist; (2) the organic composition of capital is lower in agriculture than in industry; (3) the supply of agricultural products is less than their demand; and (4) the landowning class is different from the farm-operating class.

Under these assumptions, surplus-value arises in both sectors from the same relations of production. In proportion to the capital invested, agriculture produces a higher surplus-value than industry. Thus, free labor and capital mobility between sectors tend to equalize the rate of profit in the whole economy. However, one should note that Marx developed his theory to describe a system under which landlords rented land to capitalist farmers who, in turn, repeated the process by hiring laborers who performed the direct tasks of production.

Marx (1967:616-620) asserted that capitalist development of agriculture lagged behind that of industry because of the property monopoly in land and ground rent, which is composed of differential and absolute rents (Marx, 1967:640-648). Variations in the natural fertility of the land, its geographical location, and the capital invested in it determine differential rents. Absolute rents, in contrast, are produced by all farms, regardless of their fertility or location (Marx,
1967:748-772).

The gist of Marx's assumption, and the argument which followed from it (Marx, 1967:748-772) was this: Ground rent can only be taken out of profit, given that less productive farms receive a price for production that includes both the cost of production and the average profit. However, agricultural production does not share in the social equalization of rate of profit (because land is a property monopoly) and so agricultural commodities are sold at a value which exceeds their social price of production. Therefore, even the less-productive farm produces a surplus which can be used to pay rent. Surplus-value produced by human labor therefore is the source of profits, ground rent, and interest.

Under this perspective, ground rent represents a dual loss of capital accumulation in agriculture. First, ground rent removes a portion of surplus-value which cannot be immediately reinvested in land, resulting in a lower organic composition of capital. Most ground rent, therefore, accrues to absentee landlords. Second, interest for improvements accrues to the capitalist tenant farmer. However, the more permanent improvements revert to the landowner (with the expiration of the lease) and become an inseparable feature of the land, with the result that the landowner expropriates interest as increased differential rent. This feature discourages capital improvements by tenants. Therefore, both the property monopoly and the capitalist tenant system hinder capitalist agricultural development.

Kautsky's analysis of the capitalist development of agriculture
(1980) extends the Marxian analysis and attributes the uniqueness of capitalist agricultural development to the peculiar characteristics of land as a factor of production. These characteristics include both its fixed quantity (natural monopoly) and its variation in quality (differential rents). Both the development of private property in land and absolute ground rent dictate the form of capitalist development. Thus, Kautsky maintains there is no unique form of the capitalist agricultural development.

Kautsky states that the peculiar characteristics of land differentiate capitalist agricultural development from industrial development (1980:64-68). In general, the means of industrial production are multiplied on an extended scale, whereas land is not; land is the main factor in agricultural production. This distinction indicates why capitalist industrial development is different from capitalist agricultural development: the process of concentration of industrial capital is independent of its centralization, while the concentration of agricultural capital requires its centralization.

Land is more readily centralized in areas where renting predominates. Centralization in rental areas proceeds by the acquisition of new properties in relatively close proximity. Centralization may occur by rental or purchase, depending on the unique patterns of land ownership. The land needed for centralization, however, may not be available for purchase, especially if it is owner operated; therefore owner-operation impedes centralization.

Kautsky believed that the characteristic dynamics of advanced
capitalism must inevitably differentiate SCP into an agricultural class structure composed of absentee landlords and capitalist farmers, on one side, and an agricultural proletariat on the other. The latter is composed of landless agricultural laborers along with semi-proletarianized tenant farmers; these are the remnants of the family-labor farms. Lenin (1934, 1958), like Marx, concluded that increasing differentiation within SCP would result in a landless proletariat and a landowning bourgeoisie through the concentration and centralization of land.

**Criticisms of the orthodox perspective** Marx's theory of the capitalist development of agriculture contains seven problems relating to his six assumptions. Briefly, these are: (1) Surplus profit is not necessary for reproduction in all cases, particularly in the United States; (2) The British tripartite class structure on which Marx based his theory did not develop in the U.S.; (3) The feudal relationship of tenant to landlord historically does not apply in the U.S.; (4) Ground rent has disappeared through capital accumulation on most U.S. farms; (5) Agricultural production exceeds demand; (6) The role of the state is not included in the orthodox perspective; (7) Orthodox Marxism has become dogma. These problems are discussed in more detail below.

Marx first assumed that capitalist ground rent was the amount in excess of average profit; this form of ground rent was associated with surplus-profit, which was required for capitalist farmers who rented land from landowners and hired wage laborers to produce commodities. Tenants, such as those in the Midwest, however, are often engaged in direct
production. In this case surplus-profit is not necessary to reproduce such production (Mooney, 1983:567-568).

Second, Marx developed his theory in reference to the British tripartite class structure. This class structure did not develop in the U.S. for two reasons. First, land was in ample supply and readily obtained by subsistence and simple commodity producers from the State at little or no cost (Newby, 1980:8-12). Second, a previously entrenched feudal agrarian society did not exist. Consequently, a landed monopoly, the essential condition for absolute ground rent, was not present (Goss et al., 1980:93). This suggests that the persistence of SCP may instead be the result of the initial land settlement by small family farmers and the lag in capital penetration of agriculture (Goss et al., 1980:93).

Third, a major problem exists with the theory of ground rent. Marx did not consider land as product of human labor, and so, did not conceive of land as a commodity. Therefore, his appeal to feudal relations to explain the economic necessity of landlords does not suffice in the United States, where land became a commodity with the onset of European colonization (Tribe, 1977).

Fourth, in many of the large capitalist agricultural enterprises, the organic composition of capital is near, or equal to, that of the average industry. Such capital accumulation has resulted in the disappearance of ground rent on the majority of U.S. farms (Mandel, 1980:382-383).

Fifth, the great increase in agricultural productivity has resulted in the supply of agricultural products rapidly outdistancing demand. The
tendency toward overproduction has been stimulated by technological revolution (Goss et al., 1980:101).

Sixth, Marx's analysis does not include the role of the state in maintaining the appearance of family farming (Goss et al., 1980; Kautsky, 1980). The state's conscious political support may take the form of assisting in two contradictory roles: the accumulation of capital and the legitimation of the social order (O'Connor, 1973). Policies and programs promoting the accumulation of capital do so at the expense of laborers, whereas policies and programs promoting legitimation do so at the expense of capital. Legitimation policies and programs (e.g., commodity support programs) designed to aid family farming may actually assist in the accumulation of capital by capitalist farmers, thereby contributing to the differentiation process. While the two roles may appear contradictory, state policy may serve both simultaneously.

The major weakness of the orthodox perspective, however, lies in its transformation into dogma (Denis, 1982:132). Marx claimed that his analysis of ground rent operated at a voluntary, abstract level and predicted only the necessary outcome of the capitalist evolution of agriculture. One must understand that while the orthodox perspective may have reflected the social reality of capitalist agriculture eighty years ago, no capitalist country today has a predominantly capitalist agriculture.

While some differentiation occurs within SCP, to predict the eventual differentiation of SCP on that basis alone is critically unsound and displays only an eagerness to transfer Marx's abstract analyses and
political writings to specific social formations. Such a prediction demonstrates an incomplete analysis of the various forms of production and distribution of surplus-value in SCP and ignores the manner in which the capitalist mode of production (CMP) is articulated to SCP. Thus, the prediction recognizes neither the specificity of simple commodity producers, nor their potential for resistance and adaptation. It further fails to recognize the interaction of economic factors affecting both SCP and the CMP, generally (Denis, 1982:132).

Articulation of modes of production

The orthodox perspective was rejected in favor of one based on articulation after the predictions specified by it failed to occur and capitalist social formations did not become uniformly capitalistic. The articulation perspective emphasizes the specific nature of precapitalist production and the idea of a "multiform" capitalist development, together with the linkages (or articulations) between the different modes of production (Denis, 1982:133).

Rey provides the most systematic formulation of this approach (Foster-Carter, 1978; Bradby, 1975). The transition from one mode of production to another involves both the co-existence and articulation of their relations of production rather than the simple succession of one by another. Transition is often gradual and characterized by the inversion of dominance (Denis, 1982:135). Articulation, in contrast, refers to the process by which the inversion of dominance takes place; i.e., that by which primary or dominant relationships become secondary or dominated, and secondary relationships become primary. Thus, the CMP must reinforce
the precapitalist modes in order to secure raw materials or labor-power to survive. Capitalism, in consequence, can never immediately and totally eliminate the modes of production which preceded it, nor the resulting production relationships which characterized those modes (Foster-Carter, 1978:59).

Rey believes that it is necessary to study the transition from feudalism to capitalism if one hopes to understand the articulation of the CMP with other modes. He argues that landed property is essentially outside the CMP, being instead founded upon precapitalist or feudal relations of production between peasants and landowners. The effects of these older relations may intervene in the process of capital distribution within the CMP (Chevalier, 1983:167), with the result that ground rent is gradually transformed from a dominant relation of production into a secondary role (as a distributive mechanism) through the expansion of capitalism.

Thus, in Rey's perspective, ground rent is the principal feudal, rather than capitalist, relation of production. Rey then generalizes the transition period from feudalism to capitalism (Bradby, 1975:59-60) to show that the precapitalist mode remains primary during the first stage. At this time, the CMP secures only raw materials from the precapitalist mode. This reinforces the precapitalist mode but does not promote capitalist relations of production. Therefore, capitalism can dissolve the precapitalist relations of production only by implanting transitional modes which will eventually yield to capitalism.

After the CMP is established and dominant (second phase), it
requires the precapitalist mode to meet its increasing labor demand. During this transition from feudalism to capitalism, peasant agriculture and handicrafts are first partially, then totally, transformed or eliminated. A labor-force is created thereby. However, the break with the land may be only partial, resulting in the slower penetration of agriculture by capital. Thus, those precapitalist modes which still exist now do so on the basis of the capitalist mode and are transformed by its laws. Therefore, the second stage becomes transitional when capitalism dominates, but remains more heterogeneous in nature than the first.

The full conversion of agriculture to capitalism is accomplished only during the third stage, when capitalism is able to provide its own labor supply. This third stage, Rey states, has been reached only in the U.S., where capital penetrates the agricultural sector. Peasant forms of production have been destroyed through market competition, and the dominance of capital asserted in the exploitation of agricultural workers (Chevalier, 1983:167).

Criticisms of the articulation perspective Rey's articulation of the modes of production perspective has been criticized on four points: (1) The capitalist/precapitalist linkage is ambiguous. (2) The evolutionary transition to capitalism is questionable. (3) The relations of production are inadequately defined. (4) The perspective is built upon a rigid conception of capital. These problems are discussed in more detail below.

The first criticism concerns capitalism's reason for articulating
with precapitalist modes. Does it do so because it needs raw materials, or a labor-force? If the principal motive is the production of raw materials, and if securing labor to produce raw material is but a secondary motive, there is no permanent reason for capitalism to articulate with other modes (Bradby, 1975:148-152).

This suggests that articulation will occur in response to the needs of particular capitals, and may, under particular conditions, disappear again. The disappearance would be as much a response as the appearance, because capital continually seeks cheaper sources of substitute raw materials (Bradby, 1975:149).

The problem is that at a particular stage of historical development, capital produces its own raw materials. If the securing of raw materials provides the motive for articulation, then articulation will end when capitalism secures all sources of raw materials.

This motive does not necessarily imply assimilation of the precapitalist mode (Bradby, 1975:149).

A second problem with Rey's approach is in its evolutionary model of capitalist transition (Chevalier, 1983:167-168). Although Rey rejects the earlier crude evolutionary models of orthodox Marxism, he reaffirms the predictions of Marx, Kautsky, and Lenin regarding the development of capitalism in agriculture. Some of the same criticisms which apply to the orthodox Marxist perspective therefore apply to the articulation perspective, e.g., the appeal to feudal relations of production in explanation of ground rent does not apply in the U.S., nor does the articulation between precapitalist and capitalist modes. The necessary
landed monopoly was absent (Goss et al., 1980). Also, Rey shares the orthodox prediction of eventual uniform capitalist agricultural development, and states that it has been achieved in the U.S.; however, American agriculture is not uniformly capitalist. Thus, the theory appears to deny "inconvenient" facts.

A third problem is arguably more important. Rey does not adequately define the relations of production (Denis, 1982:137). His distinction instead treats the relations of production between noncapitalist producers and capital as relations of unequal exchange, conceived in an entirely voluntaristic fashion. Under these conditions, prices are determined by differential power relations rather than economic laws. This conception reflects a naturalistic definition of surplus, i.e., any natural excess over the amount needed to reproduce the producer's labor and means of production. However, a Marxist definition of surplus refers to the relationship between a producer and a nonproducer, in which the nonproducer appropriates part of the value of the commodity produced. Such a surplus may (or may not) be a natural surplus. This problem of definition reflects Rey's inadequate integration of Marx's law of value (Denis, 1982:137).

Market prices established by power relations bear more similarity to a primitive theory of exploitation than a structural analysis; hence, the use of power relations to determine market prices results in a great over-simplification of the production and distribution of value between producers and nonproducers. Orthodox Marxism ignores the specificity of noncapitalist forms of production in predicting uniform capitalist
agricultural development, whereas the articulation perspective over-emphasizes specificity and takes capital for granted. Thus, articulation indicates a shift away from the analysis of capitalist economic laws as based on the law of value (Denis, 1982:137). This creates a substantial problem for theory.

The fourth problem associated with articulation is that it is built on a rigid conception of capital. The appearance of noncapitalist elements are reduced to manifestations of precapitalist modes of production (Chevalier, 1983:155). Advocates of articulation view the logic of capital as being centered around formal constraints and making little allowance for internal variation. The appearance of precapitalist elements properly should be accounted for by the complexity of capitalism (as seen from its own internal dynamics) or by polymorphous development, but they are not. Thus, articulation seems to reduce capitalist dynamics to the unfolding of a narrowly defined set of formal invariants. Chevalier (1983:155), in contrast, advocates defining capitalism as a "polymorphous structure of variable relations of production". This definition permits a better understanding of particular relations of production not conforming to the productive logic of the CMP.

The strength of the articulation perspective lies in its recognition of the specificity of simple commodity production, and also in the guards it sets against a mechanical and simplistic return to orthodox Marxism. Articulation allows one to avoid treating precapitalist modes as the passive horizons of capitalism, i.e., as historically-given environments that merely provide the raw materials, markets, and labor needed for the
accumulation of capital (Chevalier, 1983:155).

Articulation also demonstrates that the SCP can be integrated into and transformed by capital in numerous ways, and that the differentiation of agriculture can assume various forms (Denis, 1982:137). The analysis of "plural" economies is not unique to the articulation perspective, but it does to some extent reformulate Trotsky's law of combined and uneven development (Chevalier, 1983:155).^ Integration and exploitation

Several theorists have tried either to transcend articulation or integrate it with orthodox Marxism. The result combines the orthodox law of value with articulation's specificity of dominated forms in an effort to account for the gradual transformation and integration of SCP by capital.

The integration perspective explains the lack of rapid differentiation within agriculture on the basis of Marx's law of value (Denis, 1982:137). The exploitation and subordination of labor to capital are central concepts of the integration perspective, and those Marxists using it analyze the articulation of agriculture to capital in terms of economic laws affecting the CMP in general.

In this context, capital reproduces itself on an increasing scale and transforms all areas of production into wage labor, the highest form of domination. The main problem of SCP thus consists in its integration and transformation by capital (Denis, 1982:138).

Although the integration perspective has been used by others, Mollard (Denis, 1982) provides the most systematic exposition of both its
scope and possible limits through his contention that certain barriers exist to the capitalist development of agriculture. The extension of capitalist relations of production to agriculture necessarily involves integrating SCP agriculture through its transformation and restructuring to permit capital to extract the surplus-product from simple commodity producers. In appropriating this surplus-product, capital exploits SCP. In Mollard's definition, exploitation is based on Marx's distinction between the real and formal subordination of labor to capital, and is reduced to the process of subsumption of the simple commodity producers' labor to capital (Denis, 1982:138).

Agriculture comes into contact with capital through the agro-industrial complex. The goal of this complex is the subordination of SCP so as to systematically extract simple commodity producers' surplus-product. Mollard refers to "upstream" and "downstream" firms having relations with simple commodity producers (Denis, 1982:139). Two contradictory processes affecting SCP are connected by exploitation: simple commodity producers increase their assets and scale of operation while, simultaneously, they are gradually eliminated as a social institution.

The insertion of SCP into the agro-industrial complex occurs through the industrialization of agriculture, which modifies the means of production and also creates the need for constant modernization (Denis, 1982:139). Eventually, industrialization changes the fundamental basis of commodity production, raising productivity and decreasing the need for labor. However, it does not increase simple commodity producers'
incomes; thus, industrialization results only in the expropriation by capital of a large amount of the simple commodity producers' surplus-product. The expropriation by capital of this surplus-product forces simple commodity producers to constantly modernize their operations in order to increase productivity and maintain their incomes. Constant modernization, in turn, further integrates simple commodity producers into capital circulation circuits.

Mollard identifies three mechanisms by which capital expropriates simple commodity producers' surplus-product: ground rent, purchase of the means of production, and sale of agricultural products (Denis, 1982:139). In rejecting Marx's analysis of ground rent (because the organic composition of capital is similar in both industry and capitalist agriculture), Mollard reduces ground rent to the actual cost of land rather than the production of value. Like Rey, Mollard believes that ground rent was a relation of production under feudalism, but is a relation of distribution under capitalism. Mollard keeps the distinction between "capitalist" and "SCP" ground rent and argues that only a simple commodity producer who owns his land debt free is able to avoid the appropriation by capital of his surplus-product, thus realizing his ground rent.

The second mechanism of SCP exploitation is the forced accumulation of capital, or the increasing investment in the means of production (Denis, 1982:140). In this case, simple commodity producers' surplus-product is expropriated before it is realized by the "overpricing" and "overselling" of industrial commodities. Overpricing
becomes a relation of production when the price paid for an item by the simple commodity producer is above its production price. Thus, exploitation occurs when higher prices transfer part of the simple commodity producers' surplus-product to industry. In overselling, the purchase of equipment (the means of agricultural production) is increased beyond the necessary levels.

The sale of agricultural commodities on capitalist markets provides the third mechanism of exploitation of SCP (Denis, 1982:141). When commodities are purchased below their value, exploitation results. Mollard concludes that the SCP sector suffers endemic gaps between prices and value. This situation has worsened with the extension of international trade, in that prices are now determined nationally and internationally rather than locally. Also, superior conditions of production eventually become average conditions through continued overproduction and international competition, with the result that simple commodity producers who cannot modernize are eliminated. Under these conditions, continual modernization is required to remain competitive.

Simple commodity producers are integrated into the functioning of the law of value not as capitalists but as workers, and recover only the value of their labor-power through the sale of their commodities, Mollard states (Denis, 1982:141). This exploitation results in the regression of SCP; i.e., its reproduction on an ever-declining base (Denis, 1982:141).

Such regression is evident in the absolute decline of the number of simple commodity producers, in their exodus from agriculture, in their marginalization (if they resort to self-sufficiency), in their gradual
consumption of assets, and in the increase of both part-time farming and off-farm work.

For those simple commodity producers who remain in agriculture, regression means that the very rationality and organization of their production is increasingly controlled by capital, and SCP relations of production are increasingly transformed into capitalist relations. However, the accumulation of constant capital on an enlarged scale is possible in SCP, although simple commodity producers' surplus-product is expropriated at a high rate as a result of the non-reproduction of labor-power, Mollard concludes (Denis, 1982:141).

Mollard contends that three elements in the current evolution of SCP are interrelated; they are: exploitation of simple commodity producers' labor, accumulation of constant capital, and regression of SCP (Denis, 1982:141). Discussing the operation of the law of value in agriculture (Denis, 1982:141-143) Mollard affirms its operation in SCP with the generalization of exchange between SCP and the CMP. Since the mobility of labor and capital necessary to transform values into prices does not exist in SCP, however, the law of value operates only in its simplest form; i.e., the exchange-value of commodities is determined by the socially-necessary labor time involved in their production. Mollard gives three reasons for this in capitalist agriculture (Denis, 1982:142). First, the organic composition of capital in agriculture is at, or near, that of industry; therefore, the production of surplus-value should be similar in both sectors. Second, the capital invested in land is immobilized; this inhibits equalization of the rate of profit. Third,
the immobility of capital between agriculture and other sectors prevents any tendency towards the equalization of rates of profit for capital in general and, therefore, retards or prevents the development of a general rate of profit for capital as a whole. Since surplus-value produced in agriculture tends to remain in it, the law of value as it operates in capitalist agriculture removes all problems of transforming values into prices. Consequently, the process of transforming values into prices operates not only for all of agriculture, but also for determining the price of commodities produced by simple commodity producers as well as capitalist producers.

Mollard realizes that not all branches of agriculture are uniformly capitalist (Denis, 1982:143). Gaps between socially-necessary labor and labor actually expended occur as a result of structural imbalances between branches; however, price fluctuations usually resolve the imbalances: when prices fall, capitalist producers shift to more profitable pursuits. In contrast, simple commodity producers who are too far removed from the average conditions of production are eliminated; when this occurs labor expended realigns with socially-necessary labor, and the state intervenes with price supports guaranteeing an average profit to capitalist farmers, even in conditions of overproduction (Denis, 1982:143). State intervention tends to reduce fluctuations, but the intervention only weakens the effect of the operation of the law of value by allowing capitalist farmers to remain capitalist and continue collecting differential rents. Supported prices conform to value in the long run. Simple commodity producers who operate without this
protection, however, cannot realize or recover the value of their labor-power.

Mollard's conception of the operation of the law of value in agriculture allows for the transfer of value from SCP to capitalist agriculture, as well as "upstream" and "downstream" firms. For Mollard, this transfer is the result of the monopoly position of capital in relation to simple commodity producers, and therefore is exploitation. The transfer of value from SCP to capitalist agriculture almost guarantees average profits through state supported prices, but the consequence of this transfer of value is the increasing proletarianization and marginalization of small producers, the forced increase in scale of middle-size producers, and the gradual extension of capitalist agriculture (Denis, 1982:143).

Criticisms of the integration and exploitation perspective Mollard has been criticized on four points (Denis, 1982:143): (1) His inadequate historical perspective; (2) His lack of conceptual rigor; (3) His reliance on a voluntaristic concept of exploitation; and (4) His inadequate conception of the law of value. These are discussed in more detail below.

First, Mollard's way of regarding the organic composition of capital in relation to ground rent, the immobility of labor and capital into agriculture, and the continual overproduction of agricultural products reflects an inadequate historical perspective. Historical evidence can be gathered to refute these characteristics.

Second, in his reduction of Marx's formal and real subsumption of
labor into a general form of exploitation, and in his reduction of ground rent to the cost of land, he displays a lack of conceptual rigor. By reducing formal and real subsumption to a general process of subsumption, he ignores the specific processes by which simple commodity producers' labor can be subsumed by capital. Similarly, by reducing ground rent only to the cost of land ignores the operation of the law of value in agriculture and how value is distributed among producers and nonproducers.

Third, his reliance on a voluntaristic conception of exploitation as the result of the monopoly of capital necessarily regards all capital uniformly (as monopoly capital) and, thus, does not consider the differences between monopoly and nonmonopoly capital.

Fourth, his contention that state supported commodity prices are primarily responsible for an average profit in capitalist agriculture similarly relies on a voluntaristic explanation for their persistence.

Mollard's major weakness, however, lies in his inadequate conceptualization of the law of value (Denis, 1982:144). First, he has a naturalistic conception of surplus-product (similar to Rey's); this weakens his conception of exploitation. Second, contradictions are evident in his contention that the law of value operates in its simple form in both SCP and capitalist agriculture and also that an average profit exists in this sector (Denis, 1982:145). The existence of this average profit prohibits the direct determination of market price by market value. Therefore, Mollard confuses his levels of analysis. The law of value operates in the simple form only in "pure" SCP; it does not
operate in its simple form in the CMP generally, nor does it do so specifically in either capitalist agriculture or in "integrated" SCP. This problem surfaces again in his contention that prices for both capitalist and SCP commodities are similar. The issue is not whether price is determined directly by value (as Mollard would seem to think), but whether the distribution of value (given those common prices) is determined by supply and demand.

Another serious limitation of the exploitation perspective is that it only accounts for the easiest cases, where formal and real subordination of labor are readily identified (Denis, 1982:145). The question of whether the subordination and exploitation of SCP in general is possible is left unanswered, and so the issue revolves around the question of whether exploitation is a collective or an individual phenomenon. Despite all of this, however, the integration and exploitation perspective offers two strengths: it transcends the problems of the articulation perspective, and seriously attempts to ground an analysis of exploitation in Marx's law of value (Denis, 1982:144).

Theoretical Questions

Orthodox Marxism simply does not fit the problems of American agriculture; it was formulated for another time, on the basis of another country's class structure. The articulation perspective, while more contemporary, descends from ambiguous assumptions and inadequate definitions; it is also bound by a rigid conception of capital. The
integration perspective, while transcending the problems of articulation, remains less than adequate in its theory and less than rigorous in its conceptualization. This leads one to question whether Marxist theorists have addressed the basic issues of simple commodity production agriculture. Therefore, it is necessary to pose and answer some basic theoretical questions regarding simple commodity production. These questions are central to the controversy surrounding Marxist studies of family farming: (1) Is simple commodity production a precapitalist, noncapitalist, or capitalist mode of production? (2) How are simple commodity producers exploited by capitalism? (3) How should one conceptualize agrarian class structure? Answers to these questions will provide the theoretical foundation for a revised perspective of simple commodity production.

The nature of simple commodity production

Marxists typically regard SCP as a well-preserved or distorted residual of an older form of production and usually present it as follows (Chevalier, 1983:157): Simple commodity producers own their means of production and exchange their commodities on the market for the goods and services which they cannot produce themselves. The circulation of production and consumption goods is diagrammed below:

\[
\text{Personal} \rightarrow \text{C} \xrightarrow{\text{Selling}} \text{M} \xrightarrow{\text{Buying}} \text{C'} \xrightarrow{\text{Personal}}
\]

\[
\text{Productive} \rightarrow \text{EXCHANGE} \rightarrow \text{Consumption}
\]

Commodities (C) originate through the productive consumption of raw materials, labor-power, and instruments of production. In turn, these commodities are sold in exchange for money (M) in order to purchase
commodities \((C')\) that later enter into personal and productive consumption activities.

Simple commodity producers' primary concern is to reproduce, rather than increase, their means of personal and productive consumption; these means are regarded as necessary use-values. To accomplish this reproduction of means, they must produce use-values which may be converted into objects with quantified exchange-values. In brief, they must produce commodities that will permit them to reproduce their means of exchange and conditions of subsistence. The nature of SCP, therefore, consists in its resistance to the formal and real subsumption of labor under capital; thus, a limited development of both the forces of production and capital's expropriation of commodified factors of production takes place within SCP.

Most Marxists would accept the idea that simple commodity producers' labor-power is never purchased by capital, causing SCP to be the location of noncapitalist relations of production. Orthodox Marxists tend to accept Marx's exposition of simple commodity production as a transitional mode, destined to disappear with the development of capitalism (Kautsky, Lenin). Articulation proponents view SCP as involving precapitalist relations which can be articulated with the CMP and subjected to a transitional, yet prolonged, process of primitive accumulation (Rey). Integration and exploitation advocates view the absence of a formal subsumption process within all forms of SCP as an indication that it is the location of precapitalist relations of production (Mollard).

Chevalier (1983:157) contends that this description of the nature of
SCP is inadequate because it is based upon four misleading theses which result in an artificial description of SCP as a form partially, or fully, governed by its own precapitalist logic. These four theses are: (1) the exclusion of simple commodity producers' labor-power from the sphere of monetized exchange and, therefore, from the process of labor's formal subsumption to capital; (2) the producers' ownership of some means of production, which excludes them from the formal subsumption process; (3) the maintenance of some degree of control over the production process, which excludes producers from the real subsumption process; and (4) simple commodity producers' alleged simple reproduction rationale (or subsistence-mindedness).

Some neomarxists emphasize the theme of SCP as a capitalist labor process; therefore, it is subsumed under capitalist relations of production. Davis (1980:135) argues that to regard family farming as a noncapitalist form of production is to ignore the "capitalist context of the agricultural sector and the expanding capitalist domination of the family farm". He states that family farming has been transformed from a precapitalist form of simple commodity production into a capitalist labor process, thereby assuring a transfer of value from the propertied laborer to the nonfarm capitalist firm. The universality of capitalism, according to Davis, has reduced the family farmer to the position of a propertied laborer who produces his livelihood only by working as an agricultural piece-worker through contract production.

Banaji (1977) demonstrates how simple commodity production is subordinated to capital and converted into a capitalist labor process.
Simple commodity producers are subjugated by the substitution of commodities for the production of use-values which progressively monetizes their cycle of reproduction. As capital extends its domination over SCP, the SCP enterprise becomes a "quasi-enterprise" and the independent producer becomes a wage laborer. In Banaji's analysis, the prices that simple commodity producers receive are in fact a concealed wage, and the sale of their commodities is really the sale of their labor-power; however, this process stops short of the complete extermination and proletarianization of simple commodity producers, who retain their independence in a formal sense but are actually within the limits of capitalist control over their labor.

Bernstein (1977, 1979) states farmers have to be located within capitalist relations of production as mediated through SCP. In Bernstein's perspective, SCP locates the struggle between producers and capital for real ownership and control of farm production. Bernstein asserts that while simple commodity producers are exploited by capital, they are wage-laborer equivalents and not wage laborers; the distinction is necessary to specify the limits to the subjugation and real subsumption of simple commodity producers' labor by capital. Unlike wage laborers, simple commodity producers are neither totally expropriated from nor dependent on the sale of their "wage" labor for their reproduction.

Chevalier (1983:158) contends that SCP may be subsumed, both in the formal and real sense, to capital, and hence, governed by the logic of capital without being transformed into proletarian labor. Chevalier
(1983:163) argues that "any factor of material consumption can be commodified, and its exchange-value realized, without ever entering the sphere of 'real' market transactions". Commodification occurs whenever the estimated value of the elements directly appropriated by the simple commodity producer, including his own labor-power, is converted into other commodities that are exchanged on the market (Chevalier, 1983:162). Only those simple commodity producers who do not respond to market forces can be seen as effectively resisting the mechanisms of formal subsumption. Real subsumption occurs through mechanization of production and intensification of family labor, resulting in the production of relative surplus-value. Real subsumption does not require the complete separation of the worker from his means of production.

**Location of exploitation**

The second major issue regarding SCP concerns specifying the location of exploitation. Classical, conventional and Marxist economists' studies of agriculture all focus on the role of the agricultural surplus in promoting economic development. Thus, for Marxists, the question arises of how one conceptualizes this surplus and the process of "exploitation" which permits its appropriation by capitalist industry (Goodman and Redclift, 1981:77).

One answer focuses on the class control of the state, which extracts resources through taxation, manipulation of the terms of trade and other mechanisms (Goodman and Redclift 1981:77). Agriculture's loss of real income is imposed through industry's superior economic and political power. This process represents a redistribution of surplus-value between
direct exploiters - the agrarian and industrial capitalists. This redistribution describes the process by which relative price movements transfer surplus-value among capitalists. Marx saw these transfers as part of the process of equalization of the rates of profit among sectors.

A second answer is based on the concept of "unequal" exchange (the exchange of nonequivalent amounts of labor-power) (Goodman and Redclift, 1981:79). Because of the differences in the organic composition of capital and labor productivity between sectors, the labor content of commodities sold by simple commodity producers will be greater than that of the industrial commodities they purchase in exchange. This difference establishes the basis of unequal exchange by which simple commodity producers' surplus-labor is appropriated by capitalist industry. In this formulation, the concept of unequal exchange is intertwined with the concept of exploitation.

In a strict Marxist sense, exploitation does not occur in either of these two answers. Rather, exploitation is a relation between social classes, in which nonproducers extract surplus-labor from direct producers (Goodman and Redclift, 1981:77). Evard (Denis, 1982:144) argues that the concept of exploitation is defined by social class relations expressed in the sphere of production, not in the sphere of exchange. Faure (Denis, 1982:144) responds to this criticism by arguing that the production process includes both the immediate process of production and the exchange of commodities, or the realization of value.

Commodity production, as well as exploitation, is reproduced through exchange. The exchange process allows capital to control simple
commodity producers' agricultural production. Faure and Mollard (Denis, 1982:145) state that relations of exchange between SCP agriculture and capitalism conceal relations of production. Through the exchange process, labor becomes a mechanism to valorize capital. The exchange process allows the increase of industrial relative surplus-value and accumulation of capital through monopoly surplus-profits. Exploitation, therefore, is a general consequence of capital's domination of SCP agriculture. For Mollard and Faure (Denis, 1982:145) exploitation occurs in any transfer of surplus to capital through the purchase of inputs or through the sale of commodities. Simple commodity producers are collectively exploited through the indirect controls and requirements that capital in general imposes on SCP as a whole.

**Agrarian class structure**

The third major issue concerns the conceptualization of agrarian class structure. Orthodox Marxist class analysis assumes that as capitalism develops in agriculture, it will eventually eliminate all subordinate modes (Lenin, 1934, 1958). The apparent persistence of simple commodity modes of production complicates such analyses. Other Marxists contend that such modes are essential to the nature of the CMP and the incomplete transformation of SCP to the CMP may be a persistent effect of the requirements of the CMP (Davis, 1980; Mottura and Pugliese, 1980).

Several problems arise when one uses Lenin's concept of class to describe the differentiation of simple commodity production (Lehmann 1982:139): (1) Deep subjective and objective conflicts of interest exist
among simple commodity producers such that they are a class neither in themselves nor for themselves. These differences arise from their domination by and incorporation into the capitalist mode of production. One must use a Weberian (1964:427) concept of class to accommodate these conflicts of interest among collectives in a market. This concept of class states that an individual's (or a collective's) class status depends on "provision with goods", "external conditions of life" and "subjective satisfaction". These depend on the "kind and extent of control or lack of it which the individual has over the goods and services and existing possibilities of their exploitation for the attainment of income or receipts within a given economic order".

(2) Conflicts between rich and poor farmers tend to occur on the local level (if at all), and so the two categories remain only categories; i.e., they are not status groups, interest groups, corporate groups, or classes. Generally, one finds involvement by both rich and poor farmers within a social movement, and the movement seldom makes demands reflecting the interest of any single category. Thus, the absence of corporate organizations or social movements which cohesively express each conflict of interests underlies the problem of using Lenin's conception of class.

(3) Lenin's use of the concept of class implies a long-term trend of differentiation of simple commodity production into a class of capitalists and a class of wage laborers. The analysis of differentiation of simple commodity production in the Midwest, however, requires an explanation for the lack of such polarization.
One way to resolve this problem of class is to describe simple commodity producers as a social group differentiated through appropriation of their surplus-value and by their loss of control over their means of production. The appropriation of surplus-value from direct producers is central to the analysis of class relations according to Braverman (1974:413). Proletarianization consists in the transformation of labor into forms by which surplus-value may be appropriated by capital. Wright (1978), in contrast, focuses on the three central processes which underlie the capital-labor relationship: (1) control over the physical means of production; (2) control over labor power; and (3) control over resource allocation. The capitalist class is defined by their control over each of these processes while the proletariat is defined by their lack of control. Simple commodity producers have economic ownership and possession of the means of production but have no control over labor power.

Another problem in Marxist class analysis is that these three processes are not perfectly coincident resulting in contradictory class locations. Wright (1978) elaborates three contradictory class locations: (1) between capitalist and proletariat (e.g., managers and supervisors); (2) between petty bourgeoisie and capitalist (e.g., small employers); and (3) between petty bourgeoisie and proletariat (e.g., semi-autonomous employees).
Dissertation Outline

The proposed theoretical perspective views simple commodity production labor as being fully subsumed under capital and explains the contradictory trends in agricultural development by the phases of the long wave of late capitalist development (Mandel, 1980). This approach incorporates orthodox Marxism's law of value, the articulation perspective's reformulation of the law of combined and uneven development (Mandel, 1980), and the integration and exploitation perspective's statement of the formal and real subsumption of labor under capital (Chevalier, 1983). While the appropriation of simple commodity producers' surplus-value occurs in relations of exchange, it is recognized that exploitation occurs in relations of production (Bernstein, 1977). The theory of long waves of late capitalist development is used to relate the course of agricultural development to that of capitalist development generally. This approach is historically testable and capable of yielding predictions for the course of future agricultural development.

The dissertation follows the three article format. Although, of course, the articles mean more collectively than they do singly, each article is intended to stand on its own merits as (respectively) a revised theory, a test of the theory, and a projection. The first paper proposes two processes which exploit simple commodity producers: (1) the production of absolute surplus-value through the formal subsumption of their commodified labor; and (2) the production of relative surplus-value
through the real subsumption of their commodified labor. Under this view, the three mechanisms by which the surplus production of producers may be appropriated by capital include: (1) unequal exchange, (2) ground rent, and (3) technological rents.

The main arguments presented in the first paper are: (1) Full subsumption of agricultural production under capitalism need not result in the complete separation of simple commodity producers from their farms; (2) Simple commodity production is presently differentiated into a class structure of rural semi-proletarians, simple commodity producers, and semi-capitalist producers; (3) This process of differentiation varies according to the phases of the long wave of late capitalist development, resulting in the combined and uneven development of agricultural production.

The second paper summarizes the propositions of the first and tests them within the context of Iowa agriculture for the period 1959 through 1982. The first half of this period (1959-1967) should show the expansion of semi-capitalist agriculture and the contraction of the rural semi-proletariat while the second half (1967-1982) should show an expansion in the rural semi-proletariat and the slowing down of expansion of the semi-capitalist sector. Simple commodity production is "regressed" during both of these periods.

When examined in this fashion, changes in the differentiation of simple commodity production agriculture should vary consistently with the phases of the long wave of late capitalist development. Changes should be found in the centralization and concentration of semi-capitalist
producers, the regression of simple commodity producers, and the proletarianization of small producers. Data for the analysis come from quinquennial censuses of Iowa agriculture for the years 1959-1982.

Using a discrete time, stationary Markov chain, the third paper projects and models the structure of Iowa agriculture for the year 2002. Two alternative propositions are tested. The first takes the orthodox view and states that one should witness an increasing concentration farms in the larger farm-size category and a reduction of farms in the other two farm-size categories. The process is assumed to be independent of political and economic forces. The second states that with the increasing concentration and centralization of farms in the large farms-size category, one should witness the regression of farms in the medium farm-size category, as well as an increase in the farms in the small farm-size category and that this should vary consistently with the phases of the long wave of late capitalist development.

The transition matrices generated by the two models are multiplied by the actual distribution of farms by size categories in the base period to obtain the predicted distribution of farms by size categories in time \( t+1 \). The predicted value in time \( t+1 \) is again multiplied by the transition matrices to obtain the predicted value in time \( t+2 \). The process is repeated recursively until \( X_T \) for each of the \( T \) time periods is estimated to the year 2002. The data are again taken from the Iowa quinquennial censuses of agriculture.
Footnotes

1. There is general agreement that family farming is characterized by (1) family ownership of land and capital and (2) dependence on family labor. On the basis of these criteria, agricultural production in the U.S. is still characterized by a predominance of family-type farms. In 1978, 87 percent of the operators of farms and farmland in the United States were either full or part owners of these means of production (U.S. Department of Commerce, 1980). The family farm provided 65 percent of all labor in the agricultural sector -- only in California, Florida, New Jersey, Hawaii, Washington, Arizona, and Nevada did hired workers constitute more than 50 percent of the total agriculture labor force (United States Department of Agriculture, 1981a).

2. Marx (1967), Lenin (1934), Kautsky (1980), Goss et al., (1980), and deJanvry (1980) see simple commodity production as a transitional stage. For these theorists, the inexorable forces of centralization and concentration of agricultural production will inevitably differentiate simple commodity producers into an agricultural bourgeoisie and a landless proletariat.

3. Mann and Dickinson (1978) argue that the excess of production time (the period in which capital is tied up in the production process) over labor time (that portion of the production period in which labor is actually employed in creating value) associated with particular agricultural commodities makes the capitalist agricultural production of these commodities unattractive. The variance of production and labor time produces "an adverse effect of the rate of profit, the inefficient use of constant and variable capital, and the smooth functioning of the articulation and realization process" (Mann and Dickinson, 1978:466). See Perelman (1979) and Mooney (1982) for a critique of Mann and Dickinson's thesis.

4. Davis (1980) contends that family farming is not incompatible with capitalist development. On the contrary, "capitalist development is occurring throughout the agricultural sector despite the presence of the family farm; indeed, the family farm has itself become the basis for such development" (Davis, 1980:146). Capital has become so universal that a propertied laborer is unable to independently produce his own livelihood. He is unable to avoid participating in production processes where capital controls his productive activity and appropriates his surplus product. Instead he may be reduced to an agricultural piece worker by means of contract production. In this case, individual private property may actually be in the interest of capital.

5. Mottura and Pugliese (1980) contend that the persistence of family farming is not a result of the precapitalist nature of such modes of production. Agriculture is capitalistic and the apparent persistence of
precapitalist modes of production can be interpreted as an aspect of the economy's capitalist development, not as a lag or absence of it. Precapitalist modes remain functional to the primary objectives of the capitalist mode of production. These objectives may be the creation of a labor reserve and the production of agricultural commodities or the negation of proletarianization. These objectives vary by the course of capitalist development in the economy.

6. Vergopoulos (1978) contends that family farming is a necessary mechanism for the accumulation of urban capital. He states that family farming is the most successful form of production for putting the maximum volume of peasant surplus-labor at the disposal of urban capitalism. As such, it constitutes the most efficient way of keeping down the prices of agricultural products. Unequal exchange between agriculture and the urban economy results in the underpayment of agricultural labor. This low remuneration of labor stimulates the family farmer to increase his production through intensification of family labor and increased capital investment to achieve an adequate standard of living. The disparity between prices, incomes, rates of profit, and living standards comprises the unique method by which advanced capitalism incorporates family farming.

7. Trotsky (1970:19-20) defined the law of combined and uneven development as follows:

Capitalism finds various sections of mankind at different stages of development, each with its own profound internal contradictions. The extreme diversity in the levels attained and the extraordinary unevenness in the rate of development of the different sections of mankind during the various epochs, serve as the starting point of capitalism. Capitalism gains mastery only gradually over the inherited unevenness, breaking and altering it, employing therein its own means and methods. . . . Thereby it brings about their rapprochement and equalizes the economic and cultural levels of the most progressive and the most backward countries. . . . By drawing the countries economically closer to one another and levelling out their stages of development, capitalism however operates by methods of its own, this is to say by anarchistic methods which constantly undermine its own work, set one country against another, and one branch of industry against another, developing some parts of the world economy while hampering and throwing back the development of others. Only the correlation of these two fundamental tendencies - both of which arise from the nature of capitalism - explains to us the living texture of the historical process.

9. The low level of technology, the need to displace machinery over raw material, the biological nature of the production, fragmentation of land ownership, and the political alliance between peasants and the bourgeoisie (Denis, 1982:138).
SECTION I:
PROLETARIANIZATION, REGRESSION, AND CONCENTRATION:
A REVISED PERSPECTIVE OF SIMPLE COMMODITY PRODUCTION

Purpose

This paper proposes an alternative Marxist perspective built upon the law of value from orthodox Marxism, the law of combined and uneven development from articulation of modes of production, and the integration and exploitation of simple commodity production (SCP) from the integration perspective. The proposed alternative views simple commodity producers' labor and means of production as being fully subsumed under capital; it also recognizes that while expropriation of simple commodity producers' surplus-value occurs in relations of exchange, exploitation occurs in relations of production (Bernstein, 1977:72). The combined and uneven development of SCP agriculture may be explained under this revised perspective on the basis of the law of value and the long wave of late capitalist development.

The need for such a revisionist approach is readily apparent: Marxist theorists debating the future of the family farm as a form of SCP within the capitalist mode of production (CMP) have divided into two diametrically opposed factions each with its own predictions.¹

Orthodox Marxists predict the imminent demise of family farming; they find support for Marx's theory of capitalist development in the changing structure of American agriculture and contend, that although
family farming has survived longer than Marx predicted, its survival is only temporary. Thus, the capitalist extermination of family farming has been retarded, but not prevented.

Some neomarxists, in contrast, predict that family farming will persist; they contend that the barriers to capitalist development inherent in agricultural commodity production or in the integration of family farming into the capitalist sphere of exploitation and control guarantee its existence.

These explanations for the persistence or decline of family farming reflect several theoretical approaches. Denis (1982) suggested that the explanations for its persistence may be clarified by regrouping the literature on the basis of the approach used. His classification scheme consists of three broad perspectives, each reflecting a somewhat different approach. The first (orthodox Marxism) is based on Marx's law of value and his analysis of ground rent. The second (specificity of dominated forms) corresponds to the more recent literature on the articulation of modes of production. The third (integration and exploitation) focuses on the concept of exploitation as applied to agriculture.

These three perspectives have been criticized on a number of points. The major weakness of orthodox Marxism is that it has been transformed into dogma (Denis, 1982:133). Further, its predictions account for neither simple commodity production's specificity nor its potential for resistance and adaptation to the CMP.

The articulation perspective emphasizes the specificity of SCP but
takes the laws of capitalist motion for granted (Denis, 1982:137). Its strength lies in its recognition of the specificity of SCP and the guards it sets against a mechanical and simplistic return to orthodox Marxism. Articulation demonstrates that SCP can be integrated into and transformed by capital in numerous ways, and that agricultural differentiation can assume various forms (Denis, 1982:137). The analysis of "plural" economies, however, is not unique to the articulation perspective and may be seen as a reformulation of Trotsky's law of combined and uneven development (Chevalier, 1983:155).

The integration and exploitation perspective accounts for the specificity of SCP on the basis of the law of value. The major weakness of this perspective is its inadequate conceptualization of ground rent and the law of value (Denis, 1982:144); however, it both transcends the shortcomings of the articulation perspective and seriously attempts to base an analysis of exploitation in Marx's law of value, therefore offering many opportunities for the analysis of SCP.

The present article encompasses a large topic and so, for organizational purposes, is divided into major subsections dealing with exploitation, expropriation, and combined and uneven development. These subsections are then related to the long wave of late capitalist development as reflected in the evolution of SCP.

Two Processes of Exploitation

The perspective developed in this paper proposes two processes of exploitation affecting simple commodity producers. These are the formal,
and the real, subsumption of labor under capital.

Chevalier (1983) builds his conception of the formal subsumption of commodified labor under capital upon Marx's (1977:1019-1038) distinction between formal and real subsumption. Both are needed to establish capitalist production as a unique mode of production. Formal subsumption occurs through two means: the monetization of labor-power and the dispossession of labor from the means of production. Thus, formal subsumption effectively reduces simple commodity producers to a wage-equivalent status.

Real subsumption occurs through the intensification of commodity relations. The outcome of formal and real subsumption is a strategy of maximization without accumulation. This strategy may be seen as a response at the level of production to the processes of exploitation by capital described above. The two processes of exploitation are discussed in more detail below.

**Formal subsumption of labor under capital**

The formal subsumption process consists of two components: the monetization of all factors of production, and the dispossession of workers from all means of production. Its material expression is the production of absolute surplus-value (Marx, 1977:1021). Such absolute surplus-value is produced through the lengthening of the working day and the intensification of family labor (Bernstein, 1977:73).

**Monetization of labor-power** Most Marxists would agree that simple commodity producers' labor-power is never purchased by capital, so for this reason SCP seems to involve only noncapitalist relations of
production. Chevalier (1983:160) contends, however, that "some cases of SCP are fully subsumed, although in their own particular fashion, under the logic of capital", and thus takes sharp variance with the general view. This bears examination. The generally accepted argument runs as follows:

Farm labor is neither purchased by capital nor exchanged for real money; therefore, it has no exchange value and cannot be converted into a commodity even though the labor is productively consumed. According to this argument, simple commodity production's specificity thus seems to lie in its resistance to formal subsumption under capital; this would imply that the SCP enterprise is noncapitalist or precapitalist, which is not the case.

Chevalier (1983:163) argues, in contrast, that "any factor of material consumption can be commodified, and its exchange-value realized, without ever entering the sphere of 'real' market transactions". Commodification occurs whenever the estimated value of the elements directly appropriated by the simple commodity producer, including his own labor-power, is converted into other commodities that are exchanged on the market (Chevalier, 1983:162). These commodities are then valorized in the process of generating optimum profits for productive capital and maintaining the conditions of subordinate reproduction of simple commodity producers' labor. The exchange-value of subsistence commodities is then determined by market calculations according to the measurable amounts of labor and other means of production involved. Only those simple commodity producers who do not respond to the forces of
capital-dominated markets can be seen as effectively resisting the mechanisms of formal subsumption.

The formal subsumption of simple commodity producers can take place without the legal sale of their labor-power to capital, Chevalier (1983:164) maintains. Specifically, simple commodity producers' labor-power can be commodified and effectively exploited if it is subjected to the exploitive relations of a capital-dominated market through the purchase of their means of consumption and sale of their commodities. In other words, simple commodity producers' labor-power is economically purchased (by capital) without ever entering the sphere of legal circulation whenever their commodities are sold (to capital) or whenever they purchase their commodities for subsistence or as inputs into the production of other commodities.

Through the purchase of their own labor-power, simple commodity producers attempt to attain an estimated maximum employment of their commodified labor (Chevalier, 1983:163). Similar reasoning applies when they "purchase" their own produce rather than selling it for a sum of money that would otherwise purchase fewer equivalent goods. Therefore, the value of simple commodity producers' subsistence consumption is obtained through means other than exchange and is determined by both the rate of exchange for their commodities and the markets in labor-power, credit, commodities, and other means of production.

According to Marx, abstract labor is directly associated with the formal subsumption principle and becomes a reality only in capitalist economies. The commodification of labor gives it an abstract value if
labor's consumption either directly influences or is directly influenced by the larger market in constant and variable capital. Thus, commodification forms a test: if simple commodity producers' labor-power fails this test, it cannot be considered abstract labor, and therefore must be considered under noncapitalist relations of production (Chevalier, 1983:163); in contrast, if it meets this test, simple commodity producers' labor must be considered as abstract labor and therefore a capitalist relation of production. Thus, the test of commodification places at issue the question of whether the Marxian analysis of formal subsumption does (or does not) apply to SCP by examining the monetization of labor power.

Dispossession from the means of production Marx (1977:1026) states that the formal subsumption of labor under capital involves both the commodification of labor by capital and capital's sole ownership of the means of production, as well as its appropriation of absolute surplus-value; in other words, the simple commodity producer is dispossessed from the means of production. Chevalier (1983:164) argues that this is not the case; instead, he writes, the distinctions between the legal process of property ownership and the exchange and actual relations of material expropriation and economic control are necessary to assess the exploitation by capital of SCP. Simple commodity producers can be dispossessed from their means of production without capital's sole ownership of those means (Chevalier, 1983:165), and so it follows that while simple commodity producers may own some of the means of production (i.e., land) they need not completely own or control more value than that
needed for their own reproduction.

Real subsumption of labor under capital

Real subsumption of labor under capital, the second process of exploitation, occurs whenever the social forces of production are revolutionized, resulting in a complete transformation that brings about large-scale production and the direct application of science and advanced technology (Marx, 1977:1024). Marx claimed that the introduction of industrial production techniques in agriculture would result in the eventual differentiation of simple commodity producers; however this has not necessarily been the case. Agricultural production may (and in the U.S., has) become thoroughly mechanized without causing the complete separation of the worker from his means of production. This contradictory tendency is just one of the effects of the general process of real subsumption and, furthermore, is an example of uneven development (Chevalier, 1983:174).

Relative surplus-value may be viewed as the product of the real subsumption of labor under capital (Marx, 1977:1025); it is produced when commodity relations are intensified through the general adoption of superior production technologies, specialization in cash-crop production, or involvement in labor-intensive production as a supplement to household income. The general effect is that a greater amount of commodities is produced within a specified period of time. Relative surplus-value is also produced when the value and monetary cost of commodities consumed by the producers are reduced. Both factors reduce the time necessary for reproduction of simple commodity producers (Bernstein 1977:73).
In summary, the real subsumption of labor under capital and the production of relative surplus-value cannot be conceived as an evolutionary process; rather, it must be conceived as one effect of the tendency toward uneven development of the CMP (Chevalier, 1983:176).

The following model demonstrates how SCP operates in an economy marked by formal and real subsumption (Chevalier, 1983:176).

Figure 1.1

\[ r \quad \text{subsistence consumption} \quad r' \]
\[ (\text{personal and productive}) \]
\[ l \quad l' \]

\[ \rightarrow C \quad i \quad \rightarrow M \quad \rightarrow C' \quad i' \rightarrow g \quad \text{market products} \quad g' \]

SELLING \quad BUYING

\[ C = \text{commodity} \]
\[ r = \text{object of labor (natural resources)} \]
\[ l = \text{labor-power} \]
\[ i = \text{instruments of production} \]
\[ g = \text{articles of personal consumption} \]
\[ M = \text{money and credit} \]

The commodities produced or appropriated by a simple commodity producer include personal consumption goods (g) and the factors of production: object of labor (natural resources) (r), labor-power (l), and instruments of production (machinery) (i). These commodities are
further divided into two categories: subsistence commodities and market products. Subsistence commodities (upper branch of the model) are directly consumed within the household. Market products (lower branch of the model) are exchanged for money (and credit) and the commodities \( (C') \) which money can buy.

This revised model of SCP goes beyond the traditional Marxist model \( (C - M - C') \) by including a subsistence component \( (C - C') \) which, in its reduced form, converts simple commodity producers' labor into consumption goods \( (C_1 - C_g) \). The model also allows for the possibility of the producer selling his labor to other producers or to non-producers, or to increase his production by purchasing other producers' labor. Furthermore, the model permits important variations in the relative weight assigned to each branch. For instance, the more important the subsistence consumption component (upper branch), the less important the productive component (lower branch). The operation of the model is examined below.

Maximization without accumulation

The primary goal of simple commodity producers is to gain access to those use-values needed to achieve or maintain an acceptable standard of living; however, this cannot be achieved without treating use-values as exchange-values, which results in a strategy of "maximization in the concrete" (Chevalier, 1983:178). This strategy creates a problem for simple commodity producers because the level of concrete consumption may (or may not) correspond to the minimum standards for subsistence. Thus, they struggle to increase their productivity to maintain their incomes,
but their incomes are constantly eroding as a result of falling commodity prices. Thus, the falling rate of profit in payment for their labor leads to increased technical innovation (at high cost) and also to the intensification of family labor.

In a commodified economy, simple commodity producers' goals and activities become embodied in the measurable exchange-value their commodities possess. For example, they may be forced out of production if they cannot recover the costs of production, or they may be able to convert their limited assets into capital investments if the opportunity arises. For these reasons, simple commodity producers in either branch must calculate the best method to employ their resources if they wish to maintain their present level of consumption.

Market-centered simple commodity producers are primarily concerned with economic survival and therefore operate on the principle of "concrete economizing". By this measure, they attempt to appropriate a (limited) maximum value contained in the means of production they purchase, the land they own, the rents they pay if they do not own the land, the labor they purchase from others or themselves, and the produce they sell or purchase for their own consumption (Chevalier, 1983:178).

The quantity of commodities produced is comparable to quantifiable amounts of exchange-value for those commodities; i.e., commodities used as means of personal or productive consumption are not realized as use-values only. Thus, simple commodity producers do not seek an increase in profits, but rather a maximum level of absolute consumption, which might be equal to (or less than) previous levels of consumption.
Treating use-values as exchange-values also results in "maximization without capitalization" (Chevalier, 1983:179). Basically, if simple commodity producers own their means of personal and productive consumption, they will attempt to increase them; however, they cannot regard their means of production as a method of profit accumulation.

The means of production and objects of labor owned by simple commodity producers are of limited value, either because of the low market value placed on certain equipment items or their own long-term indebtedness. In this respect, their capital differs from industrial capital and so their means of production cannot be a source of profitable monopoly over other scarce factors of production.

In addition, those simple commodity producers who hire wage labor cannot be said to constitute a class separate from those they employ because generally, the hired laborer is another producer of the same class. In general, simple commodity producers hire wage labor as temporary help, compensating either for a temporary shortage of household labor due to cyclical demographic variations in family structure (Friedmann, 1978:80) or for additional short-term manpower needs, such as those experienced at harvest.

**Exploitation summary** The formal and real subsumption of labor under capital effectively reduces simple commodity producers to a propertied wage-labor equivalent status and calls for strategies by which they may meet the demands of capitalist exploitation. These strategies include greater production efforts (entered at the equivalent of a wage reduction) for the purpose of maintaining a relatively stable income
level (maximization without accumulation), an increased level of absolute consumption with or without an increase of profits (maximization in the concrete), and an increase of operating expenses, either through increased means of production or the hiring of outside labor (maximization without capitalization). The formal and real subsumption of simple commodity producers' labor under capital, as mechanisms of production of surplus-value, and the responses to these mechanisms constitute areas of exploitation.

Three Mechanisms of Appropriation

The three mechanisms of appropriation of surplus-value are ground rent, technological rents, and unequal exchange. Ground rents are composed of differential and absolute rents; technological rents are monopoly surplus profits which occur as the result of protected technological advances; unequal exchange occurs when a genuine technological revolution creates large differences in production costs between those firms which have (and use) the new technology and those which do not. Within the context of agriculture, such technological advances are generally understood to mean the relative amounts of mechanization simple commodity producers employ and consequently the labor-to-value ratio of the resulting product. These topics are explored in more detail below.

Ground rent

Ground rent is the first mechanism by which the surplus-value of simple commodity producers is appropriated from them by capital. In
discussing ground rent as a mechanism of the distribution of value, Marx distinguished between absolute and differential rents, indicating that differential ground rents distribute value within agriculture, while absolute ground rents distribute value between agricultural and nonagricultural capital (Denis, 1983:146).

Differential rents will occur in agriculture when demand exceeds supply or when monopoly price equivalents are in operation. Such rents accrue to high-investment farms; these tend to be large-scale farms of simple commodity producers as well as semi-capitalist farmers. Therefore, differential rents lead to differentiation within agriculture.

Differential rents are further subdivided into differential rents I and differential rents II. Type I rents are due to differences in the location and fertility of the land, while Type II rents are categorized by land on which productivity is increased through capital investment.

Type I rents generally tend to equalize with improvements in transportation and the removal from production of marginal land; however, one should note that differences in location and natural fertility can never be totally equalized.

Type II rents tend to increase in importance with rising investments in agricultural production simply because capital investments are made for the purpose of increasing productivity. Such a transfer of value from low to high productivity farms is not exploitation; rather, this transfer of value is the normal operation of the law of value (Denis, 1983:147).

Value is also transferred outside of agriculture. Mollard (Denis,
1983) and Mandel (1980) contend that the organic composition of capital in contemporary capitalist agriculture is similar to that found in industry. This increase in the organic composition of value in agriculture has led to the disappearance of absolute ground rent on a majority of farms in the U.S. (Mandel, 1980). Therefore, the organic composition of capital in agriculture hinders neither equalization of the rates of profit nor the normal transfer of value between agriculture and other sectors of the economy.

The transfer of value outside of agriculture involves the extent to which absolute and differential rents are transferred from simple commodity and capitalist producers to nonagricultural capital (Denis, 1983:147). For capitalist farmers, according to Marx and Mollard, these are relations of distribution. For simple commodity producers, however, the extent of control by nonproducers over both the production process and commodities makes these transfers of value into relations of appropriation.

Chevalier (1983) maintains that the control exerted by the marketplace in land and the commodification of the value of land as an object of labor in agricultural products results in the subordination of land under capital and the appropriation of value. He maintains that the value of land originates in its relative scarcity as a quantifiable and commodified object of labor (Chevalier, 1983:173). A central component of all extensively commodified economies is the "valorization of all factors of personal and productive consumption as scarce values amenable to the economic laws of market supply and demand" (Chevalier, 1983:172).
Chevalier suggests that capitalism survives upon the commodified "exploitation" of both the subject of labor (the laborer) and the naturally given object of labor (natural resources used in production). This exploitation demonstrates both the subsumption of labor under capital and the subsumption of nature to the social logic of abstract wealth (Chevalier, 1983:173), i.e., it constitutes a dual expression of the formal subsumption principle. Accordingly, the value of agricultural rents and surplus production does not originate within the strict confines of the agricultural sector, but rather is located in the systematic, intersectoral operation of capital-dominated markets.

Mollard reduces ground rent to the actual cost of land rather than to the production of value (Denis, 1983:140). The scarcity of land and other means of production integrates simple commodity producers within capitalism through the mechanisms of purchase used; i.e., share rent, money rent, land purchase, inheritance taxes, and interest on loans for land purchase. Mollard argues that surplus-value is appropriated through indirect control and the requirements that capital in general imposes on SCP as a whole (Denis, 1983:146).

More specifically, others have equated interest on loans for land purchase with the appropriation of surplus-value. Marx notes that where the borrower is a direct producer, loans for land purchase are a form of usurers' capital (1967:353) which absorbs not only the entire profit but even a portion of the wage that the simple commodity producer pays himself (1967:276). Kautsky contends that indebtedness is equated with the extraction of ground rent and assists in the proletarianization
process without resulting in the complete expropriation of the direct producer (1980:69-70). Lenin also equates ground rent with interest payments and of the debtor undergoing the process of proletarianization (1938:17). Stinchcombe similarly notes the equivalence of debt and rent (1961:17).

Technological rents

The second mechanism by which simple commodity producers' surplus-value may be appropriated is in technological rents, i.e., those obtained from permanent technological revolution. Technological rents are monopoly surplus-profits which occur when technological advances are protected by monopolies. A genuine technological revolution results in large differences in production and involves a fundamental restructuring of the basic techniques in all sectors of capitalist production (Mandel, 1980:119-120).

The main objective of capital in late capitalism is the reduction of direct labor costs, or the removal of human labor from production through automation (Mandel, 1980). Industrial production can never be fully automated, however, because the production of absolute and relative surplus-value would cease (Mandel, 1980:198-207). The total profit realized by the technically-advanced sectors is instead appropriated by the exchange of commodities with less technically-advanced sectors, such as SCP agriculture.

Simple commodity producers have experienced severe pressure to adopt new technology in an effort to overcome the increasing differences in productivity between themselves and the more technically-advanced
sectors. Otherwise they would lose a significant amount of the surplus-value they produce to the more technically-advanced sectors. Agricultural labor productivity has increased rapidly through technological advance, and in late capitalism, it has experienced an even greater increase than has industrial labor productivity (Mandel, 1980:378). Simple commodity producers have been driven to reduce production costs by increasing labor productivity, in an effort to obtain differential rents as close to the full value of production as possible (Denis, 1983:148).

Consequently, agriculture has become inextricably involved in the technological treadmill (Cochrane, 1979:387-390), with the result that the more-innovative simple commodity producers swallow the farms of their less-innovative neighbors. This technological treadmill is a form of differential rent (Type II) which contributes to the differentiation of simple commodity producers.

Technological rents also have caused the forced, large-scale accumulation of capital. Such accumulation beyond necessary levels results in the under-utilization of equipment (Mollard, in Denis, 1983:140). Much of this forced accumulation is financed by borrowing, and is considered by simple commodity producers as an investment in the technical conditions of production. Unfortunately, this only places them in debt, further integrating them into the circuits of capital circulation (Vergopoulos, 1978:452). This has also led to an increase in the organic composition of simple commodity producers' capital comparable to that of industry, causing the disappearance of capitalist ground
Unequal exchange

Technological rents obtained from permanent technological renewal are related to unequal exchange, the third mechanism of appropriation.

A genuine technological revolution results in sectoral underdevelopment, i.e., in large differences in production costs between those firms which use the revolutionary new technology and those which do not. Such underdevelopment has its roots in the unequal exchange of commodities between technically-advanced and less-advanced sectors of the economy and is a characteristic of late capitalism. This unequal exchange of commodities between simple commodity-producing sectors and industrial sectors leads to the intensification of family labor among simple commodity producers and the decrease in remuneration for their commodified labor (Vergopoulos, 1978:454), as well as the production of relative surplus-value (Bernstein, 1977:73). In other words, the producers must work harder for less money, on a wage-equivalent basis.

Sectoral underdevelopment is governed by the rates of profit, i.e., by competition among capitals in proportion to the total amount of capital placed in production by each individual firm. Simple commodity producers increase their labor productivity through mechanization in order to decrease the proportionate surplus-value appropriated by the more technically-advanced sectors.

Surplus-value flows from simple commodity-producing sectors with below-average rates of profit into sectors with above-average rates of profit. This outflow results in a redistribution of economic resources
from simple commodity-producing sectors to the benefit of the more-productive sectors. The outflow will continue until the technological advance is generalized in all sectors, and then will begin again with a new set of technological advances.

Appropriation summary

The two processes of exploitation and the three mechanisms by which surplus-value is appropriated results in the "simple reproduction squeeze" (Bernstein, 1979:427). This term refers to those effects of commodity relations on the household economy of simple commodity producers' households. Briefly, it means that as production costs increase, returns to labor decrease. The causal forces of this "squeeze" include the exhaustion of both land and labor, and the use of technological measures to combat it. Exhausted land loses productivity through both mining and soil erosion; exhausted labor occurs through intensifying family labor involvement to the detriment of health. Technological measures used to combat these forces include the use of existing methods of cultivation and more expensive means of production, such as improved seeds, machinery, fertilizers, insecticides, and pesticides. Of course, there is no guarantee that the return from this labor will be equal to the costs incurred, especially when deteriorating terms of exchange are considered.

Therefore, the objective effect of the "simple reproduction squeeze" is to intensify the labor of simple commodity producers' households seeking to maintain or increase the supply of commodities. Capital incurs no costs of management or supervision anywhere in the production
process (Bernstein, 1979:429).

Combined and Uneven Development

The intensity of the "simple reproduction squeeze" varies with the world economy, resulting in the combined and uneven development of agriculture. The law of combined and uneven development states that the capitalist mode of production reproduces in "varying forms and proportions a combination of past and present modes of production, or more precisely, of varying past successive stages of the present mode of production" (Mandel, 1980:23).

The development of capitalism, including its inner regularities and emerging contradictions, is a function of the six variables of the capitalist mode. "The interplay of these variables and laws of development can be summed up in a tendency for the various sectors of production and the various component parts of the value of capital to develop unevenly" (Mandel, 1980:42). Variations in the rate of appropriation of profit are indicators of this development; they are the expression of a mode of production based upon profit or the valorization of capital.

Capitalism attempts to encroach upon new areas, changing sectors of SCP into spheres of capitalist production and replacing sectors which previously produced use-values with commodity production (Mandel, 1980:47). These various modes of production are linked through the exchange of commodities, whose price is determined by the world market.
The law of value and simple commodity production

The law of value underlies the entire combined and uneven development of sectors of the economy. Different levels of sectoral development are a logical consequence of the universalization of capitalist circulation; however, the universalization of capitalist production of commodities is not (Mandel, 1980:84). Instead, unequal development arises from differences in the rate of profit, and it is expressed in the continual search for surplus-profits, produced at the expense of less-productive sectors. Therefore, development occurs in juxtaposition with underdevelopment. Combined and uneven development generally takes the form of development in growth sectors and underdevelopment in other sectors.

On the international level, the law of value concretely underlies the entire combined and uneven development of capitalist and semi-capitalist relations of production linked by capitalist relations of exchange. The development of world market prices and their effect on national economies is a concrete expression of this effect (Mandel, 1980:70-73).

World markets and agricultural commodity prices Mandel (1980:73) and Mollard (Denis, 1982:141) demonstrate that simple commodity producers' production may be sold below its real value because international market competition changes the classical value-price structure for agricultural commodities. The effects of this change are summarized below:
As capitalist relations are extended, prices are no longer determined locally; rather, they are set by national and international markets. Superior production conditions eventually become average conditions through continued overproduction and international competition; also world market prices may be below the values of domestically-produced commodities, especially if those commodities are produced under semicapitalist conditions. When this occurs, commodities are often exported below their "national" value. Consequently, simple commodity producers' "wages", considered a part of the commodities' value, may be much less than the value of their labor-power in the production of those commodities. This is especially true if simple commodity producers still own their means of production.

Price variations also may occur as a result of oscillations of stocks and the shortages of major commodities on the world market (Mandel, 1980:382). These variations determine whether vast expanses of less-productive land will be brought into production\(^9\). Contrary to orthodox Marxist theory, simple commodity producers do not always extend production to less-productive land; they are unable to immediately respond to price variations because of fear of recurrent surpluses and because of government programs aimed at reduction of commodities (Mandel, 1980:382).

**Lack of capitalist agricultural development** The more-productive lands, because of their natural fertility or larger capital investment, no longer yield a ground rent. Consequently, agricultural commodities are sold at their social price of production; this price barely covers
the cost of production and average profit. The low price obtainable is the main reason direct cultivation on a large, capitalist scale has not become predominant in capitalist countries. Consequently, the production of most agricultural commodities, particularly grain and some livestock, has been left to simple commodity producers. Therefore, "super-profit" in late capitalist agriculture (over and above the average profit) no longer exists. Instead, the average rate of profit in agriculture is the same as the rate of profit in other nonmonopolized sectors and can be achieved only by employing large amounts of constant capital. Capitalist ground rent disappears in consequence, because the organic composition of capital in many of the large capitalist enterprises is equal to, or near, that of the average industry (Mandel, 1980:383-384).

Use-value and exchange-value of agricultural commodities. The capitalist demand for the use-values produced by simple commodity producers affects redistribution of those commodities' exchange-values (Mandel, 1980:529).

If demand for commodities produced below the average profit remains constant, simple commodity producers with below-average rates of profit will face only a temporary outflow of capital. However, if demand for commodities produced below the average profit falls, simple commodity producers will face a permanent loss of capital. Therefore, the accumulation of capital in simple commodity production will be retarded if the transfer of surplus-value to the monopolized sectors is not accompanied by a change in demand (Mandel, 1980:537).

Simple commodity producers' decreasing capital accumulation will
cause a relative shortage in the use-values of commodities produced; hence, the market price of these commodities will increase absolutely as well as relatively, when compared with commodities produced by monopolies. Surplus-value transfer therefore declines periodically; in this case, demand pressure causes an equalization of the rate of profit associated with an increase in accumulation of capital.

In summary, the process of equalization in the rate of profit occurs periodically in nonmonopolized sectors, such as agriculture (Mandel, 1980:537-538), resulting in an increase of the sector's organic composition of capital comparable to that found in the monopoly sectors. Monopolies historically have attempted to achieve a constant source of surplus-value through competition with (and technological domination of) the less-developed sectors. This has resulted in the combined and uneven development of SCP agriculture.

The long wave of capitalist development

The law of combined and uneven development is manifested in the long wave of late capitalist development (Mandel, 1980). Mandel based his theory of technological revolution and the long waves of capitalist development on Marx's theory of crises; i.e., the business cycle (1980:109-145). Each successive repetition of the business cycle is characterized by the use of more productive technology than the previous cycle.

Mandel noted that there have been four "long waves" in the history of international capitalism, each lasting approximately fifty years (1980:120-122). Each long wave can be divided into expansive and
stagnating phases. According to this model, we are now in the stagnating second half of the long wave which began with World War II. The stagnation is characterized by gradually decelerating capital accumulation. One should note, however, that these long waves function through the articulation of classical business cycles and are conceivable only as manifestations of them; i.e., they are the result of cyclical fluctuations and do not assert themselves in a merely mechanical fashion.

Late capitalism is distinguished by major, long-term growth in the forces of production through the establishment of a series of monopolies in several "growth sectors" of the U.S. (Mandel, 1980:557-558). These sectors obtained real technological surplus-profits through the accelerated accumulation of capital. These growth sectors were the actual carriers of the expansive phase, characterized by a temporary expansion of capitalist activity in the nonmonopolized sectors. In other words, the possibility of increasing surplus-profits propelled the expansive phase. In contrast, the speed of concentration and centralization of monopoly capital increased in the stagnating phase which followed, causing the range of capitalist activity in the non-monopolized sectors to shrink as the amount of surplus-value and surplus-profit produced in the non-monopolized sectors was reduced (Mandel, 1980:545).

Mollard discusses how the integration of simple commodity production into the CMP has resulted in the uneven development of SCP, with the resulting regression of SCP agriculture, characterized by its continued reproduction on an ever-declining base (Denis, 1982:141). The regression
of simple commodity production agriculture is demonstrated by:

... the absolute decline in the number of peasants, their subsequent rural exodus; their marginalization as they occasionally withdraw from capitalist circuits to rely increasingly on self-sufficiency; the gradual consumption of accumulated assets through the sale of land or stock; and the increase of part-time farming combined with off-farm work.

A certain amount of historical support for this view was demonstrated by Mottura and Pugliese (1980), who noted the expansion and contraction of activity in the non-monopolized sectors within the context of Italian agriculture since Unification in 1871. In discussing its structural dualism, they noted two processes of development: The expansion of capitalist production occurred simultaneously with the contraction of the peasantry during periods of rapid capital accumulation, and the contraction of capitalist production occurred concurrently with the expansion of the peasantry during periods of slow capital accumulation. Although the U.S. has not had a peasantry similar to that of Italy, this nonlinear model provides a clue to understanding agricultural development in the United States. The process of peasantization noted by Mottura and Pugliese bears strong structural similarities to the recent rapid emergence of large numbers of small farms, whose operators rely on off-farm work rather than subsistence or commodity production for their reproduction. During the stagnating phase of late capitalism's long wave, the contraction of capitalist agricultural production appears concurrently with the extension of the rural semiproletariat, and the continued regression of simple commodity production.
Role of the state in agricultural development


Thus, the conscious political support by the state in agricultural policy takes the form of aiding in the two contradictory functions of accumulation and legitimation. 13 "Accumulation" refers to maintaining or creating the conditions necessary for profitable capital accumulation, whereas "legitimation" refers to maintaining or creating the conditions necessary for social harmony. The state must maintain or create conditions in which profitable capital accumulation is possible while simultaneously maintaining or creating conditions for social harmony. If the state uses its coercive forces to actively assist one class, it loses legitimacy and undermines the basis for loyalty and support. But if the state ignores its role of assisting in the process of capital accumulation, it risks losing the source of its own power, the taxes drawn from the economy's surplus production capacity (O'Connor, 1973:6). The two roles may appear contradictory, but state policy may serve both simultaneously. 14

Because of the contradictory nature of state policy, almost every state agency is involved in these functions, and almost every state expenditure shows that involvement (O'Connor, 1973:6-7). Some expenditures, having the character of social capital, are intended to aid in profitable private accumulation while others, having the character of
social expenses, are intended to finance the projects and services required to maintain social harmony. 15

Social capital expenditures can be subdivided into social investment and social consumption expenditures. The former increase the productivity of a given amount of labor power, thus increasing the rate of profit; 16 the latter finance projects and services that lower the reproduction costs of labor and (other factors being equal) also increase the rate of profit. 17 The state thus promotes the extension and intensification of commodity relations in conditions of low profitability through the expenditure of social capital. Private finance capital would be reluctant to operate under these conditions (Bernstein, 1977:70).

State agricultural policy has generally reinforced the competitive character of the farm sector and helped to reduce food costs for the working class (Havens, 1982). At the sectoral level, the functions of accumulation and legitimation are seen to operate in policies and programs of public and private institutions directed at large and small-scale farmers (Bonanno and Ritter, 1983). These functions vary by the phases of the long wave of late capitalist development: the accumulation function takes precedence in the expansive phase while the legitimation function takes precedence in the stagnating phase.

Mottura and Pugliese (1980) emphasize that agriculture performs both productive and labor-reserve functions and contend the state actively promotes each function. Both functions are present in capitalist societies, but their occurrence varies by the particular stage of capitalist development present. These stages are characterized by: 1)
Eras in which the predominant objective of the state is capitalist development and accumulation, distinguished by concentration of private investment and public funding in semicapitalist agriculture; 2) Eras in which the predominant objective of the state is legitimation of private property, distinguished by a decrease in private investment and an increase in public investment aimed at increasing the stability of simple commodity production; and 3) Eras in which there is a balance between the state's objectives of accumulation and legitimation and the distribution of financing between semicapitalist and simple commodity producing sectors of agriculture.

Late Capitalist Evolution of Simple Commodity Production

If the appropriation of simple commodity producers' surplus-value is central to an understanding of agrarian class relations (Braverman, 1974), then a model which includes more than just the appropriation of surplus-value from wage laborers is needed. Mooney (1983) has proposed such a model.

Mooney (1983:567) develops several criteria which form the basis of the development of a theoretical model of agrarian class structure. The first criterion is the status of producers on the labor market. The appropriation of surplus-value from direct producers through off-farm work indicates proletarianization. If the household is able to retain surplus-value from commodity production, then pure SCP will be reproduced. The control of the labor power of others indicates
transformation toward the CMP because a direct producer who exercises such control is nearer a capitalist class location to the extent that direct production is performed by hired labor. The second criterion is the extent of control that direct producers exercise over the physical means of production and investment decisions. The presence of such control indicates a pure SCP class location, but the lack of such control indicates a proletarianization process.

These processes are not perfectly coincident with class locations, giving rise to contradictory class locations (Wright, 1978). The concept of contradictory class location is a break from orthodox Marxist theory in that these locations may not be transitional but may have some degree of permanence in capitalist social formations. Under late capitalism, SCP has been differentiated into a tripartite class structure of rural semiproletarians, simple commodity producers, and semicapitalist producers. The class locations of the semiproletariat and of semicapitalist production are contradictory: semiproletarians are both laborers and direct producers; semicapitalists are both employers and direct producers. Simple commodity production may also be a contradictory class location depending upon the extent of control that producers exercise over the physical means of production and investment and their amount of off-farm work.

This classification reformulates Lenin's typology (1958) of agrarian transformation in which a labor market is formed at the expense of the "middle peasants" to benefit of the "rich peasants". However, as Bernstein (1977:69) noted, the classic typology describes a particular
case or variant of the process, and not "its sole or necessary form of development". The typology of differentiation differs from the classic typology in that it requires neither the expropriation of direct producers by capital nor their real subsumption as free wage labor. Instead, the revised typology emphasizes large-scale, horizontal concentration of the means of production as well as the tendency toward vertical concentration and control of production.

Although the typology presents a static picture of agrarian structure, it has no discrete class boundaries. Instead, those producers whose economic conditions place them at or near the rural semiproletariat or semicapitalist "boundaries" would fluctuate in and out of those classes according to the phases of the long wave of capitalist development. Of course, the same "class mobility" would also apply for the border areas of the other two classes.

This revised model takes account of the three essential elements of late capitalist agricultural development: (1) exploitation and commodification of both labor and the means of production; the appropriation of surplus-value from simple commodity producers; and (3) the combined and uneven development of SCP.

Rural semiproletariat

These producers cannot insure the needs for maintenance and reproduction of the household through simple commodity production alone; therefore, they have to sell their labor-power on a regular basis (Bernstein, 1977:67). This is their defining characteristic. But, because low wage levels do not permit their full proletarianization, they
may retain a small farm that contributes to their subsistence which, in turn, reduces the wages paid by their employers. This group constitutes a rural proletariat or a rural labor reserve in the process of formation. It is in this context that Lenin (1958:179) warned against "too stereotyped an understanding of the theoretical proposition that capitalism requires the free, landless worker".

During the expansive phase of late capitalism's long wave, members of this group rely on the sale of their labor-power; their significance in numbers, land, and production decreases as their land is purchased or rented from them by simple commodity producers.

During the stagnating phase, the subsequent decline in employment opportunities in off-farm work causes rural semiproletarians to rely more on subsistence production than on the sale of their labor-power. This sector thus becomes a labor reserve; its significance in numbers, land and production increases as the rural semiproletarians rely more on subsistence production and the intensification of family labor.

To establish or enlarge their rural residences, rural semiproletarians purchase or rent acreages from simple commodity producers or semicapitalist producers. Rural semiproletarians are concerned with providing for their subsistence needs rather than selling their commodities on the market, and also consider the labor involved in subsistence production as costing nothing; therefore, the relationship between the price of land and the sale of commodities is no longer relevant (Kautsky, 1980:70). Some members of the rural semiproletariat are former simple commodity producers recently forced out of SCP; these
individuals may have sold their land, stock and machinery but retained their rural residence.

**Simple commodity producers**

The position of simple commodity producers, the middle category, is especially precarious; they are able to reproduce themselves through household production only in the most favorable circumstances (Lenin, 1958:182), and in many cases, cannot make ends meet without securing loans or seeking outside employment through the sale of their labor-power. Each crop failure forces more of them into the rural semiproletariat.

Hence, simple commodity producers, as a class, undergo regression or depeasantization. The former is defined as continued reproduction on an ever-declining base (Mollard in Denis, 1982:141), the latter as the wearing away of the middle members and the reinforcement of the extremes (Lenin, 1958:182). These processes take place in a manner consistent with the phases of the long wave of late capitalist development.

The source of regression varies by the phases of the long wave. During the expansive phase, capitalism is extended into SCP, resulting in its horizontal concentration and centralization. The high-investment simple commodity producers obtain differential rents (Type II), which permit them to swallow the farms of their lower-investment neighbors. This high-investment expansion and mechanization is often financed through private or public financing.

Simple commodity producers who cannot reproduce their operation by commodity production resort to off-farm employment, part-time farming,
and the sale of land, machinery or stock. When this occurs, they move
towards rural semiproletarian status. The remainder, who can provide for
their continued reproduction through commodity production, are then
cought in the "simple reproduction squeeze" (Bernstein, 1979:427). They
intensify the relations of production by increasing the use of family
labor, exhaust the soil through intensive cultivation, further
rationalize production through increased use of technology, and compete
with semicapitalist producers for access to land (Kautsky, 1980:73).
This has the effect of increasing relative surplus-value while decreasing
the wage equivalent value of commodities produced, and hence increasing
the expense (and therefore, the indebtedness) required to produce them.

During the stagnating phase, capitalist activity in SCP agriculture
declives, causing a decline in horizontal concentration and
centralization, and an increase in vertical concentration and
centralization. Thus, private and public funding for capitalist
expansion in SCP decreases while public funding aimed at increasing the
economic stability of SCP increases (Kautsky, 1980:64).

Those simple commodity producers who financed their expansion and
mechanization beyond the ability of the farm to provide for their
continued reproduction are forced out of production by the prevalent
economic conditions of the stagnating phase. Their farms are then held
by private or public lending agencies and are rented to other simple
commodity producers or semicapitalist producers if the lending agencies
are unable to sell the farms on the market.
Semicapitalist producers

Semicapitalist producers are not fully capitalist in that they use both hired and unpaid family labor; the hired labor force is usually tied to the rural semiproletariat. Semicapitalist producers are usually drawn from the upper stratum of the successful simple commodity producers.

Semicapitalist producers derive their power from their economic base, and they share that power with nonagricultural capitalists in controlling the state (deJanvry, 1981:113). This shared control of the state results in public services oriented toward the development of capitalism in agriculture through labor-saving technology and infrastructure investment. Semicapitalist producers typically share ownership with public or private capital. Historically, they accumulated sufficient capital from public or private agencies to finance the extension of capitalist production.

They operate neither on the capitalist production principle of "maximization in the abstract" nor on the SCP principle of "maximization in the concrete"; they are primarily concerned with maintaining an income or wage over and above operating expenses. In this respect, they are not comparable to capitalists receiving a profit or simple commodity producers maintaining a minimally-acceptable standard of living. This income or wage is included in the amount of the operating loans they receive from the lending agencies.

Because they are so heavily leveraged, public and private agencies are reluctant to discontinue financing them for fear they would never be
repaid the interest on their investment (Kautsky, 1980:79). Therefore, these semicapitalist producers are usually refinanced, but not always to the previous level. During the expansive phase, public and private agencies willingly finance the extension of capitalist commodity production because the risk is relatively low. During the stagnating phase, public and private agencies are reluctant to finance the continued extension of capitalist commodity production because the risk is higher. The lending agencies are, of course, primarily concerned with maintaining the stability and security of their investments.

The tendency towards increased state financing of large-scale simple commodity producers and semicapitalist producers indicates a trend toward vertical concentration (Lenin, 1958). This occurs when a central state agency undertakes the coordination, standardization, and supervision of many commodity producers (Bernstein, 1977:70). According to Marx (1967:436-437), the use of credit by stock companies transformed capitalist entrepreneurs into managers of capital (Marx, 1967:436-437). The semicapitalist agricultural producer, however, is the manager of public rather than private capital, and the farm firm takes the form of a public utility rather than a private stock company.

Semicapitalist producers thus effectively become a managerial class holding title to the land only in the legal sense; economic ownership effectively resides with the public finance agency. This distinction between legal and economic ownership confirms Marx's (1973:279) view that in an advanced stage, capital regards private property as a hindrance to
capitalist development and thus attempts to dissolve it in the effort to transfer ownership to the state. The interest paid on loans received by semicapitalist producers from the public finance agency thus becomes the universal state rent, or a new form of ground rent.

In summary, semicapitalist production undergoes periods of progressive concentration and centralization in both phases, but the rate and kind of centralization and concentration varies by the phase of the long wave. The rate is greater in the expansive phase than in the stagnating phase; however, the significance of semicapitalist production in land, production, and hired labor increases in both phases, thus confirming the central law of capitalist development.

Summary

This paper describes a revised Marxist position explaining contemporary family farming as a form of simple commodity production in the context of late capitalism and attempts to overcome the shortcomings inherent in the orthodox, articulation, and the integration and exploitation perspectives of Marxian analysis.

In retaining the orthodox perspective's law of value, the revised perspective retains a rigorous conception of capital. Its additional concepts of permanent technological revolution and technological rents further locate SCP agriculture within the context of late capitalism.

Through defining late capitalism as a combination of varying past successive stages in the present mode of production, the revised perspective acknowledges that the specificity of SCP is related to the
needs and contradictions of late capitalism.

The concepts of real and formal subsumption of labor under capital both acknowledge the specificity of SCP and demonstrate its full subordination to capitalism.

The revised perspective argues: (1) SCP may be fully subsumed under capitalism without resulting in the complete separation of simple commodity producers from their means of production; (2) SCP is being differentiated into a tripartite class structure of rural semiproletarians, simple commodity producers and semicapitalist producers; (3) this differentiation varies by the phases of the long wave of late capitalist development, resulting in the combined and uneven development of SCP; and (4) the state aids in this process through policies and programs designed to serve legitimation and accumulation functions simultaneously.

This revised perspective thus predicts the persistence of simple commodity producers, on a numerical basis, even though SCP undergoes progressive regression in both phases of late capitalism's long wave. The long wave is divided into the expansive phase (1940-1967) during which SCP is differentiated internally as differential rents (Type II) permit the more technically-advanced producers to incorporate the farms of their less-technically advanced neighbors, and the stagnating phase (1967-1985) during which capitalist activity in SCP decreases. Horizontal concentration and centralization occurs in the expansive phase while vertical concentration occurs in the stagnating phase. Finally, this revised perspective predicts the continued reproduction of SCP on an
ever-declining base as it undergoes successive regression at different rates during the phases of late capitalism's long wave.
Footnotes

1. There is general agreement that family farming is characterized by (1) family ownership of land and capital and (2) dependence on family labor. On the basis of these criteria, agricultural production in the U.S. is still characterized by a predominance of family-type farms. In 1978, 87 percent of the operators of farms and farmland in the U.S. were either full or part owners of these means of production (U.S. Department of Commerce, 1980). Furthermore, the family farm provided 65 percent of all labor in the agricultural sector -- only in California, Florida, New Jersey, Hawaii, Washington, Arizona, and Nevada did hired workers constitute more than 50 percent of the total agriculture labor force (United States Department of Agriculture, 1981a).

2. For Kautsky (1980), Lenin (1934, 1958), Goss et al., (1980), and deJanvry (1980) simple commodity production is a transitional stage. The inexorable forces of centralization and concentration of agricultural production will inevitably differentiate simple commodity production into an agricultural bourgeoisie and a landless proletariat.

3. Mann and Dickinson (1978) argue that the excess of production time (the period in which capital is tied up in the production process) over labor time (that portion of the production period in which labor is actually employed in creating value) associated with particular agricultural commodities makes the capitalist agricultural production of these commodities unattractive. The variance of production and labor time produces "an adverse effect of the rate of profit, the inefficient use of constant and variable capital, and the smooth functioning of the articulation and realization process" (Mann and Dickinson, 1978:466). See Perelman (1979) and Mooney (1982) for a critique of Mann and Dickinsons' thesis.

4. Davis (1980) contends that family farming is not incompatible with capitalist development. Instead, "capitalist development is occurring throughout the agricultural sector despite the presence of the family farm; indeed, the family farm has itself become the basis for such development" (Davis, 1980:146). Capital has become so universal that a propertied laborer is unable to independently produce his own livelihood. He is unable to avoid participating in production processes where capital controls his productive activity and appropriates his surplus product. Instead, he may be reduced to an agricultural piece worker by means of contract production. In this case, individual private property may actually be in the interest of capital.

5. The reader is referred to the introduction to the dissertation for a more detailed discussion and critique of these three perspectives.

6. Formal subsumption implies both the monetization of labor-power and
the purchase of labor-power by capital. It presupposes the employer's monopoly of workers' objective conditions of labor (means of production) and the subjective conditions of labor (means of subsistence). Real subsumption occurs as a result of a technical revolution in the mode of production and the social forces of production (Marx, 1977:1026-1038).

7. A technological revolution involves a fundamental restructuring of the basic techniques in all sectors of capitalist production (Mandel, 1980:119-120). Large-scale innovation does not occur during a stagnating phase of the long wave of late capitalist development, because of low profit expectations. Once the average rate of profit begins to rise, capital discovers a supply of unused innovations and uninvested capital and now has the means to begin a technological revolution. The uninvested capital is added to the rapid increase in new and accumulated surplus-value to make a genuine technological revolution possible.

8. These variables include the following (Mandel, 1980:39):

   . . . the organic composition of capital in general and in the most important department in particular (which also includes, among other things, the volume of capital and its distribution between the departments); the distribution of constant capital between fixed and circulating capital (again in general and in each of the main departments); the development of the rate of surplus-value; the development of the rate of accumulation (the relation between productive surplus-value and surplus-value which is unproductively consumed); the development of the turnover time of capital; and the relations of exchange between the two departments (which are mainly, but not exclusively a function of the given organic composition in these departments).

9. Orthodox Marxism posits that the production of agricultural commodities will be extended to less-productive lands as a result of price variations, and that the costs of production on these lands will determine the market price of the commodities (Mandel, 1968:279).

10. Mandel notes the following four long waves in the history of capitalism: (1) The period from the end of the 18th century up to the crisis of 1847 was the long wave of the industrial revolution itself and was characterized basically by the gradual spread of the steam engine to all the most important branches of industry in the industrial countries; (2) The period lasting from the crisis of 1847 until the beginning of the 1890s was the long wave of the first technological revolution and was characterized by the generalization of the steam engine as the principal motive machine. (3) The period lasting from the 1890s to the Second World War was the long wave of the second technological revolution and was characterized by the generalized application of electric and internal combustion engines in all branches of industry. (4) The period beginning in North America in the 1940 and in the other imperialist countries in
1945-48 is the long wave of the third technological revolution (Mandel, 1980:120-121), characterized by the generalized control of machines by means of electronic apparatuses (as well as the gradual introduction of nuclear energy).

11. In the first phase technology is revolutionized, as characterized by an increasing rate of profit, accelerated self-expansion of previously idle capital and the accelerated devalorization of capital previously invested in now technologically-obsolete means of production. The second phase is characterized by retreating profits, slowly reducing accumulation, decelerating economic growth, gradually increasing difficulties in the valorization of the total accumulated capital, and the gradual, self-reproducing rise in idle capital. The actual transformation in productive technology has already occurred and has been generally adopted (Mandel, 1980:120-121).

12. The search for surplus-profits by monopolies is a consequence of their attempt to prevent or postpone the equalization of the rate of profit. They realize their limitations only in the long-run when such equalization cannot be prevented, and the monopoly rate of profit descends to the level of the average profit. The monopoly profit can only increase above the average profit if the monopolized sector controls but a relatively small area of production. Since expansion of the monopoly sector lessens the difference between monopoly profit and average profit, it is not in the monopolized sector's interest to assimilate all the sectors where "free competition" remains; it may actually be in monopolies' interest to create new nonmonopolized sectors, particularly if the accelerated accumulation of capital primarily occurred in the growth sectors that were the actual carriers of the expansive phase of late capitalism's long wave. Therefore, monopolies try to prevent or indefinitely postpone the equalization of the rate of profit by making difficult the inflow or outflow of capital from particular sectors of production (Mandel, 1980:536-537).


14. The contradictory nature of farm programs is demonstrated by the nature of the clientele they actually serve as opposed to the clientele they were designed to serve. Most United States Department of Agriculture commodity programs, while ostensibly designed to aid small farmers, have tended to disproportionately benefit large-scale farmers. Such benefit takes place at the expense of small-scale farmers (Schultze, 1971; Bonnen, 1968). Federal tax laws also disproportionately benefit large-scale farmers rather than small-scale farmers (McDonald in Vogeler, 1981:157). These commodity programs and tax laws simultaneously aid in the accumulation and legitimation process by providing nominal support to
small-scale farmers, even though some programs (e.g., the Farmers Home Administration, an agency explicitly designed to assist small-scale farmers) more often benefit large-scale farmers instead (United States Department of Agriculture, 1981b:121). Similarly, research and programs of the land-grant colleges, experiment stations, and the cooperative extension service share a bias toward large-scale producers (Vogeler, 1981).

15. The Farmers' Home Administration, and other agencies and programs designed to stabilize simple commodity production may all be described formally as "social expenses". The Farmers' Home Administration, the agricultural lender of last resort, had its origin in the Great Depression. Its primary purpose is to provide capital to small farmers who do not qualify for loans from other sources.

16. The research conducted by land-grant universities and the programs of the cooperative extension service may be described formally as "social capital/investment" programs. Historically, much of this research has facilitated technological advances in agriculture. Similarly, cooperative extension aids in the diffusion of these services to the users. Thus, state policy aids in the development of technical advances and the diffusion of these advances, leading to capital accumulation in industry (through the technological rents received from users) and to an increase in surplus-value extracted from simple commodity producers (a consequence of the technological rents paid).

17. The agricultural commodity programs of the United States Department of Agriculture (USDA) may be formally described as "social capital/consumption" programs; historically, these have subsidized farm incomes by providing farmers a guaranteed minimum market price for their commodities, thus fostering the reproduction of a competitive commodity production sector. Unfortunately, this assured market has led to chronic overproduction - caused in part by increases in productivity brought about by state-funded research. Such overproduction has caused supply to exceed demand, with the result of falling prices and continuing agricultural crises. Technically described, capitalist use-value demand fell below average profits, resulting in permanent loss of capital to commodity producers through the redistribution of the commodities's exchange-values. The Cooperative Farm Credit System is another example of social capital/investment expenditures in that it is a quasi-public agency which extends credit to farmers through member banks in situations where private capital is reluctant to do so; its lending agencies include local federal land banks and production credit associations.

18. Kautsky (1980:79) noted this reluctance of usury capital to expropriate direct producers from their lands in times of economic distress as long as the producers repaid the interest:

In the present conjuncture, with the profitability of agriculture declining as a result of world competition, and
the current stagnation and incipient decline of prices and rents, usury capital shows less and less interest in expropriating the indebted peasantry; if the property is auctioned, it stands to lose not only its interest but a part of its capital too. Far from hastening the process, it is therefore attempting to postpone it by granting arrears in payment and even advancing new loans — just as the worst landlords in England are compelled to grant arrears on the payment of rent, to lower rent rates and take on the costs of improvement. In a recent inquiry, the landowner Winklemann of Westphalia states: "many usurers in this part of the country are finding it more to their advantage to get the peasant to work for them and to take from him the whole produce of his labor excepting his subsistence, than to auction his property when the gains are uncertain."

19. In *The Development of Capitalism in Russia*, Lenin (1958) gave examples of vertical concentration in conditions under which it was more profitable for productive capital to invest in processing and manufacturing enterprises consuming commodities produced by peasants than to undertake the production of these commodities itself. Chayanov (1966), in the last chapter of his book *Peasant Farm Organization* called attention to the process of vertical concentration brought about by the intervention of trading capital in the conditions of production and by certain kinds of cooperatives. Bernstein (1979) cited examples of vertical concentration through state intervention, such as in the Tanzania villagization programs and other rural development schemes in African countries.

20. Marx (1967:436-437) discussed the role of credit in stock companies in *Capital*, Volume III: Chapter 27. Particularly interesting is his analysis of the transformation of a capitalist entrepreneur into a manager of capital:

... transformation of the actually functioning capitalist into a mere manager, administrator of other people's capital, and of the owner of capital into a mere owner, a mere money-capitalist. Even if the dividends which they receive include the interest and the profit of enterprise, i.e., the total profit (or the salary of the manager is, or should be, simply the wage of a specific type of skilled labour, whose price is regulated in the labour-market (like that of any other labor), this total profit is henceforth received only in the form of interest, i.e., as mere compensation for owning capital that now is entirely divorced from the function in the actual process of reproduction, just as this function in the person of the manager is divorced from ownership of capital.

21. Knutson et al., (1983:250) also noted that the state may assist in
transforming agriculture into a public utility:

In a public utility, government licenses production, establishes prices, and sets standards for service and performance as well as acceptable profit levels. Government could perform the identical function in agriculture. Specifically, it could decide who can produce what and how much, it could determine how land is used, provide credit to agriculture, allocate inputs used in production, and specify prices to be charged for inputs and paid for farm products.

22. In the Grundrisse, Marx (1973:279) stated that in its advanced stage, capital:

. . . regards the existence of landed property itself as a merely transitional development, which is required as an action of capital on the old relations of landed property, and a product of their decomposition; but which, as such - once this purpose is achieved - is merely a limitation on profit, not a necessary requirement for production. It thus endeavours to dissolve landed property as private property and to transfer it to the state. This is the negative side. Thus to transform the entire domestic society into capitalists and wage laborers . . . the negation (of landed property) from the side of capital is only a change of form, towards its undivided rule. (Ground rent is the universal state rent (state tax), so that bourgeois society reproduces the medieval system in a new way, but as the latter's total negation).
SECTION II:

COMBINED AND UNEVEN DEVELOPMENT

OF SIMPLE COMMODITY PRODUCTION

IN LATE CAPITALISM

Introduction

The recent concern with the changing structure of agriculture and its consequences for family farming as a form of simple commodity production (SCP) has led to a rapidly expanding body of research conducted by neo-Marxist researchers.

Havens notes "it is imperative to analyze these changes and develop the link between changes in agriculture and the broader political economy" (1982:311). Unfortunately, much of the analysis now in the literature is merely descriptive and rarely relates changes in the structure of agriculture to the larger political-economic context, particularly at the global level. Also, "the omission of a theoretical framework which integrates these levels or units of analysis convincingly, unifying the development of capitalism on a world scale with its varied course in different social formations, is the critical weakness of recent Marxist underdevelopment theory and the fundamental cause of its deep divisions" Goodman and Redclift note (1981:66).

This paper summarizes a theoretical perspective linking the dynamics of agricultural development to the capitalist world economy and demonstrates that the integration of agriculture into the world economy has resulted in its combined and uneven development.
Previous Studies

Buttel (1980) notes two major variants within contemporary Marxist political economy regarding the future of the family farm as a form of SCP. The first predicts that the inexorable forces of centralization and concentration of agricultural production will inevitably differentiate simple commodity producers into an agricultural bourgeoisie and a landless proletariat. The second predicts a continued, if marginal, existence for simple commodity producers. Neither of these predictions have yet been fully realized even within American agriculture.

Rodefeld (1978) notes that previous studies of agricultural change have been in near complete agreement when they found: (1) no decline in the levels of land and capital ownership; (2) no decline in labor provision by farm managers; and (3) no decline in the status of "family-type" farms. However, Rodefeld notes that recently levels of farmland ownership, capital ownership, labor provision and business ownership by farm managers have all declined. In each case, farms with high levels of land ownership, capital ownership, labor provision, and business ownership have declined relative to farms with lower levels. Also, small-scale farms have declined substantially relative to large-scale farms, and both family and tenant-type farms have declined, relative to larger-than-family and industrial-type farms.

From 1959 to 1964, industrial-type farms experienced the greatest increase of all farm types in numbers and sales. This trend has continued so that today, although family-type farms account for a
numerical majority of farms, they do not account for a majority in either production or sales. Hence, there is today great heterogeneity and rapid differentiation within the family-farm sector, such that this sector's upper category participates in the tendency toward concentration of production while the lower category is disintegrating. In the latter category, the significance of off-farm employment as a source of income has increased rapidly.

Nikolitch (1972b) notes that while the absolute size of the farm work force has decreased substantially in the last thirty to forty years, there has been little or no change in: (1) its composition, (2) the relative significance of its elements, or (3) the relative proportions of farms employing low and high amounts of labor (Nikolitch, 1972a). Further examination of Nikolitch's data suggests other trends. Among them are a decline in short-term labor (seasonal help) and an increase in more permanent labor: that is, while the provision of labor by farmers, their families and short-term laborers (less than 75 days a year) has declined, the number of laborers employed for longer periods has increased. In addition, the employment of full-time laborers is becoming more concentrated.

Further, while few studies have been conducted at the level of concrete social formations, one study of family labor farms in New York state found a tendency toward the differentiation of SCP into two classes: an agricultural proletariat, and a capitalist class. Additionally, some family labor farmers were able to reproduce the relations of simple commodity production (Gillespie, 1981).
These data support neither the inevitability of capitalist development in agriculture nor the persistence of SCP, so the problem, then, becomes one of accounting for these contradictory trends. An alternative theory is needed that accounts for the gradual integration and transformation of SCP agriculture by capital and the lack of rapid differentiation within agriculture in order to explain the continued proportional dominance and ongoing differentiation of family farms.

A Revised Theoretical Perspective

The revised perspective views simple commodity producers' labor and means of production as being fully subsumed under capital and recognizes that, while appropriation of simple commodity producers' surplus-value occurs in relations of exchange, exploitation occurs in relations of production (Bernstein, 1977:72). The combined and uneven development of SCP agriculture may also be explained under this revised perspective on the basis of the law of value and the long waves of late capitalist development.8

The revised perspective views the production of surplus-value as occurring in relations of production and the appropriation of surplus-value as occurring in relations of exchange (Bernstein, 1979). The two processes of exploitation affecting simple commodity producers are (Chevalier, 1983): (1) the formal subsumption of commodified labor and the production of absolute surplus-value; and (2) the real subsumption of commodified labor and the production of relative surplus-value. The mechanisms of appropriation of simple commodity
producers' surplus-value include: (1) ground rent; (2) technological rents; and (3) unequal exchange.

The two processes of exploitation and the three mechanisms by which surplus-value is appropriated results in the "simple reproduction squeeze" (Bernstein, 1979:427). This term refers to those effects of commodity relations on the household economy of simple commodity producers' households. Briefly, it means that as production costs increase, returns to labor decrease. The causal forces of this "squeeze" include the exhaustion of both land and labor and the use of technological measures to combat it. Land is exhausted when it loses productivity through both mining and soil erosion; labor is exhausted through intensification of family labor involvement to the detriment of health. Technological measures used to combat these forces include the use of existing methods of cultivation and more expensive means of production, such as improved seeds, machinery, fertilizers, insecticides, and pesticides. Of course there is no guarantee that the return from this labor will be equal to the costs incurred, especially when deteriorating terms of exchange are considered.

Therefore, the objective effect of the "simple reproduction squeeze" is to intensify the labor of simple commodity producers' households, while maintaining or increasing the supply of commodities. Capital incurs no costs of management or supervision anywhere in the production process (Bernstein, 1979:429).

The two processes of exploitation of simple commodity producers and the three mechanisms of appropriation of their surplus-value are
articulated through the phases of the long wave of late capitalist development which results in the uneven and combined development of SCP agriculture (Mandel, 1980). The expansionary phase of the long wave is characterized by a temporary extension of capitalist activity in simple commodity production agriculture. In the stagnating phase which follows, in contrast, the range of capitalist activity in simple commodity production agriculture declines.

The state aids in this alternating expansion and contraction of simple commodity production agriculture through its agricultural programs and policies directed at capitalist and simple commodity producers (Bonanno and Ritter, 1983). State policy takes the form of aiding in the two contradictory functions of accumulation and legitimization (O'Conner, 1973). During the expansionary phase, state policy promotes the accumulation of capital and the extension of capitalist activity in agriculture. In the stagnating phase, however, state policy promotes the legitimation of the state and the stabilization of simple commodity production agriculture.

Late Capitalist Evolution of Simple Commodity Production

If the appropriation of simple commodity producers' surplus-value is central to an understanding of agrarian class relations (Braverman, 1974), then a model which includes more than just the appropriation of surplus-value from wage laborers is needed. Mooney (1983) has proposed such a model.
Mooney (1983:567) develops several criteria which form the basis of the development of a theoretical model of agrarian class structure. The first criterion is the status of producers on the labor market. The appropriation of surplus-value from direct producers through off-farm work indicates proletarianization. If the household is able to retain surplus-value from commodity production, pure SCP will be reproduced. The control of the labor power of others indicates transformation toward the CMP because a direct producer who exercises such control is nearer a capitalist class location to the extent that direct production is performed by hired labor. The second criterion is the extent of control that direct producers exercise over the physical means of production and investment decisions. The presence of such control indicates a pure SCP class location, but the lack of such control indicates a proletarianization process.

These processes are not perfectly coincident with class locations, giving rise to contradictory class locations (Wright, 1978). The concept of contradictory class location is a break from orthodox Marxist theory in that these locations may not be transitional but may have some degree of permanence in capitalist social formations. Under late capitalism, SCP has been differentiated into a tripartite class structure of rural semiproletarians, simple commodity producers, and semicapitalist producers. The class locations of the semiproletariat and of semicapitalist production are contradictory: semiproletarians are both laborers and direct producers; semicapitalists are both employers and direct producers. Simple commodity production may also be a
contradictory class location depending upon the extent of control that producers exercise over the physical means of production and investment and their amount of off-farm work.

This classification reformulates Lenin's typology (1958) of agrarian transformation in which a labor market is formed at the expense of the "middle peasants" to the benefit of the "rich peasants". However, as Bernstein (1977:69) noted, the classic typology describes a particular case or variant of the process, and not "its sole or necessary form of development". The typology of differentiation differs from the classic typology in that it requires neither the expropriation of direct producers by capital nor their real subsumption as free wage labor. Instead, the revised typology emphasizes large-scale, horizontal concentration of the means of production as well as the tendency toward vertical concentration and control of production.

Although the typology presents a static picture of agrarian structure, it has no discrete class boundaries. Instead, those farmers whose economic conditions place them at or near the rural semiproletariat or semicapitalist "boundaries" would fluctuate in and out of those classes according to the phases of the long wave of capitalist development. Of course, the same "class mobility" would also apply for the border areas of the other two classes.

This revised model takes account of the three essential elements of late capitalist agricultural development: (1) exploitation and commodification of both labor and the means of production (Chevalier, 1983); (2) the appropriation of surplus-value from simple commodity
producers; and (3) the combined and uneven development of SCP (Kautsky, 1980:71).

**Rural semiproletariat**

These producers cannot insure the needs for maintenance and reproduction of the household through simple commodity production alone; therefore, they have to sell their labor-power on a regular basis (Bernstein, 1977:67). This is their defining characteristic. But, because low wage levels do not permit their full proletarianization, they may retain a small farm that contributes to their subsistence which, in turn, reduces the wages paid by their employers. This group constitutes a rural proletariat or a rural labor reserve in the process of formation. It is in this context that Lenin (1958:179) warned against "too stereotyped an understanding of the theoretical proposition that capitalism requires the free, landless worker".

During the expansive phase of late capitalism's long wave, members of this group rely on the sale of their labor-power; their significance in numbers, land, and production decreases as their land is purchased or rented from them by simple commodity producers.

During the stagnating phase, the subsequent decline in employment opportunities in off-farm work causes rural semiproletarians to rely more on subsistence production than on the sale of their labor-power. This sector thus becomes a labor reserve; its significance in numbers, land and production increases as the rural semiproletarians rely more on subsistence production and the intensification of family labor.

To establish or enlarge their rural residences, rural
semiproletarians purchase or rent acreages from simple commodity producers or semicapitalist producers. Rural semiproletarians are concerned with providing for their subsistence needs rather than selling their commodities on the market, and also consider the labor involved in subsistence production as costing nothing; therefore, the relationship between the price of land and the sale of commodities is no longer relevant (Kautsky, 1980:70). Some members of the rural semiproletariat are former simple commodity producers recently forced out of SCP; these individuals may have sold their land, stock and machinery but retained their rural residence.

**Simple commodity producers**

The position of simple commodity producers, the middle category, is especially precarious; they are able to reproduce themselves through household production only in the most favorable circumstances (Lenin, 1958:182), and in many cases, cannot make ends meet without securing loans or seeking outside employment through the sale of their labor-power. Each crop failure forces more of them into the rural semiproletariat.

Hence, simple commodity producers, as a class, undergo regression or depeasantization. The former is defined as continued reproduction on an ever-declining base (Mollard in Denis, 1982:141), the latter as the wearing away of the middle members and the reinforcement of the extremes (Lenin, 1958:182). These processes take place in a manner consistent with the phases of the long wave of late capitalist development.

The source of regression varies by the phases of the long wave.
During the expansive phase, capitalism is extended into SCP, resulting in its horizontal concentration and centralization. The high-investment simple commodity producers obtain differential rents (Type II), which permit them to swallow the farms of their lower-investment neighbors. This high-investment expansion and mechanization is often financed through private or public financing.

Simple commodity producers who cannot reproduce their operation by commodity production resort to off-farm employment, part-time farming, and the sale of land, machinery or stock. When this occurs, they move towards rural semiproletarian status. The remainder, who can provide for their continued reproduction through commodity production, are then caught in the "simple reproduction squeeze" (Bernstein, 1979:427). They intensify the relations of production by increasing the use of family labor, exhaust the soil through intensive cultivation, further rationalize production through increased use of technology, and compete with semicapitalist producers for access to land (Kautsky, 1980:73).

This has the effect of increasing relative surplus-value while decreasing the wage equivalent value of commodities produced, and hence increasing the expense (and therefore, the indebtedness) required to produce them.

During the stagnating phase, capitalist activity in SCP agriculture declines, causing a decline in horizontal concentration and centralization, and an increase in vertical concentration and centralization. Thus, private and public funding for capitalist expansion in SCP decreases while public funding aimed at increasing the economic stability of SCP increases (Kautsky, 1980:64).
Those simple commodity producers who financed their expansion and mechanization beyond the ability of the farm to provide for their continued reproduction are forced out of production by the prevalent economic conditions of the stagnating phase. Their farms are then held by private or public lending agencies and are rented to other simple commodity producers or semicapitalist producers if the lending agencies are unable to sell the farms on the market.

Semicapitalist producers

Semicapitalist producers are not fully capitalist in that they use both hired and unpaid family labor. The hired labor force is usually tied to the rural semiproletariat. Semicapitalist producers are usually drawn from the upper stratum of the successful simple commodity producers.

Semicapitalist producers derive their power from their economic base, and they share that power with nonagricultural capitalists in controlling the state (deJanvry, 1981:113). This shared control of the state results in public services oriented toward the development of capitalism in agriculture through labor-saving technology and infrastructure investment. Semi-capitalist producers typically share ownership with public or private capital. Historically, they accumulated sufficient capital from public or private agencies to finance the extension of capitalist production.

They operate neither on the capitalist production principle of "maximization in the abstract" nor on the SCP principle of "maximization in the concrete"; they are primarily concerned with maintaining an income
or wage over and above operating expenses. In this respect, they are not comparable to capitalists receiving a profit or simple commodity producers maintaining a minimally-acceptable standard of living. This income or wage is included in the amount of the operating loans they receive from the lending agencies.

Because they are so heavily leveraged, public and private agencies are reluctant to discontinue financing them for fear they would never be repaid the interest on their investment (Kautsky, 1980:79). Therefore, these semicapitalist producers are usually refinanced, but not always to the previous level. During the expansive phase, public and private agencies willingly finance the extension of capitalist commodity production because the risk is relatively low. During the stagnating phase, public and private agencies are reluctant to finance the continued extension of capitalist commodity production because the risk is higher. The lending agencies are, of course, primarily concerned with maintaining the stability and security of their investments.

The tendency towards increased state financing of large-scale simple commodity producers and semicapitalist producers indicates a trend toward vertical concentration (Lenin, 1958). This occurs when a central state agency undertakes the coordination, standardization, and supervision of many commodity producers (Bernstein, 1977:70). According to Marx (1967:436-437), the use of credit by stock companies transformed capitalist entrepreneurs into managers of capital (Marx, 1967:436-437). The semicapitalist agricultural producer, however, is the manager of public rather than private capital, and the farm firm takes the form of a
Semicapitalist producers thus effectively become a managerial class holding title to the land only in the legal sense; economic ownership effectively resides with the public finance agency. This distinction between legal and economic ownership confirms Marx's (1973:279) view that in an advanced stage, capital regards private property as a hindrance to capitalist development and thus attempts to dissolve it in the effort to transfer ownership to the state. The interest paid on loans received by semicapitalist producers from the public finance agency thus becomes the universal state rent, or a new form of ground rent.

In summary, semicapitalist production undergoes periods of progressive concentration and centralization in both phases, but the rate and kind of centralization and concentration varies by the phase of the long wave. The rate is greater in the expansive phase than in the stagnating phase; however, the significance of semicapitalist production in land, production, and hired labor increases in both phases, thus confirming the central law of capitalist development.

Setting and Data

The era between 1959 and 1982 was selected for analysis because it spans parts of two different eras of agricultural development in the United States. Cochrane (1979) described the period from 1930 to 1970 as "The Era of Technological Revolution" and the years after 1970 as "The Era of Market Instability and Uncertainty". During the later part of the "Era of Technological Revolution" (1950-1970), American agriculture
underwent a great structural transformation.

These two "eras" correspond approximately with Mandel's (1980) analysis of the closing years of the expansive phase of late capitalism's long wave (1959-1967) and the beginning of the stagnating phase (1967-1982). If the law of combined and uneven development is valid, the contradictory tendencies of capitalist agricultural development should then be more apparent during the period of transition from the expansive to the stagnating phase of the long wave of late capitalist development.

Iowa was chosen for study because 98 percent of the farms in the state were classified as family farms (Nikolitch, 1962). Therefore, if the processes of late capitalist development occur as predicted by the law of combined and uneven development in an area where SCP agriculture predominates, one might generalize to other areas where similar conditions prevail. The quinquennial censuses of agriculture for Iowa for the years 1959 to 1982 provided the data for this analysis. Each census reports various characteristics by ten farm-size categories.

Measurement

Agrarian class structure

Farmers were separated into one of three classes based on examination of the percentage distribution of various farm structural characteristics over time and among the ten farm-size categories reported in the censuses. The natural breaking points in the percent distribution of number of farms, acres in farms, value of products sold, and farms with a full-time labor force appeared after the 10 to 49 acres
and 260-499 acres farm-size categories. Collapsing the ten farm-size
categories around these natural breaks provided three farm-size
categories: less than 50 acres, 50 to 499 acres, and 500 or more
acres. These categories correspond respectively to the rural
semiproletariat, simple commodity producers, and semicapitalist
producers. These size categories also have been used by other
researchers to describe the structure of Iowa agriculture (Lasley and
Goudy, 1982; 1984).

**Rural semiproletarianization**

Rural semiproletarians reproduce their operations through the sale
of their labor-power, their subsistence production, and their rental or
ownership of small tracts of land. These characteristics are indicated
by the percent of the total number of farms, acres in farms, value of
products sold, farms reporting 100 or more days off-farm work a year,
ownership, part ownership, and tenancy in the less than 50 acres
farm-size category.

**Regression of simple commodity production**

Regression refers to the "continued reproduction of simple commodity
production on an ever-declining base" and is indicated as the overall
decline in significance of SCP when measured in terms of the absolute
number of farms, production, acreage, and ownership. Under such
decreasing conditions, one should see an increase in part-time farming and
off-farm work, an increase the use of family labor, and an increased
rationalization of production through the use of technology.

All measures of "regression of SCP" were computed for the 50-499
The absolute decline in the significance of SCP is indicated by the percent decrease in the total number of farms, acres in farms, ownership, part-ownership, and tenancy of farms. Semiproletarianization is indicated by the percent and percent change of the total of the number of farms reporting 100 or more days off-farm work a year.

Concentration and centralization of semicapitalist production

"Centralization" refers to the union of different farms into a single farm. "Concentration" refers to the growth in value in each semicapitalist farm resulting from the processes of accumulation and competition which have eliminated smaller and weaker farms. Kautsky (1980) asserts that centralization precedes concentration, and is therefore impeded wherever owner operation prevails. The process of concentration cannot take place independently of centralization, he asserts (because land is a unique factor in agricultural production).

From this, it follows that centralization must take place either prior to or concurrent with concentration of assets. The indicators of centralization and concentration are computed for the 500 or more acres farm-size category. Centralization is indicated by an increase in the percent of the total number of farms; and concentration is indicated by an increase in the percent of the total value of products sold and of acres. The presence of full-time wage labor is discussed in more detail below.

All the measures of centralization and concentration are computed for the 500 or more acres farm-size category. Centralization is indicated by an increase in the percent of the total number of farms; and concentration is indicated by an increase in the percent of the total value of products sold and of acres. The presence of full-time wage labor is discussed in more detail below.
used to distinguish capitalist production from SCP (Mann and Dickinson, 1978). The increase in the employment of a full-time labor force is indicated by percent and change in percent of the total number of farms employing labor for 150 or more days a year.

Hypotheses

The hypotheses are designed to test whether Mandel's (1980) theory of combined and uneven development associated with late capitalism's long wave provides an accurate theoretical explanation of what has actually happened in SCP agriculture.

Many of the hypotheses are dualistic in character because the phases of late capitalism's long wave are inherently dualistic; i.e., the theory posits both expansive and stagnating phases of late capitalism's long wave. For this reason, all hypotheses are presented as simple assertions, sometimes in two parts which may be separately supported or not supported.

The year 1969 was chosen as the division between the expansive and stagnating phases of late capitalism's long wave. If the theory fits the data one should see a change of direction in patterns after this point. In other words, 1969 is seen as the crest of the long wave's expansive phase.

Hypotheses 1 through 3 examine rural semiproletarization. Hypotheses 4 through 6 examine the regression of simple commodity production. Hypotheses 7 through 9 examine concentration and centralization of semicapitalist production.
Rural semiproletarianization

1. a. A decrease will be evident in the percent of total farms, acres in farms, and value of products sold in the period 1959 to 1969.
   b. An increase will be evident in the percent of total farms, acres in farms, and value of products sold in the period 1969 to 1982.

2. a. A decrease will be evident in the percent of total ownership, part ownership, and tenancy in the period 1959 to 1969.
   b. An increase will be evident in the percent of total ownership, part ownership, and tenancy in the period 1969 to 1982.

3. a. A decrease will be evident in the percent of total farms reporting more than 100 days off-farm work in the period 1959 to 1969.
   b. An increase will be evident in the percent of total farms reporting more than 100 days off-farm work in the period 1969 to 1982.

Regression of simple commodity production

4. A decrease will be evident in the percent of total farms, acres in farms, and value of products sold for the period 1959 to 1982.

5. A decrease will be evident in the percent of total ownership, part ownership, and tenancy for the period 1959 to 1982.

6. a. An increase will be evident in the percent of total farms reporting 100 or more days off-farm work per year for the period 1959 to 1969.
   b. A decrease will be evident in the percent of total farms reporting 100 or more days off-farm work per year for the period

Concentration and centralization of semicapitalist production

7. An increase will be evident in the percent of the total number of farms, acres in farms, and value of products sold for the period 1959-1982.

8. An increase will be evident in the percent of total ownership, part ownership, and tenancy for the period 1959-1982.

9. a. An increase will be evident in the percent of farms employing labor 150 or more days per year for the period 1959-1969.

b. A decrease will be evident in the percent of farms employing labor 150 or more days per year for the period 1969-1982.

Discussion

The hypotheses were phrased so as to be either supported or not supported. Support required complete consistency with the hypothesis as stated. Nonsupport covered a broader range - i.e., in a nonsupported hypothesis, the data (a) did not support expectations, (b) partially supported expectations, (c) or were so mixed that no trend could be discovered, and therefore could be considered as neutral, i.e., the expectations were neither supported nor not supported.

Hypotheses 1 - 3: Rural semiproletarianization

Hypotheses 1 predicted an evident decrease in the percent of total farms, acres, and value of products sold for the first half of the period followed by an increase in the second half for farms of 50 acres or less. The percentages are reported in Tables 2.1 through 2.3 and shown in
Figures 2.1 through 2.3. These trends were generally supported. However, hypothesis 1(a) predicted a decrease in percent of the total number of farms, acres in farms, and value of products sold for the period 1959 to 1969. The acres in farms decreased by half, from 1.7 percent (1959) to 0.8 percent (1969). The value of products sold decreased slightly, from 2.1 percent (1959) to 1.9 percent (1969). However, the total number of farms in the size category remained relatively stable through 1969, fluctuating around 10 or 14 percent.

Because the percent of total number of farms remained stable through this period, hypothesis 1(a) was not supported - even though its prediction was solidly supported in terms of percent of total acreage and arguably supported in terms of percent of value of products sold.

Hypothesis 1(b) predicted an increase in percent in the total number of farms in this size category, an increase in percent in acreage, and an increase in percent in the value of products sold for the period 1969 to 1982.

The total number of farms increased from the 11 percent level of 1969 to 17.5 percent in 1982. Acres in farms held stable at the 0.8 percent level from 1969 to 1974, but increased after that to a 1.1 percent level in 1978 and 1982. The value of products sold increased from 1.9 percent in 1969 to 4.5 percent in 1982. Since all predicted increases were demonstrated, the hypothesis of a general increase for the second half of the period was supported.

For the entire period, then, the picture is this: the percent of total number of acres in farms for this size category dramatically
decreased through the expansive phase of the 1960s and then increased slightly, falling from 1.7 percent at the beginning of the period to 0.8 percent at the middle, rising to an apparently stable 1.1 percent at the end. Taken as a trend, this indicates a pattern of decreasing and then increasing percent of acreage in the smallest farms.

While the percent of total number of farms in this category remained relatively stable through the first half of the period (11 percent in 1969), it nearly doubled (to 17.5 percent) by 1982, indicating that during the stagnating phase of the long wave, more farmers were reduced to a semiproletarian status.

The slight drop in percent of value of products sold from 1959 to 1969 (2.1 percent to 1.9 percent) was followed by a sharp increase by 1982 (to 4.5 percent), indicating that during the stagnating phase, farmers in this size category increased the volume of their production by twice of what it was in the relatively stable period of expansion which preceded it.

By the end of the period, approximately twice as many farmers were working small plots which yielded a higher value of products sold. However, this value was still too small for economic self-sufficiency so the large numbers in this economically marginal category had to seek outside employment.

These data therefore provide some support for the proposition that the rural semiproletariat performs a labor reserve function which varies by the phases of the long wave of late capitalist development.

Hypothesis 2(a) predicted a decrease in the percent of total
ownership, part ownership, and tenancy for the period 1959 through 1969, followed by an increase in percent of total ownership, part ownership, and tenancy for the period 1969 to 1982 (2b). The percentages are reported in Tables 2.6 to 2.8 and Figures 2.16 to 2.24. Both parts of the hypothesis were supported.

In the period 1959 to 1969, the percent of total ownership of farms in this category dropped by slightly more than half (from 19.8 percent in 1959 to 8.6 percent in 1969). However, ownership increased dramatically by 1982, rising to 30.4 percent; this figure is nearly triple that of the 1969 level. It would appear that in the expansive phase of the 1960s, farmers in this size category sold their land to join the labor force, while in the more stagnant period of the 1970s, their labor-force participation declined, and they increased their subsistence production. An alternative explanation not addressed by the present study is that the dramatic increase in ownership in this category may be due to land purchase by hobby or retired farmers, the rural gentry, or land-intensive simple commodity or semicapitalist producers.

Part ownership decreased dramatically between 1959 and 1969 (falling from 3.4 percent to 0.6 percent), then increased just as dramatically between 1969 and 1982 (rising to 3.6 percent). It would appear that for every part owner in this category by 1969, six had moved out of this category altogether since 1959; it would also appear that for every part owner in 1969, there were six part owners in 1982. Again, it would appear that during the expansive phase, the owners of these small farms sold some of their land to join the labor force, while during the
stagnating phase, more farmers rented additional land to increase their subsistence production.

The anticipated decrease in percent of tenancy from 1959 through 1969 was supported, as was the anticipated increase in percent of tenancy from 1969 through 1982. The tenancy level in 1959 was 3.6 percent; in 1969, it was 2.4 percent; in 1982, it was 11.4 percent. Examining only the gross elements of this trend, tenancy tripled in percent between 1959 and 1982, and quadrupled between 1969 and 1982.

Taken together, the decrease in tenancy for these very small farms for the first half of the period, followed by the increase for the second, support the hypothesis completely and lends strong support to the proposition that the labor-reserve function of the rural semiproletariat varies with the phases of the long wave of late capitalist development.

The third hypothesis predicted (a) a decrease in percent of off-farm work (>100 days per year) for the expansive phase (1959-1969) followed by (b) an increase in percent of off-farm work for the stagnating phase (1969-1982). The percentages are reported in Table 2.4 and Figures 2.10 to 2.12. Both of the individual hypotheses were supported. During the expansive phase, off-farm work of 100 days or more per year decreased from 37.5 percent in 1959 to 12.7 percent in 1969. During the stagnating phase, it increased from 12.7 percent in 1969 to 39.8 percent in 1982, slightly higher than the 1959 level. The proposition of a rural labor-reserve function which varies according to the phases of late capitalism's long wave was supported.

The data as here presented suggest that ownership and off-farm work
provide a better descriptive measure of rural semiproletarianization than does size or scale of operation. Generally, the data support the proposition that the rural semiproletariat serves a labor-reserve function which varies according to the phases of the long wave of late capitalist development.

A decrease was evident in the percent of total farms, acres in farms and value of products sold for the first half followed by an increase in these indicators for the second half. A decrease in percent of total ownership, part ownership, tenancy and off-farm work in the first half was followed by an increase of these indicators in the second half.

**Hypotheses 4 - 6: Regression of simple commodity production**

Those hypotheses predicting a general decrease in percent of the total number of farms, acres in farms, and value of products sold (4); and ownership, part ownership, and tenancy (5) for the entire period 1959 to 1982 were supported. Also, those hypotheses predicting an increase in percent of total off-farm employment for the first half of the period (6a) followed by a decrease in off-farm employment for the second half of the period (6b) were supported.

Hypothesis 4 predicted a decrease in the percent of total farms, acres in farms, and value of products sold in the 50 to 499 acres farm-size category. The percentages are reported in Tables 2.1 through 2.3 and shown in Figures 2.1 through 2.3. The hypothesis was supported. The percent of total number of farms decreased from 86.3 percent in 1959 to 66.9 percent in 1982. The percent of total acres decreased from 89.1 percent in 1959 to 55.1 percent in 1982. The percent of total value of
products sold held steady at 89 percent from 1959 to 1964, then dropped sharply to 53.3 percent in 1982. The overall decline in percent of total numbers of farms, acres in farms, and value of products sold supports completely the proposition of the regression of SCP through both phases of the late capitalism's long wave.

Hypothesis 5 posited a decrease in the percent of total ownership, part-ownership and tenancy for the entire period 1959 to 1982. The percentages are reported in Tables 2.6 through 2.8 and are shown in Figures 2.16 through 2.24. The hypothesis was supported. The percent of total ownership in 1959 was approximately 80 percent. It increased slightly (to 87.7) percent in 1969, after which it dropped sharply - to 63.5 percent in 1982. The percent of total part ownership increased slightly between 1959 and 1964 (from 84.3 percent to 85.9 percent) but decreased thereafter until it reached a 1982 level of 64.6 percent. The percent of total tenancy decreased from 94.5 percent in 1959 to 78 percent in 1982.

Thus, while there was a small increase in both percent of total ownership and part ownership for the expansive phase, there was an obvious and significant decrease in all tenure measures for the entire period. In summary, ownership declined by 25 percent between 1959 and 1982; part ownership declined by 20 percent; and tenancy declined by 17 percent.

The overall trends of the tenure measures thus offer strong support for the proposition of the continued regression of simple commodity producers through both phases of late capitalism's long wave.
Hypothesis 6 predicted (a) an increase in the percent of total farms reporting 100 or more days off-farm work for the period 1959 to 1969, followed by (b) a decrease in the percent of farms reporting the same amount of off-farm work for the period 1969 to 1982. The percentages are reported in Table 2.4 and shown in Figure 2.10 to 2.12. Both parts of the hypothesis were supported.

The first half of the period saw an increase from the 1959 level of 61.3 percent to the 1969 level of 84.1 percent, while the second half saw off-farm employment drop to 56.4 percent in 1982. One should note that the 1982 level is not only below the 1969 level but also below the 1959 level.

For this, there are several possible explanations. If the trend is taken as a measure of rural semiproletarianism, then it may be taken as lending support to the proposition that the regression of SCP occurs in accordance with the phases of late capitalism's long wave. The trend may also be considered as illustrative of the general decrease in percent of both total number of farms, acres in farms, value of products sold, ownership, part ownership, and tenancy over the entire period.

The regression of SCP was hypothesized to include three components: (1) A decline in the percent of total number of farms, acres in farms, and value of products sold; (2) A decline in percent of total ownership, part ownership, and tenancy; and (3) An increase in percent of total off-farm work within late capitalism's expansive phase, followed by a decrease in such labor within the stagnating phase.

In fact, all three of these components did occur in the SCP sector,
whereas they did not in the rural semiproletariat. The net effect has been the semiproletarianization of the SCP as dispossessed members of the SCP joined the labor reserve after a long decline in the numbers of farms, acres in farms, and value of products sold.

Interestingly, throughout the period 1959 through 1982, the rural semiproletariat gained in the total percent of the total number of farms, acres in farms, and value of products sold while the SCP sector lost in the percent of the total number of farms, acres in farms, and value of products sold. Although semiproletarians (having 50 acres of land or less) show an increase in percent of total farms, acres and sales over time, they are not relying on subsistence agriculture for their reproduction. Rather, they rely on the sale of their labor power as the percentage reporting off-farm work demonstrates.

Similarly, if the percent of total farms reporting 100 days or more off-farm work throughout the period remains relatively stable for the rural semiproletariat, it would appear that simple commodity producers (rather than the rural semiproletariat) form the group dependent upon agriculture for its reproduction.

This trend is further indicated by the general decrease in percent of total ownership, part ownership, and tenancy experienced by SCP over the entire period, as compared with the decrease in percent of total ownership, part ownership, and tenancy experienced by the rural semiproletariat in the 1960s and the increase which followed it.

Tenure measures for the rural semiproletariat all decreased sharply between 1959 and 1969, after which they all rose dramatically. In
conjunction with the apparent stability of percent of total off-farm work and the evident increase in percent of total value of products sold, tenancy, ownership, and part ownership one might conclude that these small farmers were not dependent upon subsistence agriculture, whereas their predecessors were.

This trend becomes interesting when compared with the tenure measures of SCP, wherein it appears that the percent of total ownership increased rapidly through the 1960s then decreased throughout the 1970s. In terms of ownership and tenancy, SCP appears to respond more immediately to the conditions in the general agricultural economy than does the rural semiproletariat.

While there are several measures which one might examine to determine agricultural class boundaries, the most important one is the degree to which a class appears dependent for its subsistence on production of agricultural commodities. SCP appears dependent for its subsistence on commodity production while the rural semiproletariat is not. This analysis indicates that the "class boundary" between the rural semiproletariat and SCP should be determined by the percent of off-farm work by farm-size category. If this measure is used to delineate "class boundaries", then the dividing line between the rural semiproletariat and SCP may be as high as 100 acres. Such an elevation of class boundaries would provide a demarcation above which farmers could reasonably be expected to depend upon commodity production as their primary means of reproduction and would - almost incidentally - demonstrate a substantial regression of SCP into the rural semiproletariat.
Hypotheses 7 - 9: Concentration and centralization of semicapitalist production

The anticipated increases in the percent of total farms, acres, and value of products sold, ownership, part ownership, tenancy, and employment of full-time labor throughout the period 1959 through 1982 were all supported.

Hypothesis 7 predicted an increase in the percent of total farms, acres in farms, and value of products sold of semicapitalist producers in the 500 acres or more category for the entire period 1959 to 1982. The percentages are reported in Tables 2.1. through 2.3 and shown in Figures 2.1 through 2.3. The hypothesis was supported.

The percent of the total number of large farms increased from 2.8 percent in 1959 to 15.6 percent in 1982 so it would appear that by the end of the period there were approximately five times as many large farmers as at the beginning.

The percent of total acres in farms and value of products sold increased almost as dramatically as did the percent of total number of large farms; total acreage in these farms grew from 9.8 percent in 1959 to 43.8 percent in 1982, and total value of products sold grew from 9.1 percent in 1959 to 42.2 percent in 1982. In each case, the multiple of growth is about 4.5, which appears reasonable in connection with the five-fold increase in the percent of total number of large farms. Thus, by the end of the period, approximately one-seventh of the farmers held approximately two-fifths of the land and value of products sold.

This dramatic increase over time in the percent of the total number
of farms, acres in farms, and value of products sold in this size category supports the proposition of the increasing concentration and centralization of semicapitalist production. When considered in view of the decrease in percent of total number of farms, acres in farms, and value of products sold experienced by simple commodity producers for the same period, it may be taken as further evidence of the regression of SCP.

Hypothesis 8 predicted an increase in the percent of total ownership, part ownership, and tenancy for the entire period 1959 to 1982. The percentages are reported in Tables 2.6 through 2.8 and shown in Figures 2.16 through 2.24. The hypothesis was supported.

The percent of ownership increased from 1.5 percent in 1959 to 6.1 percent in 1982, indicating that by the end of the period there were four times as many fully-owned large farms as at the beginning. There were also nearly five times as many part-owners (6.6 percent in 1959 and 31.8 percent in 1982) and tenants (2.0 percent in 1959 and 10.6 percent in 1982). The data indicate that the process of centralization and concentration of farms in semicapitalist production occurs through lease arrangements.

The growth in percent for the tenure measures over the period - a five-fold increase - is consistent with that for the growth in the percent of the number of farms and acres in farms. The land required for such expansive growth in semicapitalist production came from the decrease in the percent of farms and acres in farms in SCP.

Hypothesis 9 predicted an increase in percent of the number of farms
employing full-time labor (150 days or more a year) for the period 1959 to 1982. The percentages are reported in Table 2.5 and shown in Figures 2.13 to 2.15. Not surprisingly in view of the approximate four-fold increases in percent for both farms, acres, sales, ownership, part ownership, and tenancy throughout the period, the hypothesis was supported.

The percent of farms employing full-time labor more than doubled between 1959 and 1982, rising from a 1959 level of 17.7 percent to a 1974 high of 44.4 percent, after which it decreased to a 1978 level of 40.2 percent and increased slightly by 1982 to 41.1 percent.

These data support the proposition that the employment of full-time wage labor is becoming more concentrated in semicapitalist production. That the twofold employment increase is somewhat smaller than might be expected (given the fourfold increase in percent both in farms, acres, sales, ownership, part ownership, and tenancy) may be attributed to the higher level of mechanization to be expected in semicapitalist production. Given the present data, one might hypothesize that the full-time laborers came from the rural semiproletariat in the first half of the period and from SCP in the second. However, such an analysis is necessarily speculative.

Summary

Nine hypotheses, comprising fourteen assertions, were tested. Thirteen assertions were supported and one was not supported.

Although 1967 marks the turning point between the expansive and
stagnating phases of late capitalism's long wave, agriculture continued to perform a productive function through the early 1970s. A series of poor harvests in the early 1970s in the Soviet Union and Southeast Asian countries increased concern about a "World Food Crisis". These countries began to purchase grain on the world market to make up for their deficiencies. The United States increased its exports significantly and reduced its carryover stocks to very low levels. Importing countries and private handlers, fearing further supply reductions, began a wild scramble to acquire additional stocks, and grain prices increased dramatically. Government programs encouraged farmers to "plant fence row to fence row" in order to feed the world and meet the increasing export demand. Consequently, American farmers experienced two years of prosperity between 1972 and 1974. After 1975, however, world harvests improved and the world food crisis was over. As grain stocks began to accumulate again, grain prices fell sharply between 1975 and 1977 and returned to world market prices. The 1980 agricultural act continued to support prices below world market levels.

Another reason for the inexactness of predicting a general increase or decrease in percent prior to and after 1969 is that farmers cannot immediately respond to changes in the economy. They may take several years to respond to changes in the economy because of the nature of the composition of agricultural capital.

Fixed capital (constant capital in land, machinery and buildings) is relatively unresponsive to changes in the economy whereas circulating capital (constant capital in raw materials, energy and associated
products) and variable capital (capital used for purchase of labor power as well as the household's own labor power) are relatively more responsive to changes in the economy. One would therefore expect that simple commodity producers would respond to changes in the economy by varying the components of circulating capital and variable capital before changing the components of fixed capital.

Nevertheless, the support for thirteen of the fourteen assertions does provide support for the proposition that the proletarianization, regression, and concentration and centralization of simple commodity production does vary by the phases of the long wave of late capitalist development resulting in its combined and uneven development. Kautsky (Mottura and Pugliese, 1980:174-175) arrived at a similar conclusion in his analysis of German agriculture:

I have carried out research to see which of the two opinions might be true, and contrary to all expectations, I reached the conclusion that neither one was universally true and that we must not expect to find in agriculture either the end of the big enterprise or that of the small. We do find at one pole the universal tendency towards proletarianization, but we also find at the other pole a constant oscillation between the progress of the small enterprise and that of the large. In conformity with this I have likewise reached the conclusion that agriculture does not by itself produce the elements it needs to reach socialism. But agriculture independent of industry, be it peasant or capitalist farming, increasingly ceases to have a function in society. Industry dominates agriculture to the extent that industrial development increasingly determines the laws of agricultural development.
1. During the period 1949-1969, family farms (defined as farms using less than 1.5 man years of hired labor and operated by risk-taking managers) represented 95 percent of all farms and accounted for 62 percent of gross farm sales; also 75 percent of all farm labor was provided by the farmer and his family (Nikolitch, 1972a).

2. By one estimate, family farms accounted for 79 percent of all farms in 1964 and 49 percent of all sales. Both of these percentages would have been lower, however, if part-owners (owning less than half of the land in their farms) had been removed from the category (Rodefeld, 1978).

3. The upper category accounted for 25 percent of all farms and received 38 percent of all cash receipts in 1977; the lower category accounted for 70 percent of all farms and received 11 percent of the total cash receipts for the same period (Economics Research Service, 1978).

4. In 1978, 65 percent of the households in the lower family-farm category reported off-farm employment, with non-farm income accounting for 83 percent of the total net income. By comparison, in the upper family-farm category, the share of the nonfarm income in total net income was only 31 percent; it dropped to 20 percent in the six percent of large capitalist farms surveyed (Economics Research Service, 1978).

5. The percentage of hired farm workers in the agricultural work force was 20 to 22 percent in 1948-1952, 24 to 27 percent in 1953-1973, and 30 percent in 1974-1977 (Goss et al., 1980).

6. The percentage of full-time (more than 150 days) hired workers in the agricultural work force increased from 20 percent (1968-1970) to 23 percent (1974-1976). The percentage of the total agricultural wage work rose from 66 percent (1968-1970) to 68 percent (1975) (Goss et al., 1980).

7. Although the number of total and full-time workers has increased since 1970, the number and percentage of farms employing full-time laborers decreased from 1964-1974 (Goss et al., 1980).

8. The reader should refer to Section I for a more explicit elaboration of the revised theory.

9. In The Development of Capitalism in Russia, Lenin (1958) gave examples of vertical concentration under conditions which made it more profitable for productive capital to invest in processing and manufacturing enterprises than to undertake the production task itself. In the last chapter of his book, Peasant Farm Organization, Chayanov (1966) also called attention to the process of vertical concentration,
brought about by the intervention of trading capital both in the conditions of production and in certain kinds of cooperatives. Bernstein (1979) cited examples of vertical concentration through state intervention, such as in the Tanzania villagization programs and other rural development schemes in African countries.

10. In 1959, the Cooperative Farm Credit System held 15.5 percent of outstanding farm debt (excluding Commodity Credit Corporation loans) while the Farmers Home Administration held 4.7 percent. By contrast, in 1982 the Cooperative Farm Credit System held 33.8 percent of all outstanding farm debt while the Farmers Home Administration held another 11.4 percent (Federal Reserve System, 1984).

11. Data by farm-size categories for all the variables used in this analysis were not available before 1959.

12. Gillespie (1981:38) includes among the problems of using census data the following:

... (1) definitions, categories used in analysis, and the analyses themselves are not consistent through successive censuses, all of which add an element of ambiguity of interpretation; (2) the questions asked varied among censuses, sometimes to better reflect changing conditions, but rendering interpretation problematic; (3) respondents to the census questionnaires can be expected to not have interpreted the census questions in the same way; (4) respondents may have dissembled on some of the questions because they wished to conceal certain facts from local census takers whose confidentiality they doubted, or to embellish on facts to make a good impression on local census takers; (5) respondents may not have known the answers to all the questions, especially if they were not the operator, but rather were the wife or other member of the operator's family, landlord, hired laborer, neighbor, or other, which were indicated as possible respondents in a block at the end of the questionnaire of the 1964 and other censuses.

Despite these problems, however, the censuses are the best available source of longitudinal data.

13. Before the 1974 agricultural census, a farm was defined as "any place with less than 10 acres from which $250 or more of agricultural products were sold or normally would have been sold during the census year, or any place of 10 acres of more from which $50 or more of agricultural products were sold or normally would have been sold during the census year". The 1974 agricultural census and those following have defined a farm as "any place from which $1000 or more of agricultural products were sold, or normally would have been sold, during the census year".
14. Pointing out the problems inherent in measuring the development of capitalism in agriculture either by farm size or the number and importance of large farms, when judged by their total acreage, Lenin (1934:12) noted that they are only indirect indications; farm size does not always indicate that the farm is really big (as an economic enterprise) or does it give any direct indication as to its capitalist nature. Ideally, one would obtain a better indication of the state of capitalist agricultural development by comparing sales data across censuses. This approach would provide measures of semi-proletarianization, regression, and concentration/centralization by sales classes. Unfortunately, agricultural sales classes are not comparable: inflation across years deflates the significance of some sales classes and increases the significance of others. Additionally, data for measures of semi-proletarianization, regression, and concentration/centralization were not available by sales classes.
Table 2.1  Percent distribution of farms by farm size categories

<table>
<thead>
<tr>
<th>Farm-Size Categories</th>
<th>1959&lt;sup&gt;a&lt;/sup&gt;</th>
<th>1964&lt;sup&gt;b&lt;/sup&gt;</th>
<th>1969&lt;sup&gt;c&lt;/sup&gt;</th>
<th>1974&lt;sup&gt;d&lt;/sup&gt;</th>
<th>1978&lt;sup&gt;e&lt;/sup&gt;</th>
<th>1982&lt;sup&gt;f&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 acres</td>
<td>11.0</td>
<td>9.8</td>
<td>10.8</td>
<td>11.8</td>
<td>16.9</td>
<td>17.5</td>
</tr>
<tr>
<td>50-499 acres</td>
<td>86.3</td>
<td>85.3</td>
<td>81.4</td>
<td>76.8</td>
<td>70.0</td>
<td>66.9</td>
</tr>
<tr>
<td>500+ acres</td>
<td>2.8</td>
<td>4.8</td>
<td>7.7</td>
<td>11.3</td>
<td>13.1</td>
<td>15.6</td>
</tr>
<tr>
<td>Total</td>
<td>176,681</td>
<td>157,153</td>
<td>140,354</td>
<td>126,016</td>
<td>126,454</td>
<td>115,369</td>
</tr>
</tbody>
</table>

<sup>a</sup>1954 Census of Agriculture, Volume I, Part 16, Iowa. State Table 2. Also in Tables 2.2 - 2.8.<n>  
<sup>b</sup>1959 Census of Agriculture, Volume I, Part 16, Iowa. Chapter A, Table 20. Also in Tables 2.2 - 2.8.<n>  
<sup>c</sup>1964 Census of Agriculture, Volume I, Part 16, Iowa. State Table 20. Also in Tables 2.2 - 2.8.<n>  
<sup>d</sup>1969 Census of Agriculture, Volume I, Part 16, Iowa. Chapter 1, Table 26 (Farms with more than $2,500 sales). Also in Tables 2.2 - 2.8.<n>  
<sup>e</sup>1974 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 30 (Farms with more than $2,500 sales). Also in Tables 2.2 - 2.8.<n>  
<sup>f</sup>1978 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 33. Also in Tables 2.2 - 2.8.
Table 2.2 Percent distribution of acres by farm-size categories

<table>
<thead>
<tr>
<th>Farm-Size Categories</th>
<th>1959(^a)</th>
<th>1964(^b)</th>
<th>1969(^c)</th>
<th>1974(^d)</th>
<th>1978(^e)</th>
<th>1982(^f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 acres</td>
<td>1.7</td>
<td>1.0</td>
<td>.8</td>
<td>.8</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>50-499 acres</td>
<td>88.9</td>
<td>83.5</td>
<td>76.0</td>
<td>66.8</td>
<td>60.8</td>
<td>55.1</td>
</tr>
<tr>
<td>500+ acres</td>
<td>9.8</td>
<td>15.7</td>
<td>23.0</td>
<td>32.3</td>
<td>35.8</td>
<td>43.8</td>
</tr>
<tr>
<td>Total</td>
<td>33,898,181</td>
<td>33,758,321</td>
<td>33,569,629</td>
<td>33,044,768</td>
<td>33,580,851</td>
<td>32,589,554</td>
</tr>
</tbody>
</table>

Table 2.3 Percent distribution of sales by farm-size categories

<table>
<thead>
<tr>
<th>Farm-Size Categories</th>
<th>1959(^a)</th>
<th>1964(^b)</th>
<th>1969(^c)</th>
<th>1974(^d)</th>
<th>1978(^e)</th>
<th>1982(^f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 acres</td>
<td>2.1</td>
<td>2.0</td>
<td>1.9</td>
<td>2.5</td>
<td>4.2</td>
<td>4.5</td>
</tr>
<tr>
<td>50-499 acres</td>
<td>88.8</td>
<td>89.1</td>
<td>74.8</td>
<td>65.3</td>
<td>59.3</td>
<td>53.3</td>
</tr>
<tr>
<td>500+ acres</td>
<td>9.1</td>
<td>16.2</td>
<td>23.3</td>
<td>32.2</td>
<td>36.5</td>
<td>42.2</td>
</tr>
<tr>
<td>Total</td>
<td>2,603,154</td>
<td>2,793,881</td>
<td>3,310,408</td>
<td>4,266,931</td>
<td>4,200,316</td>
<td>3,398,820</td>
</tr>
</tbody>
</table>
Table 2.4 Percent distribution of farms reporting 100+ days off-farm work by farm size categories

<table>
<thead>
<tr>
<th>Farm-Size Categories</th>
<th>1959(^a) %</th>
<th>1964(^b) %</th>
<th>1969(^c) %</th>
<th>1974(^d) %</th>
<th>1978(^e) %</th>
<th>1982(^f) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 acres</td>
<td>37.5</td>
<td>29.2</td>
<td>12.7</td>
<td>17.5</td>
<td>38.9</td>
<td>39.8</td>
</tr>
<tr>
<td>50-499 acres</td>
<td>61.3</td>
<td>69.0</td>
<td>84.1</td>
<td>79.4</td>
<td>58.2</td>
<td>56.4</td>
</tr>
<tr>
<td>500+ acres</td>
<td>1.3</td>
<td>1.7</td>
<td>3.4</td>
<td>3.0</td>
<td>2.8</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>23,456</td>
<td>25,414</td>
<td>21,741</td>
<td>19,627</td>
<td>35,137</td>
<td>32,066</td>
</tr>
</tbody>
</table>

Table 2.5 Percent distribution of farms employing laborers 150+ days by farm size categories

<table>
<thead>
<tr>
<th>Farm-Size Categories</th>
<th>1959(^a) %</th>
<th>1964(^b) %</th>
<th>1969(^c) %</th>
<th>1974(^d) %</th>
<th>1978(^e) %</th>
<th>1982(^f) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 acres</td>
<td>2.4</td>
<td>1.5</td>
<td>2.4</td>
<td>2.8</td>
<td>4.1</td>
<td>5.3</td>
</tr>
<tr>
<td>50-499 acres</td>
<td>79.8</td>
<td>72.5</td>
<td>59.0</td>
<td>52.8</td>
<td>55.7</td>
<td>53.6</td>
</tr>
<tr>
<td>500+ acres</td>
<td>17.7</td>
<td>26.0</td>
<td>38.6</td>
<td>44.4</td>
<td>40.2</td>
<td>41.1</td>
</tr>
<tr>
<td>Total</td>
<td>13,319</td>
<td>14,249</td>
<td>8,847</td>
<td>10,053</td>
<td>14,637</td>
<td>14,647</td>
</tr>
</tbody>
</table>
Table 2.6 Percent of distribution of ownership by farm-size categories

<table>
<thead>
<tr>
<th>Farm-Size Categories</th>
<th>1959&lt;sup&gt;a&lt;/sup&gt; %</th>
<th>1964&lt;sup&gt;b&lt;/sup&gt; %</th>
<th>1969&lt;sup&gt;c&lt;/sup&gt; %</th>
<th>1974&lt;sup&gt;d&lt;/sup&gt; %</th>
<th>1978&lt;sup&gt;e&lt;/sup&gt; %</th>
<th>1982&lt;sup&gt;f&lt;/sup&gt; %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 acres</td>
<td>19.8</td>
<td>18.4</td>
<td>8.6</td>
<td>13.7</td>
<td>28.6</td>
<td>30.4</td>
</tr>
<tr>
<td>50-499 acres</td>
<td>78.8</td>
<td>79.6</td>
<td>87.7</td>
<td>81.7</td>
<td>67.0</td>
<td>63.5</td>
</tr>
<tr>
<td>500+ acres</td>
<td>1.5</td>
<td>2.0</td>
<td>3.7</td>
<td>4.6</td>
<td>4.4</td>
<td>6.1</td>
</tr>
<tr>
<td>Total</td>
<td>79,677</td>
<td>69,981</td>
<td>57,102</td>
<td>56,178</td>
<td>58,775</td>
<td>52,907</td>
</tr>
</tbody>
</table>

Table 2.7 Percent of distribution of part-ownership by farm-size categories

<table>
<thead>
<tr>
<th>Farm-Size Categories</th>
<th>1959&lt;sup&gt;g&lt;/sup&gt; %</th>
<th>1964&lt;sup&gt;b&lt;/sup&gt; %</th>
<th>1969&lt;sup&gt;c&lt;/sup&gt; %</th>
<th>1974&lt;sup&gt;d&lt;/sup&gt; %</th>
<th>1978&lt;sup&gt;e&lt;/sup&gt; %</th>
<th>1982&lt;sup&gt;f&lt;/sup&gt; %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 acres</td>
<td>3.4</td>
<td>2.3</td>
<td>.6</td>
<td>1.4</td>
<td>3.1</td>
<td>3.6</td>
</tr>
<tr>
<td>50-499 acres</td>
<td>84.3</td>
<td>85.9</td>
<td>80.4</td>
<td>72.6</td>
<td>68.2</td>
<td>64.6</td>
</tr>
<tr>
<td>500+ acres</td>
<td>6.6</td>
<td>11.8</td>
<td>19.0</td>
<td>26.0</td>
<td>28.8</td>
<td>31.8</td>
</tr>
<tr>
<td>Total</td>
<td>35,546</td>
<td>34,853</td>
<td>34,347</td>
<td>35,834</td>
<td>39,532</td>
<td>38,418</td>
</tr>
</tbody>
</table>
Table 2.8 Percent of distribution of tenancy by farm-size categories

<table>
<thead>
<tr>
<th>Farm-Size Categories</th>
<th>1959&lt;sup&gt;a&lt;/sup&gt;</th>
<th>1964&lt;sup&gt;b&lt;/sup&gt;</th>
<th>1969&lt;sup&gt;c&lt;/sup&gt;</th>
<th>1974&lt;sup&gt;d&lt;/sup&gt;</th>
<th>1978&lt;sup&gt;e&lt;/sup&gt;</th>
<th>1982&lt;sup&gt;f&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 acres</td>
<td>3.5</td>
<td>3.6</td>
<td>2.4</td>
<td>4.7</td>
<td>11.8</td>
<td>11.4</td>
</tr>
<tr>
<td>50-499 acres</td>
<td>94.5</td>
<td>92.5</td>
<td>90.8</td>
<td>85.8</td>
<td>79.1</td>
<td>78.0</td>
</tr>
<tr>
<td>500+ acres</td>
<td>2.0</td>
<td>3.9</td>
<td>6.9</td>
<td>9.7</td>
<td>9.4</td>
<td>10.6</td>
</tr>
<tr>
<td>Total</td>
<td>61,071</td>
<td>48,823</td>
<td>32,046</td>
<td>25,063</td>
<td>28,073</td>
<td>24,044</td>
</tr>
</tbody>
</table>
Figure 2.1 Numbers

Figure 2.2 Numbers

Figure 2.3 Numbers
Figure 2.4 Acres

Figure 2.5 Acres

Figure 2.6 Acres
Figure 2.7 Sales

Figure 2.8 Sales

Figure 2.9 Sales
Figure 2.10 Off-farm work

Figure 2.11 Off-farm work

Figure 2.12 Off-farm work
Figure 2.13 Full-time work

Figure 2.14 Full-time work

Figure 2.15 Full-time work
Figure 2.16 Ownership

Figure 2.17 Ownership

Figure 2.18 Ownership
Figure 2.19 Part-ownership

Figure 2.20 Part-ownership

Figure 2.21 Part-ownership
Figure 2.22 Tenancy

Figure 2.23 Tenancy

Figure 2.24 Tenancy
SECTION III:
THE FUTURE EVOLUTION OF SIMPLE COMMODITY PRODUCTION
IN LATE CAPITALISM:
AN APPLICATION OF A MARKOV CHAIN MODEL

Introduction

"Iowa's family farms are an endangered species" declared George Antham in *The Des Moines Register* (January, 10, 1982). This dismal headline was based upon a USDA report (McDonald and Coffman, 1980) that predicted the number of U.S. farms would decrease by 33 percent by the year 2000. The report also predicted that the number of large farms ($>100,000 in sales) would quadruple; however, the number of medium-size farms ($20,000 - $100,000 in sales) would continue to decline, and the numerical predominance of small farms ($<20,000 in sales) would diminish substantially. The number of small farms and large farms were predicted to be nearly equal resulting in a bimodal distribution; both are predicted to outnumber the middle-sized farms.

The report indicated that family farms will continue to dominate; however, the significance in terms of sales volume of small farms will decrease while the significance of large farms will increase. While many of the large farms probably will be corporations, most of these will most likely remain family-labor farms. The report's authors found the family farm organization was sound and would probably survive with some changes.

Even though most studies of the future distribution of farms by farm-size categories have been conducted at the national level, national
studies do not account for the diversity of farming enterprises across the country. Therefore, studies need to be conducted at the state level, especially in states where family farming is predominant, to determine if the national predictions are valid. The purpose of this paper is to predict the future distribution of Iowa farms among three size categories to the year 2000 using a discrete-time, stationary Markov chain model.

A Revised Perspective of Simple Commodity Production

Family farming usually has been considered a form of simple commodity production (SCP) left untouched by capitalist development. Under this perspective, the family farmer is considered an independent producer owning both the means of production and the product of his labor. However, all SCP forms are transitional according to Marx's theory of capitalist development, which sees them as organizational residues of a former stage. Eventually, the family farm will be replaced by capitalist forms of production based upon the hired employment of landless laborers, Marx's theory argues. Therefore, the persistence of family farming within advanced capitalism has presented a problem for a Marxian analysis of agricultural development.

Buttel (1980) notes that there are two major variants within contemporary Marxist political economy regarding the future of SCP. The first variant predicts that the inexorable forces of centralization and concentration of agricultural production will inevitably differentiate SCP into an agricultural bourgeoisie and a landless proletariat. The
second predicts a continued, if marginal, existence for SCP. The problem then, is in accounting for these contradictory predictions - the continued dominance and the ongoing differentiation of family farms. A revised perspective is needed that accounts for these contradictory predictions.

This revised perspective views simple commodity producers' labor and means of production as being fully subsumed under capital and explains the uneven and combined development of SCP on the basis of the phases of the long wave of late capitalist development (Mandel, 1980). This perspective views the production of surplus-value as occurring in relations of production and the appropriation of surplus-value as occurring in relations of exchange. The two processes of exploitation of simple commodity producers are (Chevalier, 1983): (1) the formal subsumption of commodified labor and the production of absolute surplus-value; and (2) the real subsumption of commodified labor and the production of relative surplus-value. The mechanisms of appropriation of simple commodity producers' surplus-value include: (1) ground rent; (2) technological rents; and (3) unequal exchange.

The outcome of the two processes of exploitation of simple commodity producers and the three mechanisms of appropriation of their surplus-value is the "simple reproduction squeeze" (Bernstein, 1979:427). It refers to those effects of commodity relations on the economy of simple commodity producers households. Briefly, it can be summarized by increasing costs of production with decreasing returns to labor. The objective effect of the "simple reproduction squeeze" is to intensify the
labor of simple commodity producers' households to maintain or increase
the supply of commodities without capital incurring any costs of
management or supervision of the production process (Bernstein,
1979:429).

The two processes of exploitation of simple commodity producers and
the three mechanisms of appropriation of their surplus-value are
articulated through the phases of the long wave of late capitalist
development resulting in the combined and uneven development of
agriculture (Mandel, 1980). The expansive phase of late capitalism's
long wave is characterized by a temporary extension of capitalist
activity in SCP agriculture. In the stagnating phase which follows, the
range of capitalist activity in SCP agriculture declines.

The state aids in this alternating expansion and contraction of SCP
agriculture through its agricultural programs and policies directed at
capitalist and simple commodity producers (Bonnano and Ritter, 1983).
State policy takes the form of aiding in two contradictory functions of
accumulation and legitimation (O'Connor, 1973). In the expansive phase
of late capitalism's long wave, state policy promotes the accumulation of
capital and the extension of capitalist activity in agriculture. In the
stagnating phase, however, state policy promotes the legitimation of the
state and the stabilization of SCP agriculture.
Late Capitalist Evolution of Simple Commodity Production

If the appropriation of simple commodity producers' surplus-value is central to an understanding of agrarian class relations (Braverman, 1974), then a model which includes more than just the appropriation of surplus-value from wage laborers is needed. Mooney (1983) has proposed such a model.

Mooney (1983:567) develops several criteria which form the basis of the development of a theoretical model of agrarian class structure. The first criterion is the status of producers on the labor market. The appropriation of surplus-value from direct producers through off-farm work indicates proletarianization. If the household is able to retain surplus-value from commodity production, pure SCP will be reproduced. The control of the labor power of others indicates transformation toward the CMP because a direct producer who exercises such control is nearer a capitalist class location to the extent that direct production is performed by hired labor. The second criterion is the extent of control that direct producers exercise over the physical means of production and investment decisions. The presence of such control indicates a pure SCP class location, but the lack of such control indicates a proletarianization process.

These processes are not perfectly coincident with class locations, giving rise to contradictory class locations (Wright, 1978). The concept of contradictory class location is a break from orthodox Marxist theory.
in that these locations may not be transitional but may have some degree of permanence in capitalist social formations. Under late capitalism, SCP has been differentiated into a tripartite class structure of rural semiproletarians, simple commodity producers, and semicapitalist producers. The class locations of the semiproletariat and of semicapitalist production are contradictory: semiproletarians are both laborers and direct producers; semicapitalists are both employers and direct producers. Simple commodity production may also be a contradictory class location depending upon the extent of control that producers exercise over the physical means of production and investment and their amount of off-farm work.

This classification reformulates Lenin's typology (1958) of agrarian transformation in which a labor market is formed at the expense of the "middle peasants" to benefit of the "rich peasants". However, as Bernstein (1977:69) noted, the classic typology describes a particular case or variant of the process, and not "its sole or necessary form of development". The typology of differentiation differs from the classic typology in that it requires neither the expropriation of direct producers by capital nor their real subsumption as free wage labor. Instead, the revised typology emphasizes large-scale, horizontal concentration of the means of production as well as the tendency toward vertical concentration and control of production.

Although the typology presents a static picture of agrarian structure, it has no discrete class boundaries. Instead, those producers whose economic conditions place them at or near the rural semiproletariat
or semicapitalist "boundaries" would fluctuate in and out of those classes according to the phases of the long wave of capitalist development. Of course, the same "class mobility" would also apply for the border areas of the other two classes.

This revised model takes account of the three essential elements of late capitalist agricultural development: (1) exploitation and commodification of both labor and the means of production (Chevalier, 1983); the appropriation of surplus-value from simple commodity producers; and (3) the combined and uneven development of SCP (Kautsky, 1980:71).

Rural semiproletariat

These producers cannot insure the needs for maintenance and reproduction of the household through simple commodity production alone; therefore, they have to sell their labor-power on a regular basis (Bernstein, 1977:67). This is their defining characteristic. But, because low wage levels do not permit their full proletarianization, they may retain a small farm that contributes to their subsistence which, in turn, reduces the wages paid by their employers. This group constitutes a rural proletariat or a rural labor reserve in the process of formation. It is in this context that Lenin (1958:179) warned against "too stereotyped an understanding of the theoretical proposition that capitalism requires the free, landless worker".

During the expansive phase of late capitalism's long wave, members of this group rely on the sale of their labor-power; their significance in numbers, land, and production decreases as their land is purchased or
rented from them by simple commodity producers.

During the stagnating phase, the subsequent decline in employment opportunities in off-farm work causes rural semiproletarians to rely more on subsistence production than on the sale of their labor-power. This sector thus becomes a labor reserve; its significance in numbers, land and production increases as rural semiproletarians rely more on subsistence production and intensification of family labor.

To establish or enlarge their rural residences, rural semiproletarians purchase or rent acreages from simple commodity or semicapitalist producers. Rural semiproletarians are concerned with providing for their subsistence needs rather than selling their commodities on the market, and also consider the labor involved in subsistence production as costing nothing; therefore, the relationship between the price of land and the sale of commodities is no longer relevant (Kautsky, 1980:70). Some members of the rural semiproletariat are former simple commodity producers recently forced out of SCP; these individuals may have sold their land, stock and machinery but retained their rural residence.

**Simple commodity producers**

The position of simple commodity producers, the middle category, is especially precarious; they are able to reproduce themselves through household production only in the most favorable circumstances (Lenin, 1958:182), and in many cases, cannot make ends meet without securing loans or seeking outside employment through the sale of their labor-power. Each crop failure forces more of them into the rural
Hence, simple commodity producers, as a class, undergo regression or depeasantization. The former is defined as continued reproduction on an ever-declining base (Mollard in Denis, 1982:141), the latter as the wearing away of the middle members and the reinforcement of the extremes (Lenin, 1958:182). These processes take place in a manner consistent with the phases of the long wave of late capitalist development.

The source of regression varies by the phases of the long wave. During the expansive phase, capitalism is extended into SCP, resulting in its horizontal concentration and centralization. The high-investment simple commodity producers obtain differential rents (Type II), which permit them to swallow the farms of their lower-investment neighbors. This high-investment expansion and mechanization is often financed through private or public financing.

Simple commodity producers who cannot reproduce their operation by commodity production resort to off-farm employment, part-time farming, and the sale of land, machinery or stock. When this occurs, they move towards rural semiproletarian status. The remainder, who can provide for their continued reproduction through commodity production, are then caught in the "simple reproduction squeeze" (Bernstein, 1979:427). They intensify the relations of production by increasing the use of family labor, exhaust the soil through intensive cultivation, further rationalize production through increased use of technology, and compete with semicapitalist producers for access to land (Kautsky, 1980:73). This has the effect of increasing relative surplus-value while decreasing
the wage equivalent value of commodities produced, and hence increasing the expense (and therefore, the indebtedness) required to produce them.

During the stagnating phase, capitalist activity in SCP agriculture declines, causing a decline in horizontal concentration and centralization, and an increase in vertical concentration and centralization. Thus, private and public funding for capitalist expansion in SCP decreases while public funding aimed at increasing the economic stability of SCP increases (Kautsky, 1980:64).

Those simple commodity producers who financed their expansion and mechanization beyond the ability of the farm to provide for their continued reproduction are forced out of production by the prevalent economic conditions of the stagnating phase. Their farms are then held by private or public lending agencies and are rented to other simple commodity producers or semicapitalist producers if the lending agencies are unable to sell the farms on the market.

Semicapitalist producers

Semicapitalist producers are not fully capitalist in that they use both hired and unpaid family labor. The hired labor force is usually tied to the rural semiproletariat. Semicapitalist producers are usually drawn from the upper stratum of the successful simple commodity producers.

Semicapitalist producers derive their power from their economic base, and they share that power with nonagricultural capitalists in controlling the state (deJanvry, 1981:113). This shared control of the state results in public services oriented toward the development of
capitalism in agriculture through labor-saving technology and infrastructure investment. Semicapitalist producers typically share ownership with public or private capital. Historically, they accumulated sufficient capital from public or private agencies to finance the extension of capitalist production.

They operate neither on the capitalist production principle of "maximization in the abstract" nor on the SCP principle of "maximization in the concrete"; they are primarily concerned with maintaining an income or wage over and above operating expenses. In this respect, they are not comparable to capitalists receiving a profit or simple commodity producers maintaining a minimally-acceptable standard of living. This income or wage is included in the amount of the operating loans they receive from the lending agencies.

Because they are so heavily leveraged, public and private agencies are reluctant to discontinue financing them for fear they would never be repaid the interest on their investment (Kautsky, 1980:79). Therefore, these semicapitalist producers are usually refinanced, but not always to the previous level. During the expansive phase, however, public and private agencies willingly finance the extension of capitalist commodity production because the risk is relatively low. During the stagnating phase, public and private agencies are reluctant to finance the continued extension of capitalist commodity production because the risk is higher. The lending agencies are, of course, primarily concerned with maintaining the stability and security of their investments.

The tendency towards increased state financing of large-scale simple
commodity producers and semicapitalist producers indicates a trend toward vertical concentration (Lenin, 1958). This occurs when a central state agency undertakes the coordination, standardization, and supervision of many commodity producers (Bernstein, 1977:70). According to Marx (1967:436-437), the use of credit by stock companies transformed capitalist entrepreneurs into managers of capital (Marx, 1967:436-437). The semicapitalist agricultural producer, however, is the manager of public rather than private capital, and the farm firm takes the form of a public utility rather than a private stock company.

Semicapitalist producers thus effectively become a managerial class holding title to the land only in the legal sense; economic ownership effectively resides with the public finance agency. This distinction between legal and economic ownership confirms Marx's (1973:279) view that in an advanced stage, capital regards private property as a hindrance to capitalist development and thus attempts to dissolve it in the effort to transfer ownership to the state. The interest paid on loans received by semicapitalist producers from the public finance agency thus becomes the universal state rent, or a new form of ground rent.

In summary, semicapitalist production undergoes periods of progressive concentration and centralization, but the rate and kind of centralization and concentration varies by the phase of the long wave. The rate is greater in the expansive phase than in the stagnating phase; however, the significance of semicapitalist production in land, production, and hired labor increases in both phases, thus confirming the central law of capitalist development.
Propositions

Two alternative propositions are tested. The first takes the orthodox view and states that one should witness an increasing concentration of the number of farms in semicapitalist production together with a decrease of the number of farms in the other two categories. The process is assumed to be independent of political and economic forces. The second states that with the increasing concentration and centralization of the number of farms in semicapitalist production, one should witness the regression of the number of farms in simple commodity production, as well as an increase in the number of farms in the rural semiproletariart and that this should vary consistently with the phases of the long wave of late capitalist development. During the expansive phase, the processes of concentration and centralization and of proletarianization should increase. In contrast, during the stagnating phase the processes should decrease. Regression of simple commodity production continues in both phases.

Setting and Data

The period 1940 and 1982 spans two different eras of U.S. agricultural development; it was selected for analysis for this reason. Cochrane (1979) described the period from 1930 to 1970 as "The Era of Technological Revolution" and the years after 1970 as "The Era of Market Instability and Uncertainty". These two "eras" correspond approximately with Mandel's analysis of the expansive (1940-1967) and stagnating
(1967-1982) phases of the long wave of late capitalist development.

Iowa was chosen for study because 98 percent of the farms in the state were classified as family farms (Nikolitch, 1962). If the processes of late capitalist development occur as predicted by the law of combined and uneven development in an area where SCP agriculture predominates, one might generalize to other areas having similar conditions. The quinquennial censuses of agriculture for Iowa for the years 1940 to 1982 provided the data for this analysis. Each census reports various characteristics by ten farm-size categories.

Measurement

Long wave of late capitalist development

The period 1940-1969 is used to designate the expansive phase of the long wave, and the period 1969-1982 is used to designate the stagnating phase of the long wave.

Class structure

Farmers were separated into one of three classes based on examination of the percentage distribution of various farm structural characteristics over time and among the ten farm-size categories reported in the censuses. The natural breaks in the percent distribution of number of farms, acres in farms, value of products sold, and farms with a full-time labor force appeared after the 10 to 49 acres and the 260-499 acres farm-size categories. Collapsing the ten farm-size categories around these natural breaks provided three farm-size categories: less than 50 acres, 50 to 499 acres, and 500 or more acres. These size
categories correspond respectively to the rural semiproletariat, simple commodity producers, and semicapitalist producers. These size categories have been used by other researchers to describe the structure of Iowa agriculture (Lasley and Goudy, 1982; 1984).

**Rural semiproletariatization**

Rural semiproletarians reproduce their operations through the sale of their labor-power, their subsistence production, and their rental or ownership of small tracts of land. Semiproletarianization is indicated by the increase in the total number of farms in the less than 50 acres farm-size category.

**Regression of simple commodity production**

Regression refers to the "continued reproduction of simple commodity production on an ever-declining base" and is indicated as the overall decline in significance of SCP when measured by the overall decline of the absolute number of farms in the 50 to 499 acres farm-size category.

**Concentration and centralization of semicapitalist production**

"Centralization" refers to the unification of different farms into a single farm. "Concentration" refers to the growth in value in each semicapitalist farm resulting from the processes of accumulation and competition which have eliminated smaller and weaker farms. Kautsky (1980) asserts that centralization proceeds through tenure arrangements and is therefore impeded wherever owner operation prevails. The process of concentration cannot take place independently of centralization, he asserts (because land is a unique factor in agricultural production).

From this, it follows that centralization must take place either prior to
or concurrent with concentration of assets. Concentration and centralization are indicated by the increase in the percent of the total number of farms in the 500 or more acres farm-size category.

Markov Processes

Few researchers have attempted to forecast the distribution of firms by size classes. Adelman suggested that the forces determining the distribution of firm sizes within a particular industry are so varied and complex that any theoretical attempt to portray the effects of their interactions must of necessity be either drastically simplified, or else, hopelessly complicated. He also suggested that the movement of firms between size classes was a stochastic process which could be explained by one of a variety of Markov processes (Adelman, 1958:893).

A Markov process is defined as a stochastic process where the outcome of a given trial \((t, t+1, \ldots T)\) depends only on the outcome of the preceding trial \((t-1)\); this dependence is the same at all stages in the sequence of trials (Lee et al., 1965:743). The transition matrix "\(P\)" is common to all Markov processes. The elements of the transition matrix are the individual probabilities of moving from one state to another in the time period under examination.

The basic components of the Markov model are listed below (Hallberg, 1969:290):
(1) $P = \text{transition matrix}$

$$
\begin{pmatrix}
S_1 & S_2 & \cdots & S_n \\
S_1 & p_{11} & p_{12} & \cdots & p_{1n} \\
& p_{21} & p_{22} & \cdots & p_{2n} \\
\vdots & \vdots & \vdots & \ddots & \vdots \\
S_n & p_{n1} & p_{n2} & \cdots & p_{nn}
\end{pmatrix}
$$

where $S_{ij} = 1.0$ and $p_{ij} > 0$, for all $i$ and $j$.

(2) $r = \text{number of states. The transition matrix will be of size}$

$(r \times r)$.

(3) $p_{ij} = \text{probability of moving from state } i \text{ to state } j \text{ during a}$

time period.

(4) $X_0 = \text{vector of elements by states in the initial time period}.$

(5) $X_t = X_t$, the distribution of elements by states in time period

t.

The assumptions on which first order, stationary Markov models are

built are inherently restrictive: (1) the evolution of a firm through

size classes is a stochastic process; (2) the effects of the interactions

among the political-economic variables remain stationary throughout the

development process; and (3) the system is closed.

The first assumption means that the probability a firm will proceed

through a given number of size classes during a period depends only upon

its firm size at the beginning of the period and the number of firm sizes

involved, and it is independent of the previous history of the firm.

The development of a firm is seen as being probabilistic in nature with
the size of the firm at the beginning of the period as the only determinant of development (Lee et al., 1977:17). All the political-economic forces which determine the development of firms are thus reduced to a single variable - firm size. This amounts to the assumption that individual firm enterprise characteristics are all highly correlated with size, or that the magnitude and behavior of political-economic variables which induce development are more nearly homogeneous within a particular size category than they are from one size category to another.

The second assumption is that the effects of the interactions among the political-economic variables, which are summarized in a Markov chain model by size-dependent transition probabilities, are assumed to remain stationary throughout the development process (Adelman, 1958:894). Mandel (1980) has noted, however, that the political-economic forces which determine the development of firms, vary by the phase of the long wave of late capitalist development. One may expect, therefore, that the transition probabilities among firm-size classes would be more nearly stationary within the expansive and stagnating phases of late capitalism's long wave, but nonstationary from the expansive phase to the stagnating phase of the long wave.

The third assumption is that the system is closed; there is no exit or entry. This problem can be remedied by having an absorbing class that contains all the firms which have gone out of business since the initial starting period (Zumbach, 1980:103). By having a size class which collects all firms which have gone out of business, the model will always
account for the total number of firms in the initial period.

Only a few researchers have used Markov processes to estimate the number and size distribution of farms (Daly et al., 1972; Judge and Swanson, 1962; Krenz, 1964; Libbin, 1982; Linn et al., 1980; and Zumbach, 1980).

Traditional Markov analysis projects future farm numbers by multiplying the row vector of farm numbers in the initial period by the transition matrix which was constructed from actual farm numbers in the past. In order to estimate the transition matrix, it is necessary to have data which indicate the number of farms that move from one size category to another during each time period. Because the only data which are available are aggregate data that indicate the number of farms in a size category at the end of a period, an estimation technique is needed that will permit the estimation of transition probabilities from aggregate proportion data.

Most researchers have used variants or modifications of a Markov process (Krenz, 1964.; Lee et al., 1965; Zumbach, 1980). Some of the modifications are concerned with the estimation of a transition matrix which is a description of how farms move among size categories over time. Modifications are also necessary because of limited data describing the movement of farms from one time period to another. Lee, et al., (1977) developed a technique which can be used to estimate transition probabilities from aggregate proportion data in the situation where sample observations are not available. From the aggregate data, the proportion of elements in each state in each time period can be
determined. The observed proportions may be used as estimates of the farm-size probabilities at specified points in time.

Methodology

Since many factors may cause a firm's transition probabilities to change between the expansive and stagnating phases of late capitalism's long wave, it was not clear whether the assumptions of stationary Markov transition probabilities was reasonable. Therefore, two alternate hypotheses were proposed to test the assumption. These are stated below as:

1. The projected distribution of farms by size categories should closely approximate the actual distribution for the entire period (1940 to 1982).

2. (a) The projected distribution of farms by size category should closely approximate the actual distribution for the period 1940 to 1969.

   (b) The projected distribution of farms by size category should closely approximate the actual distribution for the period 1969 to 1982.

The first hypothesis assumes that the transition probabilities are stationary throughout the period. By implication it means that the transition probabilities are independent of political-economic trends of late capitalism's long wave. The second hypothesis assumes that the transition probabilities are stationary within each phase but vary between phases of the long wave of late capitalist development.
In considering the uncertainty of the assumed stationary transition probabilities and the hypotheses deriving from it, the analysis was conducted as described below:

(1) Estimates were computed for the elements of a stationary transition matrix, assuming a first-order, finite, discrete Markov process from aggregate data.

(2) The chi-square ($\chi^2$) coefficient then was used to determine if the estimated distribution was unusual. The chi-square goodness of fit test determines whether the observed proportions are "usual" or "unusual" outcomes, given the assumption that they are generated by a Markov process (Lee et al., 1977:140). If the outcomes seem quite unusual on the application of the chi-square test, one either may tentatively conclude that the data may not have been generated by a Markov process. The conclusion is tentative because the occurrence of an unusual event is possible, given that the assumed process is the one generating the data, and also because the chi-square test used does not stand in any simple relationship to measures of degree of confidence in the assumed model (Lee et al., 1977:142).

(3) The vector of farms-by-size category ($X_0$) for the initial time period ($t$) was then multiplied by the transition matrix ($P$) to obtain the projected distribution of farms by size categories ($X_t$) in time period $t+1$. The process was then repeated recursively until $X_t$ for each of the $T$ time periods was estimated.

(4) The Theil coefficient of inequality ($U$) was then used to
measure the deviations between the actual and projected distribution of farms by size categories. If the chi-square test did not conclusively indicate that the data may have been generated by a Markov process, the Theil Coefficient was used to measure the percentage error between actual and projected number of farms (Theil, 1966). The accuracy of projections is determined primarily by comparing actual numbers with projected numbers.

(5) To further indicate the degree of projection accuracy in each size category, the simple percentage differences between actual and projected numbers of a size category were also used.

(6) Distribution of farms by size categories was then estimated at five year intervals for the period 1982 to 2002, using the best prediction transition probability matrix.

**Analysis**

This section summarizes jointly the data for Hypothesis 1 and 2 (a) and (b), and discusses the results separately.

**Hypothesis 1**

The first hypothesis states that the projected distribution of farms by size categories should closely approximate the actual distribution of farms by size categories for the period 1940 to 1982. The estimated probability transition matrix for the 1940 to 1982 time period is presented in Table 3.1. The calculated chi-square value exceeded the tabulated chi-square value, suggesting that the observed proportions may not have been generated by a stationary Markov process. The actual and
projected distributions of farms by size classes for the 1940 to 1982 time period are presented in Table 3.4 and Figures 3.1 to 3.3.

The simple percentage differences between observed and projected numbers for the small-size category indicate that the projected numbers underestimated the actual numbers of farms by six to nine percent for the years 1945 to 1954, underestimated the actual numbers by twenty-two to twenty-five percent in the years 1978 to 1982, and overestimated by four to twenty percent for the years 1959 to 1974. In the mid-size category, the projected numbers underestimated the actual numbers by three to seven percent for the years 1945 to 1959 but overestimated the actual numbers by four to forty-one percent for the years 1964 to 1982. Projected numbers underestimated the actual numbers by fourteen to forty-nine percent in the large size category for the years 1945 to 1982.

The Theil coefficient indicated that the percentage error between the projected and actual number of farms increased from four to seven percent from 1945 to 1954, decreased to four percent in 1959, and increased to forty percent by 1982. On the basis of the chi-square test, the simple percentage differences, and the Theil coefficients, one may conclude that the data do not support the first hypothesis.

Hypothesis 2a

This hypothesis states that the projected distribution of farms by size categories should closely approximate the actual distribution of farms by size categories for the period 1940-1969. The estimated probability transition matrix for the 1940 to 1969 time period is presented in Table 3.2. The calculated chi-square value again exceeded
the tabulated chi-square value, suggesting that the observed proportions may not have been generated by a stationary Markov process.

The actual and projected distributions of farms by the three size categories are presented in Table 3.5 and Figures 3.1 to 3.3. The simple percentage differences between the observed and projected numbers in the small-size category indicated that the projected numbers underestimated the actual numbers by three percent for the years 1945 to 1950, overestimated by two to forty percent for the years 1954 to 1974, and underestimated by eleven to twelve percent for the years 1978 to 1982. In the mid-size category, the projected numbers underestimated actual numbers by two to four percent for the years 1945 to 1954, but the overestimates increased from two percent in 1959 to sixty percent in 1982. The projected estimates consistently underestimated the actual numbers in the large-size category by ten percent in 1945 to fifty-four percent in 1982.

The Theil coefficients increased from two percent in 1945 to fifty-eight percent in 1982. On the basis of the chi-square test, the simple percentage differences, and the Theil coefficients, one may conclude that the projected data do not support Hypothesis 2a.

**Hypothesis 2b**

This hypothesis states that the projected distribution of farms by size categories should closely approximate the actual distribution of farms by size categories for the period 1969 to 1982. The estimated probability transition matrix for the 1969 to 1982 time period is presented in Table 3.3. The calculated chi-square value exceeded the
tabulated chi-square value, therefore, one may tentatively conclude that the observed proportions may not have been generated by a stationary Markov process.

The actual and projected distributions of farms by the three size categories are presented in Table 3.6 and Figures 3.1 to 3.3. The simple percentage differences between observed and projected numbers of the small-size category indicate a small underestimation of the actual numbers of farms. In the mid-size category, the simple percentage differences indicated a slight underestimation for the years 1974 to 1978 and a slight overestimation for 1982. The simple percentage differences indicated a twelve percent underestimation in the large size category for 1974, exact estimation in 1978, and a small overestimation in 1982. The Theil coefficient indicated a small overestimation of two and three percent for the years 1974 and 1978 respectively and a one percent overestimation for 1982.

Discussion

The first hypothesis, which corresponds to the orthodox Marxist perspective, was not supported. An examination of the projected numbers of farms in the three size categories based upon the 1940-1982 transition probability matrix revealed substantial discrepancies with the actual number of farms. The Theil coefficients also demonstrated that the projected numbers of farms became increasingly inaccurate over time. When the actual number of farms for each size category was plotted over time, the trajectory revealed a nonlinear course of development contrary
to that predicted by the orthodox Marxist perspective.

The second hypothesis which corresponds to the course of SCP development associated with the long wave of late capitalist development, was proposed as an alternative to the orthodox Marxist perspective.

Hypothesis 2a, which corresponds to late capitalism's expansive phase, was not supported. The projected numbers of farms in the three size categories based upon the 1940-1969 transition probability matrix exhibited substantial discrepancies with the actual number of farms. The Theil coefficient also demonstrated that the projected number of farms became increasingly inaccurate over time.

Hypothesis 2b corresponds to the course of SCP development associated with the stagnating phase of late capitalism's long wave. The projected number of farms in the three size categories provided some support to the hypothesis. An examination of the simple percentage differences, as well as the Theil coefficients, revealed only slight discrepancies between actual and projected numbers of farms in the three size categories. A comparison of the first three years of projections of numbers of farms in the three size categories based upon the three transition matrices indicated that the 1969-1982 transition matrix exhibited the least amount of error.

Individually, the calculated chi-square values for Hypothesis 2a and 2b would lead one to reject both parts of the hypothesis. However, a comparison of the sum of the calculated chi-square values for the second hypothesis with the calculated chi-square value of the first hypothesis indicated that the sum was considerably less than the calculated
chi-square value of the first hypothesis. This would tend to indicate that, overall, the second hypothesis more nearly fit the data than did the first hypothesis.

Projection of Numbers of Farms

The 1969-1982 transition probability matrix was used to project the numbers of farms in the three size categories by five year intervals to 2002. It was assumed that the transition probabilities would remain stationary throughout the remainder of the period; this assumption is congruent with the assumption that the same political-economic trends of the 1969-1982 period would continue through the remainder of the stagnating phase of the long wave.

The projected number of farms by size categories in the year 2002 for the 1969-1982 transition matrix is presented in Table 3.6 and Figures 3.4 to 3.6. The projected total number of farms is estimated to decrease by five percent from 1982 to 2002 (115369 to 110133). An eighteen percent increase in the number of small farms is predicted (20240 to 23950). A sixteen percent decrease in mid-size farms is projected between 1982 and 2002 (77598 to 64879). The number of farms in the large-size category is projected to increase by sixteen percent between 1982 and 2002 (18292 to 21304).

The actual and projected distributions of farms by size categories based upon the 1969 to 1982 transition probability matrix is given in Table 3.9 and Figures 3.5 and 3.6. The proportion of all farms in the small-size category is projected to increase from seventeen percent in
1982 to twenty-two percent in 2002. The estimated proportion of all farms in the mid-size category is projected to decline from sixty-seven percent in 1982 to sixty-one percent in 2002. The estimated proportion of all farms in the large-size category is projected to increase from sixteen percent in 1982 to nineteen percent in 2002.

Conclusions

The projections based upon the 1969-1982 transition probability matrix tend to confirm the predictions of the perspective based upon the long wave of late capitalist development. The projections should be regarded as tentative, however, given the limiting assumptions on which the stationary transition Markov chain is based. The assumption of stationary transition probabilities may not be appropriate for a Markov chain which traces the movement of farms between size categories in future time periods.

The year 1969 was used to divide the long wave of late capitalist development into its expansive and stagnating phases. Mandel (1980:122) notes, however, that the crises of overproduction in the expansive phase are transitory and shallow while the crises in the stagnating phase are longer and deeper. One can imagine late capitalism's long wave as a continuum in which the crises of overproduction gradually become deeper and longer as the expansive phase draws to a close, or, conversely, become shallower and more transitory as the stagnating phase draws to a close. Thus, one cannot draw an artificial division between late capitalism's expansive and stagnating phases.
The intensity of the crises of overproduction affect the components of the law of value and the rate of appropriation of simple commodity producers' surplus through technological rents, ground rent, and unequal exchange. All of these variables affect the probability of an occurrence of particular outcome in any one time period in a sequence of time periods. Therefore, it might be assumed that the transitional probabilities are functions of these explanatory variables and that the transition probabilities change as the explanatory variables change. Future research should use a nonstationary Markov chain which includes these explanatory variables or a composite index of these variables. Future research should also attempt to use value of products sold by farm size categories, rather than number of farms by farm size categories, because value of products sold would provide a better measure of the scale of a farm unit than its acre-size classification.

Nevertheless, the limited support for the second hypothesis does provide some support for the proposition that concurrent with the increasing concentration and centralization of semicapitalist production is the regression of simple commodity production and the increase in the rural semiproletariat.
Footnotes

1. The reader should refer to Section I for a more explicit elaboration of the revised theory.

2. The pressures which result in the "squeeze" on simple reproduction include those that develop from the exhaustion of both land (reduction in productivity through mining and soil erosion) and labor (intensification of family labor and endangerment of health) with the existing methods of cultivation, the use of more expensive means of production (improved seeds, machinery, fertilizers, insecticides, pesticides, etc.) with no guarantee that the return to their labor will be equal to the costs incurred, and from deteriorating terms of exchange for simple commodity producers' commodities.

3. In The Development of Capitalism in Russia, Lenin (1958) gave examples of vertical concentration under conditions which made it more profitable for productive capital to invest in processing and manufacturing enterprises than to undertake the production task itself. In the last chapter of his book, Peasant Farm Organization, Chayanov (1966) also called attention to the process of vertical concentration, brought about by the intervention of trading capital both in the conditions of production and in certain kinds of cooperatives. Bernstein (1979) cited examples of vertical concentration through state intervention, such as in the Tanzania villagization programs and other rural development schemes in African countries.

4. Marx (1967:436-437) discussed the role of credit in stock companies in Capital, Volume III: Chapter 27. Particularly interesting is his analysis of the transformation of a capitalist entrepreneur into a manager of capital:

   ... transformation of the actually functioning capitalist into a mere manager, administrator of other people's capital, and of the owner of capital into a mere owner, a mere money-capitalist. Even if the dividends which they receive include the interest and the profit of enterprise, i.e., the total profit (or the salary of the manager is, or should be, simply the wage of a specific type of skilled labour, whose price is regulated in the labour-market (like that of any other labor), this total profit is henceforth received only in the form of interest, i.e., as mere compensation for owning capital that now is entirely divorced from the function in the actual process of reproduction, just as this function in the person of the manager is divorced from ownership of capital.

5. Knutson et al., (1983:250) also noted that the state may assist in
transforming agriculture into a public utility:

In a public utility, government licenses production, establishes prices, and sets standards for service and performance as well as acceptable profit levels. Government could perform the identical function in agriculture. Specifically, it could decide who can produce what and how much, it could determine how land is used, provide credit to agriculture, allocate inputs used in production, and specify prices to be charged for inputs and paid for farm products.

6. In the Grundrisse, Marx (1973:279) stated that in its advanced stage, capital:

... regards the existence of landed property itself as a merely transitional development, which is required as an action of capital on the old relations of landed property, and a product of their decomposition; but which, as such - once this purpose is achieved - is merely a limitation on profit, not a necessary requirement for production. It thus endeavours to dissolve landed property as private property and to transfer it to the state. This is the negative side. Thus to transform the entire domestic society into capitalists and wage laborers ... the negation (of landed property) from the side of capital is only a change of form, towards its undivided rule. (Ground rent is the universal state rent (state tax), so that bourgeois society reproduces the medieval system in a new way, but as the latter's total negation).

7. In the first phase, technology is revolutionized, as characterized by an increasing rate of profit, accelerated self-expansion of previously idle capital and the accelerated devalorization of capital previously invested in now technologically-obsolete means of production.

The second phase is characterized by retreating profits, slowly reducing accumulation, decelerating economic growth, gradually increasing difficulties in the valorization of the total accumulated capital, and the gradual, self-reproducing rise in idle capital. The actual transformation in productive technology has already occurred and has been generally adopted (Mandel, 1980:120-121).

8. The definition of a farm was changed for the 1974 and succeeding agricultural censuses. The previous definition counted as a farm any place with less than 10 acres from which $250 or more of agricultural products were sold or normally would have been sold during the census year, or any place of 10 acres of more from which $50 or more of agricultural products were sold or normally would have been sold during the census year. The new definition of farm is any place from which $1000 or more of agricultural products were sold, or normally would have been sold, during the census year.
9. The use of census data has a number of problems (Gillespie, 1981:38):

. . . (1) definitions, categories used in analysis, and the analyses themselves are not consistent through successive censuses, all of which add an element of ambiguity and interpretation; (2) the questions asked varied among censuses, sometimes to better reflect changing conditions, but rendering interpretation problematic; (3) respondents to the census questionnaires can be expected to not have interpreted the census questions in the same way; (4) respondents may have dissembled on some of the questions because they wished to conceal certain facts from local census takers whose confidentiality they doubted, or to embellish on facts to make a good impression on local census takers; (5) respondents may not have known the answers to all the questions, especially if they were not the operator, but rather were the wife or other member of the operator's family, landlord, hired laborer, neighbor, or other, which were indicated as possible respondents in a block at the end of the questionnaire of the 1964 and other censuses.

Despite these problems, however, the censuses are the best source of longitudinal data that I know to be available.

10. Pointing out the problems inherent in measuring the development of capitalism in agriculture either by farm size or the number and importance of large farms, when judged by their total acreage, Lenin (1934:12) noted that they are only indirect indications; farm size does not always indicate that the farm is really big (as an economic enterprise) or does it give any direct indication as to its capitalist nature. Ideally, one would obtain a better indication of the state of capitalist agricultural development by comparing sales by farm-size categories across censuses. This approach would provide measures of semi-proletarianization, regression, and concentration and centralization by sales classes. Unfortunately, agricultural sales classes are not comparable: inflation across years deflates the significance of some sales classes and increases the significance of others. Additionally, data for measures of semi-proletarianization, regression, and concentration and centralization were not available by sales classes.

11. \[ X^2(r-1) = N(t)(y_i(t) - \hat{y}_i(t))^2/\hat{y}_i(t) \]

12. \[ u = \frac{(\hat{y}_i - y_i)^2}{y_i^2} \]
\( u \) = the Theil inequality coefficient
\( \hat{y}_i \) = projected number of farms in size class \( i \), and
\( y_i \) = actual number of farms in size class \( i \).
Table 3.1 Probability transition matrix for 1940-1982

Probability of moving from state i to state j.

<table>
<thead>
<tr>
<th></th>
<th>P_{11}</th>
<th>P_{12}</th>
<th>P_{13}</th>
<th>P_{14}</th>
</tr>
</thead>
<tbody>
<tr>
<td>P_{1j}</td>
<td>.96</td>
<td>0</td>
<td>0</td>
<td>.04</td>
</tr>
<tr>
<td>P_{2j}</td>
<td>0</td>
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<td>.10</td>
<td>0</td>
</tr>
<tr>
<td>P_{3j}</td>
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<td>0</td>
<td>.93</td>
<td>0</td>
</tr>
<tr>
<td>P_{4j}</td>
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<td>.14</td>
<td>0</td>
<td>.86</td>
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</table>

\[ x^2 = 24931 \quad x^2_{30df @ .10} = 40 \]

Table 3.2 Probability transition matrix for 1940-1969

Probability of moving from state i to state j

<table>
<thead>
<tr>
<th></th>
<th>P_{11}</th>
<th>P_{12}</th>
<th>P_{13}</th>
<th>P_{14}</th>
</tr>
</thead>
<tbody>
<tr>
<td>P_{1j}</td>
<td>.98</td>
<td>0</td>
<td>0</td>
<td>.02</td>
</tr>
<tr>
<td>P_{2j}</td>
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<td>.25</td>
<td>0</td>
</tr>
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<td>P_{3j}</td>
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<td>.03</td>
<td>.92</td>
<td>0</td>
</tr>
<tr>
<td>P_{4j}</td>
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<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

\[ x^2 = 16273 \quad x^2_{21df @ .10} = 30 \]

Table 3.3 Probability transition matrix for 1969-1982

Probability of moving from state i to state j

<table>
<thead>
<tr>
<th></th>
<th>P_{11}</th>
<th>P_{12}</th>
<th>P_{13}</th>
<th>P_{14}</th>
</tr>
</thead>
<tbody>
<tr>
<td>P_{1j}</td>
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<td>.02</td>
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</tr>
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<td>P_{4j}</td>
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\[ x^2 = 839 \quad x^2_{12df @ .10} = 19 \]
Table 3.4  Actual and projected number of farms based on 1940-1982 transition matrix

<table>
<thead>
<tr>
<th>Year</th>
<th>0 - 49 Acres</th>
<th>50 - 499 Acres</th>
<th>500+ Acres</th>
<th>Total Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Projected</td>
<td>Percent Difference</td>
<td>Actual</td>
</tr>
<tr>
<td>1940</td>
<td>28625</td>
<td>182110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1945</td>
<td>27838</td>
<td>26124</td>
<td>- 6.2</td>
<td>178222</td>
</tr>
<tr>
<td>1950</td>
<td>26264</td>
<td>23823</td>
<td>- 9.3</td>
<td>173802</td>
</tr>
<tr>
<td>1954</td>
<td>23540</td>
<td>21779</td>
<td>- 7.5</td>
<td>165832</td>
</tr>
<tr>
<td>1959</td>
<td>19179</td>
<td>20029</td>
<td>4.4</td>
<td>150684</td>
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<tr>
<td>1964</td>
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<td>18588</td>
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<td>131091</td>
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<tr>
<td>1969</td>
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<td>17459</td>
<td>14.7</td>
<td>114254</td>
</tr>
<tr>
<td>1974</td>
<td>14892</td>
<td>16635</td>
<td>11.7</td>
<td>96838</td>
</tr>
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<td>1978</td>
<td>21377</td>
<td>16101</td>
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<td>88478</td>
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<td>1982</td>
<td>20228</td>
<td>15834</td>
<td>-21.7</td>
<td>77192</td>
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Table 3.5 Actual and projected number of farms based on 1940-1969 transition matrix

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<th></th>
<th>50 - 499 Acres</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Projected</td>
<td>Percent</td>
<td>Difference</td>
<td>Actual</td>
<td>Projected</td>
</tr>
<tr>
<td>1940</td>
<td>28625</td>
<td>182110</td>
<td>-3.2</td>
<td>-2.0</td>
<td>178222</td>
<td>174697</td>
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<tr>
<td>1945</td>
<td>27838</td>
<td>178222</td>
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<td>-2.0</td>
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<td>160418</td>
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<tr>
<td>1950</td>
<td>26264</td>
<td>22890</td>
<td>2.4</td>
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<td>1954</td>
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<td>1959</td>
<td>19179</td>
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<td>107724</td>
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<table>
<thead>
<tr>
<th>500+ Acres</th>
<th>Total Acres</th>
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</thead>
<tbody>
<tr>
<td>Year</td>
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<tr>
<td>1940</td>
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<td>2874</td>
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<tr>
<td>1950</td>
<td>3093</td>
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<td>1954</td>
<td>3555</td>
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<td>1959</td>
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<td>1964</td>
<td>7591</td>
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Table 3.6 Actual and projected number of farms based on 1969-1982 transition matrix

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Projected</th>
<th>Percent Difference</th>
<th>Actual</th>
<th>Projected</th>
<th>Percent Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>15233</td>
<td>114254</td>
<td>-5.1%</td>
<td>116254</td>
<td>95793</td>
<td>-0.1%</td>
</tr>
<tr>
<td>1974</td>
<td>14892</td>
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<td>-2.6%</td>
<td>88478</td>
<td>85934</td>
<td>-2.9%</td>
</tr>
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<td>1978</td>
<td>21377</td>
<td>20240</td>
<td>-0.1%</td>
<td>77192</td>
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<td>0.5%</td>
</tr>
<tr>
<td>1982</td>
<td>20228</td>
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<td></td>
<td>72944</td>
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<td></td>
</tr>
<tr>
<td>1987</td>
<td></td>
<td>23950</td>
<td></td>
<td>64879</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Projected</th>
<th>Percent Difference</th>
<th>Actual</th>
<th>Projected</th>
<th>Percent Difference</th>
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<tbody>
<tr>
<td>1969</td>
<td>10877</td>
<td>140354</td>
<td>-12.4%</td>
<td>140354</td>
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<tr>
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<td>16595</td>
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<td>123360</td>
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<tr>
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<td>16601</td>
<td>18292</td>
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<td>17949</td>
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<td>115557</td>
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<td>112181</td>
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<td>1992</td>
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<td>111795</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td>21304</td>
<td></td>
<td>110133</td>
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</table>
Table 3.7 Projected proportions of farms using the 1940-1982 transition matrix.

<table>
<thead>
<tr>
<th>Year</th>
<th>0-49 Acres Actual</th>
<th>0-49 Acres Projected</th>
<th>50-499 Acres Actual</th>
<th>50-499 Acres Projected</th>
<th>500+ Acres Actual</th>
<th>500+ Acres Projected</th>
</tr>
</thead>
<tbody>
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<td>1940</td>
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<td>85.3</td>
<td>1.2</td>
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<td></td>
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<td>85.9</td>
<td>1.4</td>
<td>1.1</td>
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<tr>
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<td>12.0</td>
<td>12.6</td>
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<td>1.3</td>
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<td>12.2</td>
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<td>86.0</td>
<td>1.8</td>
<td>1.7</td>
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<td>11.0</td>
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<td>85.6</td>
<td>2.8</td>
<td>2.4</td>
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<td>85.0</td>
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<td>3.2</td>
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<td>11.4</td>
<td>81.4</td>
<td>84.3</td>
<td>7.7</td>
<td>4.3</td>
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<td>83.2</td>
<td>11.4</td>
<td>5.5</td>
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<tr>
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<td>16.9</td>
<td>11.4</td>
<td>70.0</td>
<td>81.7</td>
<td>13.1</td>
<td>6.8</td>
</tr>
<tr>
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<td>11.7</td>
<td>66.9</td>
<td>80.1</td>
<td>15.6</td>
<td>8.2</td>
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Table 3.8 Projected proportions of farms using the 1940-1969 transition matrix.

<table>
<thead>
<tr>
<th>Year</th>
<th>0-49 Acres Actual</th>
<th>0-49 Acres Projected</th>
<th>50-499 Acres Actual</th>
<th>50-499 Acres Projected</th>
<th>500+ Acres Actual</th>
<th>500+ Acres Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>13.4</td>
<td>85.3</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1945</td>
<td>13.3</td>
<td>13.2</td>
<td>85.3</td>
<td>83.6</td>
<td>1.4</td>
<td>1.3</td>
</tr>
<tr>
<td>1950</td>
<td>12.9</td>
<td>13.0</td>
<td>85.5</td>
<td>85.6</td>
<td>1.5</td>
<td>1.4</td>
</tr>
<tr>
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<td>85.5</td>
<td>1.8</td>
<td>1.7</td>
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<td>85.3</td>
<td>2.7</td>
<td>2.0</td>
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<tr>
<td>1964</td>
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<td>12.6</td>
<td>85.0</td>
<td>84.9</td>
<td>4.9</td>
<td>2.5</td>
</tr>
<tr>
<td>1969</td>
<td>10.8</td>
<td>12.4</td>
<td>81.4</td>
<td>84.5</td>
<td>7.7</td>
<td>3.1</td>
</tr>
</tbody>
</table>
Table 3.9  Projected proportions of farms using the 1969-1982 transition matrix.

<table>
<thead>
<tr>
<th>Year</th>
<th>0-49 Acres Actual</th>
<th>0-49 Acres Projected</th>
<th>50-499 Acres Actual</th>
<th>50-499 Acres Projected</th>
<th>500+ Acres Actual</th>
<th>500+ Acres Projected</th>
</tr>
</thead>
<tbody>
<tr>
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<td>10.8</td>
<td>81.4</td>
<td>7.7</td>
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<tr>
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<td>76.8</td>
<td>77.1</td>
<td>13.0</td>
<td>11.5</td>
</tr>
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<td>1978</td>
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<td>16.9</td>
<td>70.0</td>
<td>69.7</td>
<td>13.1</td>
<td>13.4</td>
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<td>1982</td>
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<td>17.4</td>
<td>66.9</td>
<td>66.8</td>
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<td>15.6</td>
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<td>18.9</td>
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<td>2002</td>
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<td></td>
<td>60.6</td>
<td></td>
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<td>18.9</td>
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</tbody>
</table>
Figure 3.1 Actual and projected number of small farms
Figure 3.2 Actual and projected number of medium farms
Figure 3.3 Actual and projected number of large farms
Figure 3.4 Projected number of small farms
Figure 3.5 Projected number of medium farms
Figure 3.6 Projected number of large farms
SUMMARY AND DISCUSSION

Marxist theorists debating the future of the family farm as a form of simple commodity production (SCP) within the capitalist mode of production have divided into two diametrically opposed factions each with its own predictions. The first variant predicts that the inexorable forces of centralization and concentration of agricultural production will inevitably differentiate SCP into an agricultural bourgeoisie and a landless proletariat. The second predicts a continued, if marginal, existence for SCP.

Data support neither the inevitability of capitalist development in agriculture nor the persistence of SCP, so the problem then, becomes one of accounting for these contradictory trends. An alternative theory is needed that accounts for the gradual integration and transformation of SCP agriculture by capital and the lack of rapid differentiation within agriculture in order to explain the continued proportional dominance and ongoing differentiation of family farms.

The perspective proposed in the first paper views simple commodity producers' labor and means of production as being fully subsumed under capital and recognizes that, while appropriation of simple commodity producers' surplus-value occurs in relations of exchange, exploitation occurs in relations of production.

The two processes of exploitation affecting simple commodity producers are: (1) the formal subsumption of commodified labor and the production of absolute surplus-value; and (2) the real subsumption of
commodified labor and the production of relative surplus-value. The mechanisms of appropriation of simple commodity producers' surplus-value include: (1) ground rent; (2) technological rents; and (3) unequal exchange.

The revised perspective argues: (1) SCP may be fully subsumed under capital without resulting in the complete separation of simple commodity producers from their means of production; (2) SCP is being differentiated into a tripartite class structure of rural semiproletarians, simple commodity producers, and semicapitalist producers; (3) this differentiation varies by the phases of the long wave of late capitalist development, resulting in the combined and uneven development of SCP; and (4) the state aids in this process through policies and programs designed to serve legitimation and accumulation functions.

The second paper summarized the propositions of the first paper concerning the evolution of SCP in late capitalism and tested them within the context of Iowa agriculture for the period 1959 to 1982. Changes in the differentiation of SCP agriculture were hypothesized to vary consistently with the phases of the long wave of late capitalist development. Changes should be found in the centralization and concentration of semicapitalist production, the regression of SCP and the proletarianization of the rural semiproletariat.

Twelve hypotheses, comprising fourteen assertions, were tested. Support for thirteen of the fourteen assertions provided support for the proposition that the proletarianization, regression and concentration and centralization of SCP does vary by the phases of the long wave of late
capitalist development resulting in its combined and uneven development.

Using a discrete time, stationary transition probability Markov chain, the third paper projected the structure of Iowa agriculture to the year 2002. With the increasing concentration and centralization of farms in semicapitalist production, one should witness the regression of farms in SCP, as well as an increase in the farms in the rural semiproletariat and that this should vary consistently with the phases of the long wave of late capitalist development.

The first hypothesis, which corresponded to the orthodox Marxist perspective, was not supported. When the actual number of farms for each size category was plotted over time, the trajectory revealed a nonlinear course of development contrary to that predicted by the orthodox Marxist perspective.

The second hypothesis, which corresponded to the course of SCP development associated with the long wave of late capitalist development, was proposed as an alternative to the orthodox Marxist perspective. Hypothesis 2a, which corresponded to the course of SCP development associated with late capitalism's expansive phases, was not supported. Hypothesis 2b, which corresponded to the course of SCP development associated with the stagnating phase of late capitalism's long wave, was also not supported. However, the sum of the calculated chi-square values for the two parts of the second hypothesis was considerably less than the calculated chi-square value of the first hypothesis. Overall this indicated that the second hypothesis more nearly fit the data than did the first hypothesis.
The 1969 to 1982 transition probability matrix was used to project the numbers of farms in the three size categories by five-year intervals to the year 2002. The transition matrix projected a five percent decrease in the total number of farms, an eighteen percent increase in the number of small farms, a sixteen percent decrease in medium farms, and a sixteen percent increase in large farms by the year 2002.

The distribution of small farms in the three size categories was projected to increase from seventeen to twenty-two percent, the proportion of medium farms was projected to decrease from sixty-seven to sixty-one percent, and the proportion of large farms was projected to increase from sixteen to nineteen percent.

The projections based upon the transition probability matrix tended to support the predictions of the alternative perspective. The projections should be regarded as tentative, however, given the limiting assumptions on which the stationary transition probability Markov chain is based.

Nevertheless, the limited support for the second hypothesis provided some support for the proposition that concurrent with the increasing concentration and centralization of semicapitalist production is the regression of SCP and an increase in the rural semiproletariat.

In summary the papers in this dissertation provide some support for the proposition that the differentiation of SCP does vary by the phases of the long wave of late capitalist development.
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Denis, Wilfrid B.  

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Federal Reserve System  

Foster-Carter, Aidan  
Friedmann, Harriet

Gillespie, Gilbert Jr.

Goodman, David and Michael Redclift

Goss, Kevin F., Richard D. Rodefeld, and Frederick H. Buttel

Hallberg, M.C.

Havens, A. Eugene

Hedley, Max J.

deJanvry, Alain


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Kautsky, Karl

Kelley, Kevin D.

Knutson, Ronald D., J.B. Penn, and William T. Boehm

Krenz, Ronald D.

Lasley, Paul and Willis Goudy

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APPENDIX A:

MARX ON GROUND RENT

Ground rent is connected to the equalization of rates of profit and its factors: market price, market value, and production price. Varying levels of productivity in sectors implies that their commodities will also have different values, but a general average value will develop out of these individual values. The individual values are composed of the average cost of production and the average profit which are themselves determined by the average conditions of production. Market prices vary around the market or average value; these variations are determined by demand and supply conditions. Average market value determines market prices when ordinary demand equals normal supply. Since all commodities have a common market price, a balanced supply and demand market implies that commodities produced at a value below average value will receive extra value and profit. Commodities produced at a value above average value lose part of their surplus-value and are sold at a loss. This lost value is transferred to those commodities produced at a value below average value.

If supply is greater than demand, market price is determined by commodities produced under the most favorable conditions. In this situation, even those commodities produced under average conditions sell at a loss. Conversely, if demand is greater than supply, the commodities produced under the worst conditions determine market price. In this situation all commodities produced under favorable conditions, including
those produced under average conditions, realize more than their individual value (Marx, 1967:178-184). The fact that commodities may realize more than the value they contain leads to Marx's discussion of ground rent (Marx, 1967 Part VI).

Marx distinguishes between differential and absolute ground rents. When an average rate of profit develops in a sector, ground rent, a special kind of surplus profit, emerges. Certain high productivity firms monopolize the naturally productive factors. These factors, combined with labor productivity, result in super profits or ground rent. These are differential ground rents since they do not determine production price but are instead based upon it. These rents are received by all agricultural producers with below average rates of profit only if the most favorable conditions do not determine market values and thus demand and supply conditions.

With the development of an average rate of profit in agriculture, productivity differences and differential rent are determined by three factors: access to markets, natural fertility and intensity of production. Access to markets and natural fertility comprise differential rent I. Intensity of production, differential rent II, depends on constant and variable capital investment. The amount of capital invested in lands of equal natural fertility and similar location will result in variations in yields. These differential rents, however, do not determine agricultural prices. They instead describe how surplus-value is distributed within agriculture on the basis of average prices of production for agricultural commodities. Differential rents
will continue to exist in simple commodity production as long as commodities are sold at the common average market price.

The assumption that demand would slightly exceed supply for agricultural commodities led Marx to conclude that the value of commodities produced under the worst conditions would determine market price and that all other land would receive differential rents. This conclusion is consistent with his earlier assumption of a totally capitalist agriculture so that demand fluctuations would determine whether land was used in production. Since farmers could not realize a profit on commodities produced under the worst conditions, they would invest their capital elsewhere.

Since, as Marx assumed, there was a lower organic composition of capital in agriculture than in industry, the production of value and surplus-value therefore would be higher in agriculture. If the free movement of capital into and out of agriculture is assumed, this higher surplus-value would be transferred to industrial and other capital through the development of the average rate of profit. Private property in land, however, acts as a barrier to the transfer of value. Capital cannot be invested in land unless the landlord agrees to it. The landlord usually requests a share of value produced in exchange for the renter's privilege of using the land. This payment is essentially a transfer of a portion of the value produced on the land. Even land of the worst quality, therefore, commands ground rent. This rent is absolute rent; it is not related to the natural fertility or location (differential rent) but exists merely as a condition of use.
Absolute rent increases agricultural market prices above production price and thus appropriates a portion or all of surplus-value which exceeds agricultural production price. Under conditions of free movement of capital, the excess would be appropriated by nonagricultural capital. Landed monopoly, however, acts as a barrier to the equalization of the rate of profit and reduces the general rate of profit by blocking this transfer.

Surplus labor in agriculture can be appropriated by means other than surplus-value above average profit, (capitalist ground rent). It can also be appropriated by labor rent, rent in kind, or money rent which are the primary methods of appropriation of surplus labor in noncapitalist eras. These forms of appropriation are equal to capitalist profit and, unlike ground rent, they do not refer to an excess above profit.

Where simple commodity production prevails under the capitalist mode of production, the simple commodity producers may own their land and not pay rent. The cost of land is subtracted from their surplus labor which is equivalent to the capitalist average rate of profit. On the other hand, cost of land is an excess above average profit for capitalist farmers. In this case, the cost of land is deducted from the simple commodity producer's surplus labor, whereas with capitalist producers, it is the excess above average profit. In either situation, differential rents I and that part of differential rents II which is attached to the land, are included in the price of land.

Rent and land prices can influence the price of commodities only in the case of absolute rent. In this case, the lower organic composition
of capital in agriculture produces value above production price and market conditions or monopoly prices permit landlords or nonagricultural capital to appropriate the excess value. Absolute rent, therefore, represents a hindrance to the equalization of the rates of profit. Although it applies to both capitalist and simple commodity producer landowners, the later cannot collect it. In this case, absolute ground rent is used to extract simple commodity producers' surplus product and labor.
Popper (1957) has criticized Marxist laws of motion as being "historicist" in that they are predictive laws which reveal a hidden evolutionary pattern in human history. This criticism arises from a serious misreading of Marx (McQuarie, 1977:478-483). The debate over historicist prediction has obscured a fundamental fact: Marx was not a historicist as Popper defines the word, and, therefore, his refutation of Marx's laws of motion is irrelevant. Marx does not propose a universal scheme of social evolution in his theoretical writings, but he rather develops a theory of structures and their correspondence within the abstract conditions of the limits of the capitalist mode of production. His theory should be considered as a holistic system's model for the analysis of empirical social formations. The laws of motion of capital are, therefore, perfectly ahistorical; they apply under any conditions of capitalist production and exchange. The conditional antecedents, however, apply only in limited historical periods. Popper's claim that Marxian laws are historically limited, therefore, actually reduces to Marx's assertion that the conditions under which these laws apply are historically limited.

A second area of methodological concern is the compatibility of Marxian methodology with the logic of positivistic sociological inquiry. Marx employed a method of successive approximation (McQuarie, 1978:222-223) which consists of two movements or procedures. The first
is movement from the empirical to the abstract level involving a period of preliminary observation, empirical examination and tentative explanation, leading to the abstraction of certain prominent features of the phenomenon under study. The unusual or accidental features are discarded so that the phenomenon may be considered in its "most typical form most free from disturbing influences" (Marx, 1977:90). The end result of this procedure is separating the phenomenon in its pure or ideal form and stating theory in terms of simplified hypotheses at the highest level of theoretical abstraction.

The method's second procedure involves a series of transitions from abstract theory to the empirical level by successive approximations. In this procedure, mediations are introduced and the theory is reconstructed making it more complex and conditional. This procedure enriches the theory and permits it to consider and explain a wider variety of empirical phenomenon. The procedure theoretically reconstructs reality so that it is not "a chaotic conception of a whole but a rich totality of many attributes and relations" (Marx, 1977:100). Successive approximation involves two related steps (McQuarie, 1978:223): (1) expanding the theory so that propositions can account for the behavior of an increasing number of variables, and (2) verifying or rejecting the theory through empirical observation and experimentation.

If the theory is valid, it is only through its elaboration in successive approximations that it can describe a concrete phenomenon. Data gathering and empirical observation guide the elaboration and modification of abstract historical predictive hypotheses and general
laws. The logic of successive approximations is that generality in prediction is achieved with a loss in precision. The internal consistency of the abstract model is sacrificed to clarify a specific empirical phenomenon. Marx's methodological procedures are not incompatible with the logic of contemporary sociology (Wardell, 1979:425). His use of an inductive-deductive method of theory construction and verification of theory by prediction along with an implicit system's orientation are not very far removed from conventional sociological practice.
APPENDIX C:
GLOSSARY

Absolute Land Rent: specific form of surplus-profit originating from a monopoly of landownership by a special class of agrarian proprietors, who prevent the sum total of surplus-value produced in agriculture from being redistributed among all capitalists, by appropriating part of that surplus-value as a prior condition of access to the land which they own.

Accumulation in the Abstract: pursuit of profit for its own sake, one of the two versions of the economic maximizing rationale (Chevalier, 1982:145).

Accumulation of Capital: increase in the value of capital by the transformation of part of surplus-value into additional capital. That part of surplus-value which is not accumulated will be unproductively consumed by capitalists or their dependents.

Articulation: refers to the internal movement by which relations which were primary or dominant become secondary or dominated and secondary relations become primary (Denis, 1982:135).

\[^1\] All definitions are from Mandel's (1980) glossary except where noted.
Average Social Productivity of Labor: the level of productivity of labor at which the average commodity is produced in each important branch of production. A minority of goods will be produced below this average in "backward" firms, and another minority at a higher level of productivity in "advanced" firms.

Capital: exchange value which seeks a further accretion of value. Capital first appears in a society of petty commodity producers in the form of owners of money who intervene in the market with the aim of buying goods in order to resell them at a profit.

Capitalist Ground Rent: presupposes the existence in agriculture of capitalists and wage workers; capitalist rent is that part of surplus-value which remains after deduction of entrepreneur's profit (Lenin, 1958:175).

Capitalist Mode of Production: generalized commodity production, in which the direct producers have been dispossessed of their means of production, and therefore have to sell their labor power to those who own the means of production. Labor power and means of production have become commodities. Means of production in turn become capital - accruing further exchange value by the surplus-value created by direct producers and appropriated by the owners of capital. A society dominated by the capitalist mode of production is basically divided into two classes: the capitalist class which monopolizes the means of production, and the proletariat which is economically compelled to sell its labor power.
Centralization of Capital: the fusion of different capitals under a single common command.

Circulating Capital: that part of constant capital used to purchase raw materials, energy, and auxiliary products; plus variable capital needed to purchase labor power.

Concentration of Capital: the growth in the value of capital in each major capitalist firm as a result of accumulation and competition (elimination of smaller and weaker firms).

Concrete Economizing: appropriation of an optimum - albeit limited - magnitude of value which is embodied in the following elements: (a) instruments of production which they (producers) purchase; (b) the land which they own and the rent they pay to retain it; (c) the labor power which they purchase from others or themselves; and (d) the foodstuffs which they produce and sell (or buy from their own production) (Chevalier, 1983:178-179).

Constant Capital: that part of capital which is used to purchase buildings, machinery, raw materials or energy, and whose value remains constant because it is incorporated into the value of final commodities and conserved by the activity of labor power.

Department I: branches of capitalist production producing means of production (raw materials, energy, machinery and tools, buildings).

Department II: branches of capitalist production producing means of consumption (consumer goods), which reconstitute the labor-force of the direct producers and contribute to the livelihood of the capitalists and
their dependents.

**Devalorization:** the process whereby capital loses a part of its value, which takes two main forms during a capitalist crisis. Firstly, as a result of the decline in the value (price of production) of commodities, especially means of production, the capital invested in these commodities is devalorized. Secondly, as a result of commercial bankruptcies and firms going out of business, much of the value of their capital is destroyed. This capital was part of the total social capital, which thereby loses part of its aggregate value.

**Development:** the maturation of the forces and relations of the capitalist mode of production.

**Differential Land Rent:** specific form of surplus-profit originating from the differential productivity of specific agricultural or mining land (or successive investments in these lands), so long as the value and market price of the agricultural or mining products in question are regulated by less productive land.

**Equalization of Rate of Profit:** the price that equilibrates rates of profit for all departments is a price such that all products, except those of the department where the value composition of capital is the social average, sell either above or below their value (Becker, 1977:144). Capital will relinquish the branches with lower rates of profit and flow into the branches with a higher rate. There, over-production and over-accumulation will take place, lowering market prices and suppressing surplus-profits, while the branches which have suffered a drain of capital will no longer be able wholly to supply
socially effective demand at current output. Market prices in the later sectors will thus rise again. In the analysis of the process, however, it should be recalled once more that even with complete mobility of capital, there is no immediate equalization of the rate of profit. A significant period of time separates the first moment that a technological discovery is given a productive application from the moment that there is an equalization of the rate of profit. Only when intensified competition has lowered the profit of the innovating firm once more to the social average by a reduction in market value proportionate to the saving of social labor and consequent diminution in the value of the commodity, can one say that equalization of the rate of profit has been achieved. In the entire intermediate period, technical innovation does actually permit the realization of a surplus-profit. It should be further pointed out that the whole process of the appearance and disappearance of surplus-profits unleashed by technical innovation is simultaneously a process of the accumulation and devalorization of capital, in which many capitals operating with an insufficient productivity of labor are ruined before the equalization of the rate of profit takes place (Mandel, 1980:92-93).

**Equalization of Terms of Exchange:** if prices cover the costs of reproduction in all sectors, equality of terms of exchange mean that prices per unit of exported value equal prices per unit of imported value. Thus, producers in all sectors have equal shares in the costs and gains of reproduction (Becker, 1977:138).

**Exchange Value:** value for which a commodity is exchanged on the market.
According to Marx's labor theory of value, the exchange value of a commodity is determined by the socially necessary quantity of unskilled labor needed for its reproduction at a given social average productivity of labor, and measured by the length of labor time (hours or days) needed to produce it.

**Family Farming:** characterized by (1) family ownership of land and other capital items, and (2) dependence on family labor (Rodefeld, 1978). It is usually considered as a precapitalist form of simple commodity production which has been left untouched by capitalist development (Goss et al., 1980). The family farmer is a propertied laborer, an independent producer of agricultural commodities who owns both the means of production and the product of his labor (Davis, 1980). Parallel concepts include simple commodity production (Mandel, 1980; Friedmann, 1978), petty commodity production (Davis, 1980; Hedley, 1980; Goss et al., 1980); and independent production (Kelley, 1979).

**Fixed Capital:** that part of constant capital used to purchase buildings and machinery.

**Forces of Production:** a particular arrangement of labor and the objects and instruments of labor as a technical process (O'Laughlin, 1975:351).

**Formal Subsumption of Labor Under Capital:** consists of two mechanisms: the monetization of all factors of production, and the dispossession of workers from all means of production. The production of absolute surplus-value is the material expression of the formal subsumption of labor under capital (Chevalier, 1983:158,173).

**Homoficence:** literally doing the same thing or having the same effect.
Rey elsewhere calls it the parallelism of the action of capital (Foster-Carter, 1978:57).

**Increase of Absolute Surplus-Value:** obtained by a lengthening of the working day (or week) without any commensurate increase in wages for the direct producers.

**Increase in Relative Surplus Value:** obtained by a shortening of that part of the working day (or week) during which the worker reproduces the equivalent of his wage, without any overall reduction of the working day (or week), via an increase in the productivity of labor in agriculture and those branches of industry which produce consumer goods for the working class.

**Late Capitalism:** began when fascism and the Second World War generated a significant increase in the rate of surplus-value, which was prolonged by a substantial reduction in the price of important elements of constant capital, which allowed capital in general to overcome the long-term decline or stagnation of the average rate of profit. The result was an acceleration in the accumulation of capital (further favored by the permanent arms economy), which then seized the discoveries and innovations that had been maturing over the previous decade, and thereby unleashed a Third Technological Revolution (Mandel, 1980:557).

**Law of Combined and Uneven Development:** the capitalist mode of production reproduces in varying patterns and degrees a combination of past and present modes (Mandel, 1980:29).

**Law of Unequal Exchange:** is a law of price-value relationships as they arise in the course of capitalist development. The more advanced sectors
export and import from the backward sectors. As a consequence, the capitalists in the advanced sectors realize comparatively beneficial terms of trade. The price per unit of exported value is higher than the price per unit of imported value (Becker, 1977:147).

**Law of Value:** the economic mechanism in a society of private producers which distributes the total labor power at the disposal of society (and thereby all material resources necessary for production) between its various branches of production, via the mediation of the exchange of all commodities at their values (in the capitalist mode of production).

Under capitalism, this law determines the pattern of investment - i.e., the inflow and outflow of capital in different branches of production, according to the deviation of their specific rate of profit from the average rate of profit.

**Long Waves of Capitalist Development:** there have been four long waves in the history of international capitalism, each lasting approximately 50 years. Each long wave can be divided into two parts. The first part is an initial phase in which technology is revolutionized and is characterized by an increased rate of profit, accelerated accumulation, accelerated growth, accelerated self-expansion of previously idle capital and the accelerated devalorization of capital previously invested in the production of the means of production but now technically obsolescent.

In the second phase, the actual transformation in productive technology has already occurred and has been generally adopted. This phase is characterized by retreating profits, slowly reducing accumulation, decelerating economic growth, gradually increasing difficulties in the
valorization of the total accumulated capital, and the gradual, self-reproducing rise in idle capital. According to this scheme, the second half of the long wave, which began with the Second World War and which is characterized by decelerated capital accumulation, has begun. The numerous recessions in the most important industrial countries in the 1960s and 1970s confirm this hypothesis. These long waves do not assert themselves in a mechanical fashion but function through the articulation of the classical cycles. In a phase of expansion, the cyclical periods of boom will be longer and more intensive, the cyclical crises of overproduction shorter and more superficial. Conversely, in those phases of the long wave where a tendency to stagnation is prevalent, the periods of boom will prove less feverish and more transitory, while the periods of cyclical crisis of over-production will, by contrast, be longer and more profound. The long wave is conceivable only as the result of these cyclical fluctuations (Mandel, 1980:120-122).

**Maximization in the Concrete:** the working owner is driven not by the pursuit of greater profits, but rather by the quest for a feasible optimum of actual consumption (which may or may not be superior - or even equal to prior levels of consumption); one of the two versions of the economic maximizing rationale (Chevalier, 1982:145).

**Maximization Without Accumulation:** a strategy geared to the attainment of a maximum and feasible level of concrete consumption (which may or may not correspond to the minimum standards of subsistence (Chevalier, 1982:9).

**Maximization Without Capitalization:** simple commodity producers own
their own means of personal and productive consumption and will seek to enlarge them, yet they cannot treat the later as a means of profitable accumulation. They sell goods which they have produced and in such a limited quantity (or low prices) that the money thus derived is not always sufficient to sustain minimum standards of personal consumption. The instruments of production and the object of labor which they own possess limited worth (because of low market value or long-term indebtedness problems) and can hardly be considered as a source of profitable monopoly over scarce factors of production. The labor-power that workers purchase from others or themselves cannot be treated as capital but only as needed use-values that are indispensable in securing the reproduction of the household economy (Chevalier, 1983:178).

**Mode of Production:** describes the essential forces and relations of production of the economic base in a particular form of society. The base, furthermore, is not self-reproducing; it only can be realized within a social totality (O'Laughlin, 1975:358).

**Monopoly Capitalism:** that phase in the development of the capitalist mode of production in which a qualitative increase in the concentration and centralization of capital leads to the elimination of price competition from a series of key branches of industry, monopolistic agreements are formed, a few firms completely dominate successive markets, banking capital increasingly merges with industrial capital into finance capital, a few very large financial groups dominate the economy of each capitalist country, these giant monopolies divide the world markets of key commodities between themselves, and the imperialist powers
divide the globe into colonial empires or semi-colonial spheres of influence. A trend to "regulate" (i.e., limit) investment and production in monopolized sectors henceforward prevails, in spite of the emergence of monopolistic surplus-profits, so that over-accumulation leads to a frantic growth of capital exports.

**Monopoly Surplus Profits**: specific forms of surplus-profit originating from obstacles to entry into special branches of production.

**Natural Economy**: one based on the production for personal needs (use value) and the close connection between industry (handicrafts) and agriculture (Bradby, 1975:127).

**Organic Composition of Capital**: a measure of the relation of constant (c) to variable (v) capital in the total composition of capital (q), q = c/c+v, a measure of the extent to which labor is furnished with materials, instruments, and machinery in the productive process (Sweezy, 1970:66).

**Periodization**: certain periods or stages can be distinguished in the development of the capitalist mode of production (O'Laughlin, 1975:359). Rey distinguishes three periods or stages of articulation between the precapitalist mode and the capitalist mode of production (Foster-Carter, 1978:56): (1) an initial link in the sphere of exchange, where interaction with capitalism reinforces the precapitalist mode; (2) capitalism takes root, subordinating the precapitalist mode; (3) the total disappearance of the precapitalist mode, even in agriculture.

**Price** (Market Price): the monetary expression of the exchange value of a commodity, which oscillates about this value according to the laws of
supply and demand.

**Prices of Production:** transformation of values of commodities by means of competition between capitals, which tends to equalize the rate of profit for each capital. The result of this process of equalization is that each capital does not appropriate the sum total of the surplus-value produced by "its own" workers, but a part of the total social surplus-value proportionate to the fraction of total social capital which it represents. The sum total of prices of production is equal to the sum total of value, because in the process of competition and equalization of the rate of profit, no additional surplus-value can be created nor any portion of socially produced surplus-value be destroyed.

**Productive Capital:** that part of social capital invested in sectors where surplus-value is directly produced.

**Productive Labor:** in a capitalist society, only that labor which directly produces surplus-value.

**Profit:** that part of social surplus-value which is appropriated by each particular capital (each capitalist firm).

**Rate of Accumulation:** the relationship between the accumulated portion of surplus-value and the value of the capital which this surplus-value increases.

**Rate of Profit:** the ratio of surplus-value \( (s) \) to total capital outlay \( (c+v) \), \( p = \frac{s}{c+v} \), or \( p = \frac{s'}{(1-q)} \) (Sweezy, 1970:67).

**Rate of Surplus Value:** the ratio of surplus-value \( (s) \) to variable capital \( (v) \), \( s' = \frac{s}{v} \) (Sweezy, 1970:63-64).

**Real Subsumption of Labor Under Capital:** occurs only when a revolution
takes place in the development of the social forces of production of labor, hence a complete transformation which brings about large-scale production and the direct application of science and advanced technology. The production of relative surplus-value may be viewed as the real subsumption of labor under capital (Chevalier, 1983:173).

**Realization of Surplus-Value:** surplus-value, produced by workers in the process of production, and therefore contained in the commodities as soon as this production is completed, can only be appropriated by capitalists in money form - in other words, after the commodities in question have been sold. Realization of surplus-value thus involves the sale of commodities at such a market price that part or whole of the surplus-value which they contain can be appropriated by their owners.

**Relations of Production:** a particular arrangement of labor and the objects and instruments of labor in terms of the relations of appropriation between persons (O'Laughlin, 1975:351).

**Reproduction:** the process by which, after production and sale of commodities, a new cycle of production is undertaken by a given capital.

**Simple Commodity Production:** economic system in which producers sell the products of their labor on the market, but remain proprietors of, or have direct access to, their own means of production and livelihood (essentially small farmers and independent artisans). The general purpose of such commodity owners is to sell their own products in order to buy goods necessary for their livelihood which they do not produce themselves, because of the social division of labor.

**Social Formation:** relational systems composed of superstructure and a
determinant economic base which may itself be a complex articulation of
more than a single mode of production (O'Laughlin, 1975:350).

**Specificity of Dominated Forms:** surviving noncapitalist structures and
enterprises are characterized as modes of production reproduced in
articulation with the dominant mode (Goodman and Reclift, 1981:59). They
have properties common to all precapitalist economies, - e.g., "natural
economies" - such that they can be analyzed by a common set of concepts
(O'Laughlin, 1975:353).

**Surplus-Profits:** all profits over and above the socially average rate of
profit.

**Surplus-Value:** the monetary form assumed by the social surplus product
in a commodity producing society. In a capitalist society, surplus-value
is produced by wage laborers and appropriated by capitalists: in other
words, it is the difference between the new value produced by labor in
the process of production and the cost of reproducing labor power (or the
value of labor power). In the final analysis, it represents unpaid labor
appropriated by the capitalist class.

**Technological Rents:** those monopoly surplus-profits originating from
technical advances protected by monopolistic practices.

**Technological Revolution:** involves a fundamental restructuring of the
basic techniques in all areas of capitalist production and distribution
including transportation and communications. Massive innovation does not
occur during a long wave with an undertone of stagnation because of low
profit expectations. Once the average rate of profit begins to increase,
capital discovers a supply of unused or only slightly applied innovations
and has, therefore, the means to undertake a technological revolution. Along with the supply of innovations is a supply of unused capital not previously invested which is now added to the rapid increase in new and accumulated surplus-value to make a healthy increase in productive investment possible. A genuine technological revolution results in large differences in production costs between those firms using the revolutionary technology and those that do not (Mandel, 1980:119-120).

**Technological Treadmill:** the aggressive, innovative farmer is on a treadmill with regard to the adoption of new and improved technologies on his farm. As he rushes to adopt a new and improved technology when it first becomes available, he at first reaps a gain. But as others after him run to adopt the technology, the treadmill speeds up and grinds out an increased supply of the product. The increased supply of the product drives the price of the product down to where the early adopter and all his fellow adopters are back in a no-profit situation. Farm technological advance in a free market situation forces the participants to run on a treadmill. Not only did the process of farm technological advance force the participants in the process onto a treadmill, but it created a condition in which the strong and aggressive farmers gobbled up the weak and inefficient. The process of farm technological advance has contributed importantly to the redistribution of productive assets in American agriculture in which commerical production has been, and continues to be, concentrated on the larger farms. The process of farm technological advance has resulted in widespread cannibalism in American agriculture (Cochrane, 1979:389-390).
Terms of Exchange: measure the relations of exchange in an interdependent system. The terms are a ratio of the long-run market price received per unit of value exported compared to the market price paid per unit of value imported (Becker, 1977:138).

Third Technological Revolution: began in North America in 1940 and in other industrial countries in 1945-48 and is characterized by the generalized control of machines by means of electronic apparatuses (Mandel, 1980:121).

Turnover Time of Capital: the time during which the value of a capital is reconstituted. Normally, one cycle of production and circulation (sale of commodities) reconstitutes circulating capital, whereas fixed capital is only reconstituted after several cycles of production and circulation of commodities.

Use-Value: utility of a commodity for the fulfillment of a specific need of its purchaser. Goods without use value for anyone cannot be exchanged or sold. By extension, production of use values pure and simple, as opposed to production of commodities, is production of goods for the consumption of their direct producers, or collective units of such producers.

Valorization: the process whereby capital increases its own value by the production of surplus-value. Marx presents the process of commodity production as a unity of two distinct processes - the labor process through which labor power produces use values, and the valorization process through which labor power produces additional value over and above its own value. This surplus-value, although created during the
process of production, has first to be realized through the sale of commodities before capital can appropriate it and therewith, actually increase its own value.

**Value of Labor Power**: the sum total of the exchange values of all those commodities necessary to reproduce the labor power of the direct producer and his family. This contains a purely physiological element, and a moral-historical element. The later is a function of those workers' needs that are formed by a specific level of civilization and a given relationship of forces between social classes, which have become acknowledged as integral to a normal standard of living.

**Variable Capital**: replaces the value of labor power, does in a sense undergo an alteration of value in that it both reproduces the equivalent of its own value, and also produces an excess, a surplus-value, which may itself vary, maybe more or less according to circumstances (Sweezy, 1970:62).

**Vertical Concentration**: refers to the coordination, standardization, and (greater or lesser) supervision of the production of numerous small producers through a central agency whether this represents productive capital directly (as in out-grower arrangements), forms of merchant's capital which thereby actively intervene in the organization of production, or whether the agency is that of a cooperative or other state-managed scheme (Bernstein, 1977:70).

**Wage**: price of the commodity of labor power, or monetary expression of its exchange-value, which oscillates about the value of labor-power via the regulation of the reserve army of labor, or volume of unemployment.
APPENDIX D:

MARKOV MODEL

First-Order, Finite, Discrete Stationary
Markov Process Model
Estimated From Micro Data

The model and its characteristics are defined as follows
(Hallberg, 1969: 290-291; Lee et al., 1977: 23):

1. \( s_i \) = the \( i \)th outcome or state. There are a finite number of outcomes or states \( s_i \) (\( i \ldots r \)), which random variable \( X_t \) (\( t=0,1,2,\ldots T \)) may take in \( T \) discrete equidistant time periods.

2. \( \text{Pr} (X_t = s_{it}, X_{t-1} = s_{it-1}, X_{t-2} = s_{it-2}, \ldots) \) \( X_0 = s_{i0} \) = \( \text{Pr} (X_t = s_{it} | X_{t-1} = s_{it-1}) \) for all \( t \), meaning that it is a first-order process.

3. \( P = (p_{ijt}) = r \times r \) matrix of transition probabilities, where \( p_{ijt} \) represents the probability that outcome \( s_j \) will result during the \( t \)th time period given that outcome \( s_i \) occurred during the \( (t-1) \)th time period.

4. \( X_0 \) = the initial starting state vector or initial configuration of elements in the \( r \) states, where \( X_{0i} \) represents the number of elements in \( s_i \) during time period \( t=0 \).

5. \( X_t = (x_{ti}) = \) the configuration vector.

6. \( n_{ij} \) = the number of elements in \( s_i \) during period \( (t-1) \) which moved to \( s_j \) during time period \( t \).

7. \( X_t = X_0 P \), the future time path of the stochastic process.
Additionally, two constraints are imposed on the elements of the $P$ matrix:

\begin{align*}
(8) \quad & P_{ijt} \geq 0 \text{ for all } i, j, t. \\
(9) \quad & \sum_{j=1}^{r} P_{ijt} = 1 \text{ for all } i \text{ and } t. 
\end{align*}

Anderson and Goodman (1957) suggested that the maximum likelihood estimator technique could be used to estimate the transition probabilities of elements moving between size categories. The calculation of the maximum likelihood estimator is as follows:

\begin{align*}
(10) \quad & \hat{P}_{ij} = \frac{\sum_{j=1}^{r} n_{ijt}}{\sum_{j=1}^{r} \sum_{t=1}^{T} n_{ijt}}.
\end{align*}

To estimate the transition matrix, historical micro-level data which indicate the number of elements which move from state $i$ to state $j$ during each time period are needed.

First-Order, Finite, Discrete, Stationary Markov Process Model Estimated from Aggregate Data

Because micro data which indicate the movement of farms between size categories in successive time periods is not available, aggregate data which indicate the number of farms by size categories at successive time periods would have to suffice. Lee, Judge and Zellner (1977) developed a model which could be used to estimate transition probabilities from aggregate proportion data. The model addressed the situation where $n_{ijt}$ sample observations are not available. Instead, the model uses aggregate outcome data, $n_{jt}$ and the total number of elements which are being observed, $\sum_{j=1}^{r} n_{jt}$. This aggregate data can be used to determine the proportion of elements in each state in time.
period t.

(11) \( y_{jt} = \frac{n_{jt}}{\sum_{j=1}^{n_{jt}}} \)

The first order conditional probability assumption is (Lee et al., 1977: 31):

(12) \( P_r(x_{t-1}=s_i, x_t=s_j) = P_r(x_{t-1}=s_i)Pr(x_t=s_j | x_{t-1}=s_i) \)

By applying the generalized law of addition to 12, 13 can be generated:

(13) \( P_r(x_t=s_j) = \sum_{i=1}^{r} P_r(x_{t-1}=s_i)P_r(x_t=s_j | x_{t-1}=s_i) \) or,

(14) \( q_{jt} = \sum_{i} (t-1)p_{ij} \) where \( q_{jt} \) and \( q_{i(t-1)} \) represent the unconditional probabilities, \( P_r(x_{t-1}=s_i) \) and \( P_r(x_{t-1}=s_i) \) respectively. The observed proportions \( y_{jt} \) and \( y_{j(t-1)} \) may be substituted as estimates for the unconditional probabilities.

By substituting the observed proportions and by adding an error term, 14 becomes:

(15) \( y_j(t) = \sum_{i=1}^{r} (t-1)p_{ij} + u_{jt} \).

Equation 15 can be written in matrix notation as:

(16) \( y_j = x_jp_j + u_j \) where

(17) \( y_j \) is a \((T\times1)\) vector of observed sample proportions.
(18) $X_j$ is a ($T \times r$) matrix of sample proportions.

\[
\begin{pmatrix}
X_{10} & X_{20} & \cdots & X_{r0} \\
X_{11} & X_{21} & \cdots & X_{r1} \\
\vdots & \vdots & \ddots & \vdots \\
X_{1(T-1)} & X_{2(T-1)} & \cdots & X_{r(T-1)}
\end{pmatrix}
\]

(19) $p_j$ is a ($r \times 1$) vector of unknown transition probabilities to be estimated.

\[
\begin{pmatrix}
P_{1j} \\
P_{2j} \\
\vdots \\
P_{rj}
\end{pmatrix}
\]

(20) $u_j$ is a ($T \times 1$) vector of error terms.

The error term vector assumptions are:

(21) $E(u_j) = 0$

(22) $E(u_j u_j) = \Phi$, a ($T \times T$) covariance matrix.

The model can be restated to reflect all $y_j$'s for each of the time periods.

(23) $y = Xp + u$. 
Equation 23 can be written in matrix notation as:

\[
\begin{bmatrix}
  y_1 \\
  y_2 \\
  \vdots \\
  y_r \\
\end{bmatrix}
= 
\begin{bmatrix}
  x_1 \\
  x_2 \\
  \vdots \\
  x_r \\
\end{bmatrix}
+ 
\begin{bmatrix}
  P_1 \\
  P_2 \\
  \vdots \\
  P_r \\
\end{bmatrix}
\begin{bmatrix}
  u_1 \\
  u_2 \\
  \vdots \\
  u_r \\
\end{bmatrix}
\]

Each \( y \) is a \((r \times 1)\) vector of sample proportions, where each \( y_j \) is a \((r \times 1)\) vector as demonstrated in 17.

\[
y = \begin{bmatrix}
  y_1 \\
  y_2 \\
  \vdots \\
  y_r \\
\end{bmatrix}
\]

The \( x \) is a \((r \times r^2)\) block diagonal matrix with \( x_1 = x_2 = x_r \), where each \( x_j \) is a \((r \times r)\) matrix of sample proportions as described in 18.

\[
x = \begin{bmatrix}
  x_1 & \ldots & 0 \\
  0 & x_2 & \ldots \\
  \vdots & \vdots & \ddots \\
  0 & \ldots & \ldots & x_r \\
\end{bmatrix}
\]

The \( p \) is a \((r^2 \times 1)\) matrix of unknown transition probabilities, where each \( p_j \) is a \((r \times 1)\) vector of unknown transition probabilities where each vector takes the form developed in 19.
\[ P = \begin{bmatrix} p_1 \\ p_2 \\ \vdots \\ p_r \end{bmatrix} \]

\( u \) is a \((r \times 1)\) vector of error terms, where each \( u_j \) is a \((1 \times 1)\) vector of error terms as developed in 20.

\[ u = \begin{bmatrix} u_1 \\ u_2 \\ \vdots \\ u_r \end{bmatrix} \]

The error term assumptions are:

\[ E(u) = 0 \]

\[ E(uu') = \Psi, \text{ a } (r \times r) \text{ covariance matrix as shown in 31.} \]

\[ \Psi = \begin{bmatrix} \psi_{11} & \psi_{12} & \cdots & \psi_{1r} \\ \psi_{21} & \psi_{22} & \cdots & \psi_{2r} \\ \vdots & \vdots & \ddots & \vdots \\ \psi_{r1} & \psi_{r2} & \cdots & \psi_{rr} \end{bmatrix} \]

The elements of the covariance matrix \( \Psi \) are given as:

\[ \text{variance: } t=t', i=j \quad \frac{q_{jt}(1-q_{jt})}{N_t} \]

\[ \text{covariance: } t=t', i \neq j \quad -q_{it}q_{jt} \frac{1}{N_t} \]
and where the submatrices $\psi_{ij}$ are the size (TXT) as expressed in:

\[
\psi_{ii} = \begin{bmatrix}
q_{i1}(1-q_{i1})/N_1 & q_{i2}(1-q_{i2})/N_2 \\
q_{i3}(1-q_{i3})/N_3 & \cdots & q_{iT}(1-q_{iT})/N_T
\end{bmatrix}
\]

\[
\psi_{ij} = \begin{bmatrix}
-q_{i1}q_{j1}/N_1 \\
-q_{i2}q_{j2}/N_2 \\
\vdots \\
-q_{iT}q_{jT}/N_T
\end{bmatrix}
\] for $i \neq j$

The ordinary least squares technique can be used to estimate the transition probabilities by minimizing the sum of squared error terms (Miller, 1952).

\[
\min u'u = (y-Xp)'(y-Xp)
\]

An estimate for $p$ is obtained by setting the sum of the squared error terms equal to zero and solving for $p$.

\[
p = (X'X)^{-1}X'Y
\]

When a solution for $p$ is obtained in 34, there is no guarantee that all of the estimated $p_{ij}$'s will meet the criteria that $p_{ij} \geq 0$ or $\sum_{j=1}^{r} p_{ij} = 1$. To fulfill the requirement that all $p_{ij}$'s are $\geq 0$ and to also guarantee that $\sum_{j=1}^{r} p_{ij} = 1$, the following restrictions are placed on 35.

\[
Gp \geq n_r
\]

where $G$ is a $(r \times r^2)$ matrix $(I_1, I_2, \ldots, I_r)$ with each $I_i$ an $(r \times r)$ identity matrix, and $n_r$ is a $(r \times 1)$ column vector with all elements equal to 1. The purpose of the restriction in 37 is to guarantee that $\sum_{j=1}^{r} p_{ij} = 1$. 

Another restriction, $p \geq 0$, is imposed on 35 to guarantee that there are no negative $p_{ij}$'s.

The solution of 28 with the imposed restrictions 37 and 38 shall be referred to as estimating restricted stationary transition probabilities by ordinary least squares Markov model. In a model involving proportions, however, heteroscedasticity is present. The unweighted, restricted ordinary least squares estimator does not account for heteroscedasticity and is therefore inefficient. Aitken's generalized least squares approach (Lee et al., 1977: 63) can be applied to deal with the problem. The following unbiased estimator is obtained:

\[(39) \quad p = (X'Y^{-1}X)^{-1}X'Y^{-1}Y.\]

Because $Y$ is a singular (TrXTr) covariance matrix, $Y^{-1}$ does not exist thus making Aitken's generalized least square technique unusable. Lee et al., (1977: 75) noted, however, that since the model as developed in 23 is restricted by the requirement that the row sums for each $y_{ij}$ must equal 1, there are redundant variables. There are, therefore, only $r-1$ independent observation vectors $y_j$ and $r-1$ independent parameter vectors $p_j$. The model can be reduced as follows:

\[(40) \quad \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_{r-1} \end{bmatrix} = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_{r-1} \end{bmatrix} + \begin{bmatrix} p_1 \\ p_2 \\ \vdots \\ p_{r-1} \end{bmatrix} + \begin{bmatrix} u_1 \\ u_2 \\ \vdots \\ u_{r-1} \end{bmatrix}.\]
The model can be written in matrix form as follows:

(41) \[ Y^* = X^*p^* + u^* \]

where

\[ Y^* = (T(r-1)X 1) \text{ matrix} \]
\[ X^* = (T(r-1)X 1) \text{ vector} \]
\[ p^* = (Tr(r-1)X 1) \text{ vector} \]
\[ u^* = (T(r-1)X 1) \text{ vector} \]

The error term vector \( u^* \) has the following assumptions:

(42) \[ Eu^* = 0 \]

(43) \[ Eu^*u^* = \Psi^* \] where \( \Psi^* \) is a nonsingular block matrix consisting of \( (r-1)^2 \) \( \Psi_{ij} \) submatrices in the form developed in 44.

(44) \[ \Psi^* = \begin{bmatrix} \Psi_{11} & \Psi_{12} & \ldots & \Psi_{1r-1} \\ \Psi_{21} & \Psi_{22} & \ldots & \Psi_{2r-1} \\ \vdots & \vdots & \ddots & \vdots \\ \Psi_{r-1,1} & \Psi_{r-1,2} & \ldots & \Psi_{r-1,r-1} \end{bmatrix} \]

The submatrices dimensions of \( \Psi^* \) are \((T \times T)\) and the elements of each are given by 45 and 46.

(45) \[ \Psi_{ij} = \begin{bmatrix} q_{i1}q_{j1}/N_1 \\ \vdots \\ q_{i1r-1}/N_1 \end{bmatrix} \]

(46) \[ \Psi_{ii} = \begin{bmatrix} q_{i1}(1-q_{i1})/N_1 \\ \vdots \\ q_{i1}q_{1T}/N_1 \end{bmatrix} \]

\[ q_{i1}(1-q_{i1})/N_2 \\ q_{i2}(1-q_{i2})/N_2 \\ q_{i1}q_{2T}/N_2 \]

\[ q_{i1}(1-q_{i1})/N_T \\ q_{i2}(1-q_{i2})/N_T \]

\[ q_{i1}q_{2T}/N_T \]
(47) The inverse of $\Psi^*$ is a $(r-1)T \times (r-1)T$ matrix with $(r-1)(r-1)$ submatrices in the following form:

$$
\Psi^{-1} = \begin{bmatrix}
\Psi_{11} & \Psi_{12} & \cdots & \Psi_{1,r-1} \\
\Psi_{21} & \Psi_{22} & \cdots & \Psi_{2,r-1} \\
& & \ddots & \\
& & & \Psi_{r-1} & \Psi_{r-1} & \cdots & \Psi_{r-1,r-1}
\end{bmatrix}
$$

The size of the submatrices of $\Psi^*$ is $(T \times T)$ and the elements of each submatrix are specified in the following:

(48) $\Psi_{ij} = \begin{bmatrix}
\frac{N_1}{q_{r1}} \\
\frac{N_2}{q_{r2}} \\
& \ddots \\
& & \frac{N_T}{q_{rT}}
\end{bmatrix}
$

(49) $\Psi_{jj} = \begin{bmatrix}
\frac{N_1 + N_1}{q_{r1} q_{11}} \\
\frac{N_2 + N_2}{q_{r2} q_{22}} \\
& \ddots \\
& & \frac{N_T + N_t}{q_{rT} + q(r-1)T}
\end{bmatrix}$
p* can be estimated by placing 41 in quadratic form, and solving for p* which minimizes the sum of the squared error terms. The solution for p* is calculated by minimizing the quadratic as developed in 50 and subject to the following restrictions:

\[(50)\quad (y* - X*p*)' \Psi *^{-1}(y* - X*p*)\]
\[(51)\quad R\hat{p}^* \leq n_r\]
\[(52)\quad p^* \geq 0\]

The \(n_r\) matrix is a \((r \times 1)\) vector of ones, and the \(R\) matrix is a reduced \(G\) matrix of the size \((r(r-1) \times r)\) which takes the form \((I_1, I_2, \ldots, I_{r-1})\) where each \(I\) is a \((r \times r)\) identity matrix.

Once p* has been estimated, the deleted parameter \(p^*_r\) can be estimated by solving the following equation:

\[(53)\quad \hat{p}^*_r = n_r - R\hat{p}^*\]

Because the number of estimated parameters cannot be greater than the number of observations, the following equation must hold:

\[(54)\quad r^2 < rT \text{ or } r < T\]

In summary, the model for a first order finite, stationary Markov process to estimate transition probabilities from macro data, utilizing ordinary least squares, is set forth in the following:

\[(55)\quad \text{min } (y - Xp)'(y - Xp) \text{ subject to the restrictions}\]
\[(56)\quad Gp \leq n_r \text{ and } p \geq 0\]

and the first order, discrete, stationary Markov process model used to estimate transition probabilities from macro data, utilizing generalized least squares, is as follows:

\[(57)\quad \text{min } (y* - X/p*)' \Psi *^{-1}(y* - y*p*) \text{ subject to the restrictions}\]
(58)  \( R\hat{p}^* \leq n_x \)

\( p^* \geq 0 \), and

\( \hat{p}_x = n_{r_x} - R\hat{p}^* \)
APPENDIX E:

DATA
Table E.1 Number of farms by farm-size categories 1940-1982

<table>
<thead>
<tr>
<th>Farm-Size Categories</th>
<th>1940^a</th>
<th>1945^a</th>
<th>1950^a</th>
<th>1954^b</th>
<th>1964^c</th>
<th>1969^d</th>
<th>1974^e</th>
<th>1978^f</th>
<th>1982^g</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10 acres</td>
<td>10428</td>
<td>10664</td>
<td>9585</td>
<td>9138</td>
<td>5469</td>
<td>4324</td>
<td>5637</td>
<td>5051</td>
<td>8343</td>
</tr>
<tr>
<td>10-49 acres</td>
<td>18097</td>
<td>17174</td>
<td>16515</td>
<td>14402</td>
<td>13710</td>
<td>11156</td>
<td>13796</td>
<td>12826</td>
<td>12327</td>
</tr>
<tr>
<td>50-99 acres</td>
<td>32146</td>
<td>28080</td>
<td>25894</td>
<td>22582</td>
<td>18549</td>
<td>18351</td>
<td>13769</td>
<td>12826</td>
<td>10951</td>
</tr>
<tr>
<td>100-139 acres</td>
<td>32854</td>
<td>30323</td>
<td>28720</td>
<td>24923</td>
<td>19586</td>
<td>15113</td>
<td>12563</td>
<td>10306</td>
<td>7992</td>
</tr>
<tr>
<td>140-179 acres</td>
<td>50967</td>
<td>50019</td>
<td>48846</td>
<td>45564</td>
<td>37408</td>
<td>27837</td>
<td>21897</td>
<td>17014</td>
<td>12010</td>
</tr>
<tr>
<td>180-219 acres</td>
<td>20722</td>
<td>21982</td>
<td>22457</td>
<td>22152</td>
<td>20105</td>
<td>16067</td>
<td>12818</td>
<td>10166</td>
<td>8890</td>
</tr>
<tr>
<td>220-259 acres</td>
<td>19302</td>
<td>20335</td>
<td>19896</td>
<td>20657</td>
<td>20699</td>
<td>17873</td>
<td>14582</td>
<td>11597</td>
<td>10012</td>
</tr>
<tr>
<td>250-299 acres</td>
<td>26119</td>
<td>27483</td>
<td>28144</td>
<td>29660</td>
<td>34337</td>
<td>38850</td>
<td>38598</td>
<td>36929</td>
<td>33373</td>
</tr>
<tr>
<td>300-399 acres</td>
<td>2382</td>
<td>2655</td>
<td>2845</td>
<td>3284</td>
<td>4477</td>
<td>6990</td>
<td>9865</td>
<td>12578</td>
<td>14195</td>
</tr>
<tr>
<td>400-499 acres</td>
<td>201</td>
<td>219</td>
<td>253</td>
<td>271</td>
<td>341</td>
<td>592</td>
<td>1012</td>
<td>1708</td>
<td>2406</td>
</tr>
<tr>
<td>500-999 acres</td>
<td>20834</td>
<td>20355</td>
<td>192933</td>
<td>174681</td>
<td>157153</td>
<td>140354</td>
<td>126010</td>
<td>126456</td>
<td>115369</td>
</tr>
</tbody>
</table>

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^a 1954 Census of Agriculture, Volume I, Part 16, Iowa. State Table 2.
^d 1969 Census of Agriculture, Volume I, Part 16, Iowa. Chapter 1, Table 26 (Farms with more than $2,500 sales).
^e 1974 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 30 (Farms with more than $2,500 sales).
^f 1978 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 33.
^g 1982 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 48.
Table E.2 Number and percent of acres by farm-size categories

<table>
<thead>
<tr>
<th>Farm Size Categories</th>
<th>1959(^a)</th>
<th>1964(^b)</th>
<th>1969(^c)</th>
<th>1974(^d)</th>
<th>1978(^e)</th>
<th>1982(^f)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>&lt;10 acres</td>
<td>23135</td>
<td>.06</td>
<td>16944</td>
<td>.05</td>
<td>14365</td>
<td>.04</td>
</tr>
<tr>
<td>10-49 acres</td>
<td>368602</td>
<td>1.1</td>
<td>306477</td>
<td>.9</td>
<td>267618</td>
<td>.8</td>
</tr>
<tr>
<td>50-99 acres</td>
<td>1427816</td>
<td>4.2</td>
<td>1175936</td>
<td>3.5</td>
<td>1052929</td>
<td>3.1</td>
</tr>
<tr>
<td>100-139 acres</td>
<td>2316141</td>
<td>6.8</td>
<td>1786915</td>
<td>5.3</td>
<td>1482641</td>
<td>4.4</td>
</tr>
<tr>
<td>140-179 acres</td>
<td>5940523</td>
<td>17.5</td>
<td>4420728</td>
<td>13.1</td>
<td>3471079</td>
<td>10.3</td>
</tr>
<tr>
<td>180-219 acres</td>
<td>3978935</td>
<td>11.7</td>
<td>3176784</td>
<td>9.4</td>
<td>2534995</td>
<td>7.6</td>
</tr>
<tr>
<td>220-259 acres</td>
<td>4920230</td>
<td>14.5</td>
<td>4251136</td>
<td>12.6</td>
<td>3468717</td>
<td>10.3</td>
</tr>
<tr>
<td>260-499 acres</td>
<td>11600483</td>
<td>34.2</td>
<td>13351684</td>
<td>39.6</td>
<td>13540385</td>
<td>40.3</td>
</tr>
<tr>
<td>500-999 acres</td>
<td>2821045</td>
<td>8.3</td>
<td>4410781</td>
<td>13.1</td>
<td>6307752</td>
<td>18.8</td>
</tr>
<tr>
<td>1000+ acres</td>
<td>501271</td>
<td>1.5</td>
<td>861936</td>
<td>2.6</td>
<td>1429148</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>33898181</td>
<td></td>
<td>33758321</td>
<td></td>
<td>33569629</td>
<td></td>
</tr>
<tr>
<td>Avg. Farm Size</td>
<td>194</td>
<td></td>
<td>219</td>
<td></td>
<td>239</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)1954 Census of Agriculture, Volume I, Part 16, Iowa. State Table 2.
\(^c\)1964 Census of Agriculture, Volume I, Part 16, Iowa. State Table 20.
\(^d\)1969 Census of Agriculture, Volume I, Part 16, Iowa. Chapter 1, Table 26
\(^e\)1974 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 30
\(^f\)1978 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 33.
<table>
<thead>
<tr>
<th>Farm Size Categories</th>
<th>1959&lt;sup&gt;a&lt;/sup&gt;</th>
<th>1964&lt;sup&gt;b&lt;/sup&gt;</th>
<th>1969&lt;sup&gt;c&lt;/sup&gt;</th>
<th>1974&lt;sup&gt;d&lt;/sup&gt;</th>
<th>1978&lt;sup&gt;e&lt;/sup&gt;</th>
<th>1982&lt;sup&gt;f&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number %</td>
<td>Number %</td>
<td>Number %</td>
<td>Number %</td>
<td>Number %</td>
<td>Number %</td>
</tr>
<tr>
<td>&lt;10 acres</td>
<td>15667 0.6</td>
<td>16988 0.6</td>
<td>32107 1.0</td>
<td>50680 1.2</td>
<td>80106 1.9</td>
<td>78197</td>
</tr>
<tr>
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<td>31351 0.9</td>
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<td>383974 14.8</td>
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<tr>
<td>180-219 acres</td>
<td>394466 11.7</td>
<td>260998 10.0</td>
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<td>244272 5.7</td>
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<td>394660 15.2</td>
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<td>4266931</td>
<td>4200316</td>
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<sup>a</sup>1954 Census of Agriculture, Volume I, Part 16, Iowa. State Table 2.
<sup>c</sup>1964 Census of Agriculture, Volume I, Part 16, Iowa. State Table 20.
<sup>d</sup>1969 Census of Agriculture, Volume I, Part 16, Iowa. Chapter 1, Table 26
<sup>e</sup>(Farms with more than $2,500 sales).
<sup>f</sup>1974 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 30
<sup>e</sup>(Farms with more than $2,500 sales).

<sup>f</sup>1978 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 33.
<table>
<thead>
<tr>
<th>Year</th>
<th>Farm Size Categories</th>
<th>1959(^a) Number</th>
<th>1959(^a) %</th>
<th>1964(^b) Number</th>
<th>1964(^b) %</th>
<th>1969(^c) Number</th>
<th>1969(^c) %</th>
<th>1974(^d) Number</th>
<th>1974(^d) %</th>
<th>1978(^e) Number</th>
<th>1978(^e) %</th>
<th>1982(^f) Number</th>
<th>1982(^f) %</th>
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<td>5003</td>
<td>14.2</td>
<td>4697</td>
<td>14.6</td>
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<td>8696</td>
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<td>8062</td>
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<td>4170</td>
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<td>1664</td>
<td>6.5</td>
<td>1911</td>
<td>8.8</td>
<td>1515</td>
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<td>1854</td>
<td>5.3</td>
<td>1714</td>
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<td>1673</td>
<td>7.7</td>
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<td>9.1</td>
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<td>507</td>
<td>2.6</td>
<td>814</td>
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<td>35137</td>
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\(^a\) 1954 Census of Agriculture, Volume 1, Part 16, Iowa. State Table 2.


\(^c\) 1964 Census of Agriculture, Volume 1, Part 16, Iowa. State Table 20.

\(^d\) 1969 Census of Agriculture, Volume 1, Part 16, Iowa. Chapter 1, Table 26 (Farms with more than $2,500 sales).

\(^e\) 1974 Census of Agriculture, Volume 1, Part 15, Iowa. Chapter 1, Table 30 (Farms with more than $2,500 sales).

\(^f\) 1978 Census of Agriculture, Volume 1, Part 15, Iowa. Chapter 1, Table 33.
Table E.5  Number and percent of farms employing laborers 150 days or more per year by farm-size categories

<table>
<thead>
<tr>
<th>Farm Size Categories</th>
<th>1959&lt;sup&gt;a&lt;/sup&gt;</th>
<th>1964&lt;sup&gt;b&lt;/sup&gt;</th>
<th>1969&lt;sup&gt;c&lt;/sup&gt;</th>
<th>1974&lt;sup&gt;d&lt;/sup&gt;</th>
<th>1978&lt;sup&gt;e&lt;/sup&gt;</th>
<th>1982&lt;sup&gt;f&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>&lt;10 acres</td>
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<td>.7</td>
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<td>261</td>
<td>1.8</td>
<td>142</td>
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<td>304</td>
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<td>391</td>
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<td>192</td>
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<td>74</td>
<td>.8</td>
<td>118</td>
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<td>1098</td>
<td>7.7</td>
<td>485</td>
<td>5.4</td>
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<td>744</td>
<td>5.2</td>
<td>401</td>
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<td>2777</td>
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<td>14249</td>
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<sup>a</sup>1959 Census of Agriculture, Volume I, Part 16, Iowa. Chapter A, Table 20 (Estimates based on samples).

<sup>b</sup>1964 Census of Agriculture, Volume I, Part 16, Iowa. Chapter 1, Table 20 (Estimates based on samples).

<sup>c</sup>1969 Census of Agriculture, Volume I, Part 16, Iowa. Chapter 1, Table 20 (Farms with more than $2,500 sales).

<sup>d</sup>1974 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 30 (Farms with more than $2,500 sales).

<sup>e</sup>1978 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 33.

<sup>f</sup>1982 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 48.
<table>
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<th>Farm Size Categories</th>
<th>Year</th>
<th>Number</th>
<th>%</th>
<th>Number</th>
<th>%</th>
<th>Number</th>
<th>%</th>
<th>Number</th>
<th>%</th>
<th>Number</th>
<th>%</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1959&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1964&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1969&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1974&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1978&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1982&lt;sup&gt;f&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&lt;10 acres</td>
<td>4446</td>
<td>3582</td>
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<td>2976</td>
<td>6918</td>
<td>6886</td>
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</tr>
<tr>
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<td>5365</td>
<td>4275</td>
<td>3576</td>
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<sup>a</sup>1959 Census of Agriculture, Volume I, Part 16, Iowa. Chapter A, Table 20.<br>
<sup>b</sup>1964 Census of Agriculture, Volume I, Part 16, Iowa. State Table 20.<br>
<sup>c</sup>1969 Census of Agriculture, Volume I, Part 16, Iowa. Chapter 1, Table 26 (Farms with more than $2,500 sales).<br>
<sup>d</sup>1974 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 30 (Farms with more than $2,500 sales).<br>
<sup>e</sup>1978 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 33.<br>
<sup>f</sup>1982 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 48.
Table E.7 Number and percent of part-owners by farm-size categories

<table>
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<tr>
<th>Farm Size Categories</th>
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<th>1964&lt;sup&gt;b&lt;/sup&gt;</th>
<th>1969&lt;sup&gt;c&lt;/sup&gt;</th>
<th>1974&lt;sup&gt;d&lt;/sup&gt;</th>
<th>1978&lt;sup&gt;e&lt;/sup&gt;</th>
<th>1982&lt;sup&gt;f&lt;/sup&gt;</th>
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<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
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<td>1586</td>
<td>4.3</td>
<td>1093</td>
<td>3.2</td>
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<td>140-179 acres</td>
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<td>3432</td>
<td>9.8</td>
<td>2413</td>
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<td>12.8</td>
<td>3842</td>
<td>11.0</td>
<td>2905</td>
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<td>4889</td>
<td>14.0</td>
<td>4052</td>
<td>11.8</td>
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<td>16569</td>
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<td>.9</td>
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<td>1.9</td>
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<td>34853</td>
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<sup>a</sup>1959 Census of Agriculture, Volume I, Part 16, Iowa. Chapter A, Table 20.
<sup>b</sup>1964 Census of Agriculture, Volume I, Part 16, Iowa. State Table 20.
<sup>c</sup>1969 Census of Agriculture, Volume I, Part 16, Iowa. Chapter 1, Table 26 (Farms with more than $2,500 sales).
<sup>d</sup>1974 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 30 (Farms with more than $2,500 sales).
<sup>e</sup>1978 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 33.
<sup>f</sup>1982 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 48.
Table E.8 Number and percent of tenants by farm-size categories

<table>
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<tr>
<th>Year</th>
<th>Farm Size Categories</th>
<th>1959&lt;sup&gt;a&lt;/sup&gt;</th>
<th>1964&lt;sup&gt;b&lt;/sup&gt;</th>
<th>1969&lt;sup&gt;c&lt;/sup&gt;</th>
<th>1974&lt;sup&gt;d&lt;/sup&gt;</th>
<th>1978&lt;sup&gt;e&lt;/sup&gt;</th>
<th>1982&lt;sup&gt;f&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>1959</td>
<td></td>
<td>801</td>
<td>1.3</td>
<td>623</td>
<td>1.3</td>
<td>305</td>
<td>1.0</td>
</tr>
<tr>
<td>1964</td>
<td>&lt;10 acres</td>
<td>1357</td>
<td>2.2</td>
<td>1139</td>
<td>2.3</td>
<td>456</td>
<td>1.4</td>
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<tr>
<td>1969</td>
<td>10-49 acres</td>
<td>3138</td>
<td>5.1</td>
<td>2353</td>
<td>4.8</td>
<td>1540</td>
<td>4.8</td>
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<tr>
<td>1974</td>
<td>50-99 acres</td>
<td>5432</td>
<td>8.9</td>
<td>3630</td>
<td>7.4</td>
<td>2096</td>
<td>6.5</td>
</tr>
<tr>
<td>1978</td>
<td>100-139 acres</td>
<td>16065</td>
<td>26.3</td>
<td>10485</td>
<td>21.5</td>
<td>6026</td>
<td>18.8</td>
</tr>
<tr>
<td>1982</td>
<td>140-179 acres</td>
<td>8685</td>
<td>14.2</td>
<td>5932</td>
<td>12.2</td>
<td>3421</td>
<td>10.7</td>
</tr>
<tr>
<td>1959</td>
<td>180-219 acres</td>
<td>9889</td>
<td>16.2</td>
<td>7617</td>
<td>15.6</td>
<td>4530</td>
<td>14.1</td>
</tr>
<tr>
<td>1964</td>
<td>220-259 acres</td>
<td>14512</td>
<td>23.8</td>
<td>15148</td>
<td>31.0</td>
<td>11469</td>
<td>35.8</td>
</tr>
<tr>
<td>1969</td>
<td>260-499 acres</td>
<td>1156</td>
<td>1.9</td>
<td>1812</td>
<td>3.7</td>
<td>2077</td>
<td>6.5</td>
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<tr>
<td>1974</td>
<td>500-999 acres</td>
<td>36</td>
<td>.1</td>
<td>84</td>
<td>.2</td>
<td>126</td>
<td>.4</td>
</tr>
<tr>
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<td>1000+ acres</td>
<td>36</td>
<td>.1</td>
<td>84</td>
<td>.2</td>
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<td>.4</td>
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<tr>
<td>1982</td>
<td>Total</td>
<td>61071</td>
<td>100</td>
<td>48823</td>
<td>100</td>
<td>32046</td>
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<sup>b</sup>1964 Census of Agriculture, Volume I, Part 16, Iowa. State Table 20.
<sup>c</sup>1969 Census of Agriculture, Volume I, Part 16, Iowa. Chapter 1, Table 26 (Farms with more than $2,500 sales).
<sup>d</sup>1974 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 30 (Farms with more than $2,500 sales).
<sup>e</sup>1978 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 33.
<sup>f</sup>1982 Census of Agriculture, Volume I, Part 15, Iowa. Chapter 1, Table 48.