The impacts of rental-market legislation on agriculture in northwest Portugal

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THE IMPACTS OF RENTAL-MARKET LEGISLATION ON AGRICULTURE IN NORTHWEST PORTUGAL

by

Daniel Richard Kennedy

A Thesis Submitted to the Faculty of the

DEPARTMENT OF AGRICULTURAL ECONOMICS

In Partial Fulfillment of the Requirements
For the Degree of

MASTER OF SCIENCE

In the Graduate College

THE UNIVERSITY OF ARIZONA

1989

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ABSTRACT

In January, 1986, Portugal became a part of the European Community. Although this will have many beneficial effects on Portugal's industrial sector, the agricultural sector will be negatively impacted by the regulations under the Common Agricultural Policy (CAP) due to take affect in 1996. The Entre Douro e Minho (EDM) region, in particular, will be hard hit by the CAP regulations. Modeling of the EDM suggests that farm operators can offset many of the negative impacts through increases in farm investment and farm size. However, legislation in both the credit and land markets hinder this process.

This study analyzes the rental-market legislation in light of tenancy theory. The analysis suggests that changes in the method of calculating maximum rent along with changes in the security of tenure provisions will stimulate the rental markets and lead to the desired increases in farm investment and farm size.

CHAPTER ONE

INTRODUCTION

Prior to the mid-1940's, policy makers considered industrialization as the key to development, with the capital for new industrial investment obtained from taxes on the rural population or agricultural output and labor requirements met by a transfer of labor from the agricultural sector. It was assumed that much of the agricultural labor force was unproductive, and that food production would not decline as a result of a shift in labor away from agriculture to industry.

Since that time, the focus of economic development in developing countries has shifted away from industrialization and back toward agriculture as problems with the industry-first strategy were discovered (Monke and Pearson). For example, the small size of domestic markets in many developing countries forced the new industries to compete in international markets where they were at a great disadvantage. In order to sustain the viability of firms, domestic consumers paid prices higher than world prices, or governments subsidized production costs to maintain international competitiveness. Often, both policies were used, thus creating an increased burden on the budgets of consumers and governments. An additional problem with the industry-first strategy was the absence of the assumed surplus resources in agriculture. In most countries this meant that industry lured labor away from productive agriculture, and agricultural production declined as industry grew. In countries where this occurred, foreign exchange had to be directed increasingly toward imports of food rather than imports of the inputs essential for industrial development. Finally, the industry-first strategy caused a decline in agricultural incomes resulting in a decreased rural demand for industrial sector output.

Due to these discoveries, development strategies have shifted the emphasis toward agricultural development with industry as a complement to agricultural growth. In contrast to the earlier approaches, the industrial growth is determined largely by domestic demand. International markets can still provide opportunities for growth, but usually in the processing of agricultural and other labor-intensive products.

Although Portugal is a part of Europe, it has an agricultural sector considered to be thirty years out of date, and is characterized by many as a "developing country." In much of the country, ownership and cultivation patterns are fragmented, rural education levels are low, and technologies are highly labor-and animal-intensive. In addition, the Ministry of Agricultural is characterized by top-heavy bureaucracy, a lack of political influence and access to budgetary resources, and a salary structure so low that employees seek secondary jobs (Pearson and Monke). Portugal's accession into the European Community (EC) in January 1986 has created a dilemma about the strategy for economic development. Neither the industry-first nor the agriculture-first strategy applies exclusively in this unique situation. The above arguments against the industry-first strategy do not necessarily apply here because Portuguese industry will not have to rely on domestic capital investment or domestic demand because low labor costs in Portugal compared to the rest of the EC will attract foreign investment capital to produce products for sale throughout the EC.

Even though Portugal is in a situation where it can benefit substantially from industrial development, its agricultural sector should not be ignored. Despite its recent stagnation, the agricultural sector in Portugal remains an important part of the economy, accounting for one-fourth of national employment and one-eighth of national income (Pearson and Monke). Therefore, Portugal needs to find a way to maintain an economic balance between industry and agriculture and create more rapid growth in aggregate income.

Portugal's accession to the EC exacerbates the internal pressures for changing agricultural policies because Common Agricultural Policy (CAP) will change the center for agricultural decision making and the level of incentives given by the present system of price supports.

The Entre Douro e Minho (EDM) region of Portugal will be particularly hard hit by CAP policies which will impose lower prices and/or limits on the principal outputs of the EDM (corn, milk, wine, and beef), reducing profit and making agriculture a less attractive source of employment for domestic labor and capital resources (Josling and Tangermann). Granted, the relative decline of agriculture in employment and national income occurs as a result of economic development in all countries. However, the effects of a decline in the agricultural sector can be "healthy" or "unhealthy" (Timmer).

With a healthy decline, returns to domestic resources in the agricultural sector remain equal (or nearly equal) to returns in the non-agricultural sector. So, the agricultural sector declines in relative but not necessarily in absolute terms. In fact, total income generated by agriculture may increase. An unhealthy decline occurs when real returns to domestic factors within agriculture remain fixed, and thus lag behind other expanding sectors of the economy. Domestic factors of production leave agriculture at a rate determined by the growth in non-agricultural employment opportunities. In this way, agriculture becomes a depressed sector in the economy, declining in both relative and absolute terms. Instead of competing for resources, agriculture becomes the employer of last resort.

Agricultural sectors in almost all countries face continual pressure to adjust and maintain profitability because of real price declines in most agricultural products and increased opportunity costs of labor (represented by off-farm earnings). A healthy agricultural sector that is able to compete for and retain quality managerial resources will

show some capacity for autonomous adjustment--changing crop mixes, experimenting with new technologies, and perfecting production practices to raise yields or reduce unit costs of production. In contrast, an unhealthy agricultural sector retains the least mobile and lowest quality of human resources. With little or no ability to innovate, the unhealthy agricultural sector relies on external government assistance to prevent the farm population from becoming impoverished, and thus it can become a constant drain on resources generated by growth rather than a source of innovation and a contributor to the growth process.

For EDM agriculture, the potential for unhealthy decline is ominous. Dominated by small traditional farms, the EDM region is already among the poorest in the Portuguese (and European) economy (Monke). One of the most adverse consequences of accession to the EC is the possibility of further impoverishment for the EDM population relative to the rest of Portugal. Can a healthy agricultural sector be sustained in the EDM, or should farmers be encouraged through government programs to leave in search of opportunities elsewhere? An attempt at answering these questions has been made by a team of analysts. They concluded that there exist possibilities for a healthy agricultural sector in much of the EDM provided that farmers increase investment and/or farm size.

This paper focuses on the EDM region in northwest Portugal and how it might combat the impacts of increased competition for domestic resources--capital, land, and labor--and the declining returns to agriculture as a result of joining the EC. More specifically, the focus is on how the legislation affecting farmland rental markets has hindered both investment and farm-size expansion. Present fragmentation legislation limits the sale and rental of farmland in such a way that most EDM farmers must disregard the legislation if they desire to increase their farm size. In addition, the rental market legislation discourages landowners from renting their land because of official rental rates that are too low and

security of tenure provisions that effectively provide tenants with life-time tenure. Both types of legislation have resulted in as extremely high rate of avoidance of official contracts. Avoidance has been achieved mainly through the use of verbal share contracts, which the Portuguese government discourages because it adheres to the Marshallian (tax-equivalent) theory that share tenancy is inherently inefficient. However, even if one accepts Cheung's theory that share and fixed-rent tenancy can be equally efficient, the Portuguese legislation still results in inefficiencies because of costs of avoidance, discouragement of investment, and limitation of farm-size expansion.

To better understand the impacts of Portuguese fragmentation and rental-market legislation on EDM farmers, this paper begins with a description of the EDM agricultural sector, followed by a description of the land markets. The results from a survey of the region provide characterizations of employment patterns, crop production patterns, and the operation of land, labor, and capital markets in the EDM's three agroclimatic zones. In all, 15 representative farm types are identified that include more than four-fifths of EDM farms. The characterizations vary in terms of crop mix, production technology and agroclimatic zone.

Chapters Four and Five concentrate on the various theories of tenancy--mainly the tax-equivalent and equal-efficiency models. Chapter Four provides a review of the literature concerning land tenancy, while Chapter Five details the specifics of the tax-equivalent and the equal-efficiency models. The remainder of the paper analyzes, in light of tenancy theory, the present Portuguese legislation that affects rental markets in the EDM. The analysis includes a discussion of how legislation ignores many of the conclusions of tenancy theory as well as the uniqueness of the EDM region. In addition, estimates of the efficiency losses caused by legislation are included. Finally, recommendations are given

for revisions in the legislation. A comprehensive revision of rental legislation would require further research along certain lines proposed in the final two chapters.

CHAPTER TWO

THE STUDY AREA

This chapter describes briefly the farming systems and the physical characteristics of the Entre Douro e Minho (EDM) region. The purpose is to give the reader an appreciation for the diversity of the region and its farming systems.

I. Description of the EDM Region

The EDM region in Northwest Portugal is 8,790 square kilometers (or 3,394 square miles). Despite its small size, the EDM is heterogeneous in several respects: agroclimatic variations, cropping choices, technology adoption, and the allocation of family resources. Based on these characteristics, most analysts divide the region into three major zones: Coastal, Intermediate, and Mountain (See Figure 2.1). The three zones differ in terms of climate and topography. These differences influence crop choices, production technologies, and livestock activities. Elevation, slope, and rainfall increase from the West to the East, while temperature is generally lower in the mountains where there are few trees. Because of the slope of the land in the Intermediate and Mountain zones, terraced farming is a common practice that results in greater fragmentation of farms.

II. The Farming Systems[1]

Major agricultural activities for the EDM include corn, milk, and wine. Corn is planted on over 80 percent of the agricultural area. In 1980, the EDM produced 35 percent

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1 The descriptions of the various EDM farming systems are based largely on those of Timothy Finan found in Portuguese Agriculture in Transition, Ch. 8.

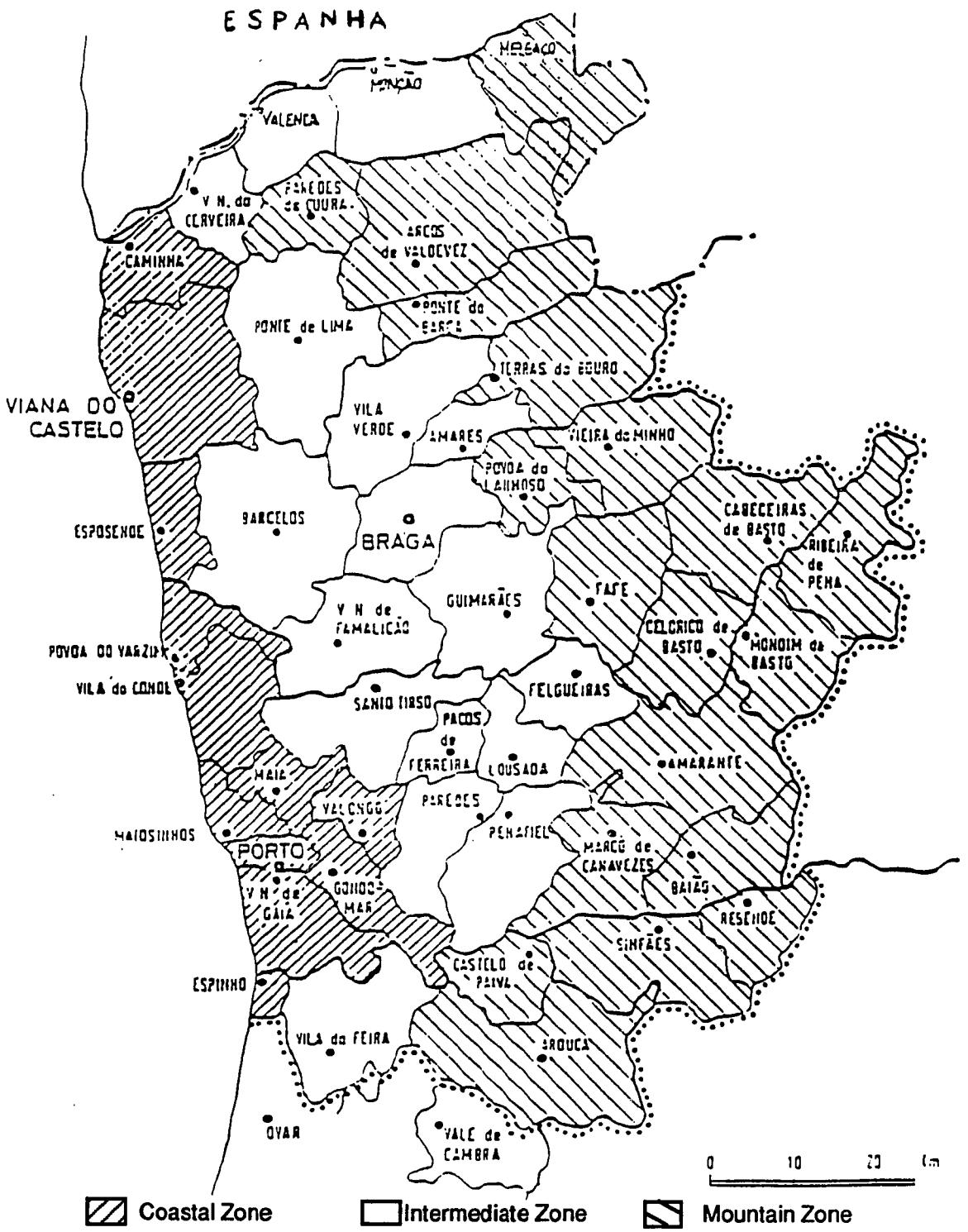

Figure 2.1: Agroclimatic Zones in Entre Douro e Minho

of the mainland milk supply on only five percent of Portugal's agricultural area with approximately 28,000 farmers--17 percent of the economically active agricultural population (Mendes, p. 8). Milk production is primarily based on inputs produced on the farms: corn, silage, grass, pasture, hay, and crop residues. As for wine, grapes are almost entirely grown on arbors that border the fields. They occupy an additional 16 percent of the agricultural area; wine accounts for about one-third of the region's gross agricultural product (INE).

Beginning in 1981, characteristics that are both quantitative and qualitative--such as the breed of animal in a dairy activity or the type of staking used in a vineyard--were used by the Portuguese Program of Soil Correction, Fertilizers and Forages (PROCALFER) to classify the various farming systems in the EDM. Six principal production strategies were identified which account for about 90 percent of the number of farms and the same percentage of total farmland: dairy and young calves, beef, corn for grain or silage, wine, small ruminants, and vegetables. Within these six production strategies, additional systems were identified to represent variations in production technologies, degrees of specialization, and size of operation.

Table 2.1 summarizes the relative weight of the farm types across the three zones of the EDM. Limited specialization in the region is demonstrated by the fact that the predominant farming systems--in terms of farm numbers (68 percent) and total farmland (44 percent)--are the traditional and transitional types. These representative systems are especially prominent in the Intermediate and Mountain zones.

A. The Traditional Farm:

A traditional farm is characterized by approximately one hectare (ha) of cultivated area on which a corn/bean mixture is rotated with winter forage. The central crop is corn,

Table 2.1: Frequency Distribution of the Principal Farming Systems.

Represent. Systems	Coastal Farms (%)	Coastal Farmland (%)	Intermediate Farms (%)	Intermediate Farmland (%)	Mountain Farms (%)	Mountain Farmland (%)	EDM Farms (%)	EDM Farmland (%)
Traditional	--	--	42.0	33.9	44.4	32.6	35.2	23.4
Transitional:								
Wine	9.8	3.1	27.1	15.9	6.1	2.9	17.9	8.3
Dairy	8.2	2.5	3.9	3.7	15.1	13.4	7.9	6.2
Beef	3.3	0.4	4.9	4.2	5.1	3.8	4.7	2.9
Corn	--	--	2.2	3.2	5.1	5.8	2.6	3.0
Small Wine	--	--	0.6	1.5	--	--	0.3	0.6
Small Dairy	26.2	18.5	6.6	16.5	2.0	9.9	8.8	15.2
Small Beef	--	--	1.1	1.6	--	--	0.6	0.6
Medium Wine	--	--	0.6	4.6	--	--	0.3	1.9
Medium Dairy	23.0	30.5	1.1	2.3	--	--	4.7	10.1
Medium Beef	3.3	2.4	1.1	2.5	--	--	1.2	1.7
Large & Very Large Dairy	16.4	39.6	--	--	1.0	12.9	3.2	15.6
Sheep/Goats	--	--	--	--	1.0	0.5	0.3	0.2
Others	9.8	3.0	8.8	10.1	20.2	18.2	12.3	10.3

Source: Freguesia Survey, (Avillez et al.).

used for both family consumption and animal feed. Forage crops, commonly ryegrass, are fed to the cattle first as green fodder, later as hay. Other crops include potatoes, rye that is used for bread and seed, and wine grapes which are grown on arbors that border the fields.

The technology on traditional farms is labor-intensive. Animals provide both transportation and field traction with typically two multipurpose work cows providing several hundred hours of draft power as well as 1,000 liters of milk per year. In addition, calves from the cows are sold to beef producers.

Traditional cows require little management. They are kept in stables under the farm residence and milked once a day for approximately 200 days after calving. The milk goes from the farm to a cooperative reception post for transportation and then to processing plants. Cows are only in the field when harnessed for work; they do not graze. Instead, the cows are fed in the stable with feed produced entirely on the farm.

B. Small Dairy:

In the small dairy system, dairy cows, which produce more milk but require more management and feed, replace traditional cows. The farmers also adopt a standard crop technology of hybrid corn seed (in place of regional varieties), limestone for soil acidity, and higher levels of fertilizer. With the increased yields of corn for grain and fodder, the small dairy farmers can support a herd of two dairy cows. Small amounts of mixed feed supplement the on-farm inputs. Farmers use artificial insemination to control herd quality.

Small milk farmers use collective milking parlors that are owned either by local cooperatives or by their unions and are located within a one or two kilometer (km) radius of their farms. The cows are milked twice a day at the collective parlor, where in most cases the milk is held in refrigerated bulk tanks. The parlors are important to the small dairy farmers because they provide a guaranteed market and help maintain milk quality.

The higher-yielding dairy cows produce triple the output of traditional breeds; however, the farmers who exchange their traditional cows lose animal traction on a farm still too small to mechanize. One solution might be for farmers to replace lost animal traction with custom machinery services.

C. Medium Dairy:

The Medium dairy system is generally three ha in size and supports approximately 12 cows. Like the smaller systems, crop diversity is not sacrificed--potatoes and wine are still produced. However, the nondairy products are primarily for home consumption.

There are two major technological alterations in the medium dairy system. First, corn silage replaces corn grain as the basic feeding regime. This requires a substantial investment in capital, including machinery, and a silo, cow barn, and corral. As in other systems, corn is followed by a forage mix in the winter rotation. The improvements in feed quality and increases in mixed feed usage increase milk yield to 4000 liters per cow-year. Second, there is an increase in the degree of mechanization and use of purchased inputs such as herbicides. These increases in turn lead to a reduction in labor hours.

At this level, the farmers invest more in veterinary care and herd management. Only the best calves are kept for replacement reserves, and surplus calves are marketed at less than one month of age. The medium dairy farm also has its own milk parlor with refrigerated bulk tank that cooperative trucks empty regularly.

D. Large Dairy:

At the large dairy level, no corn grain or wine is produced. There may be a 0.5 ha potato field with all other land resources allocated to cattle feed production. On average, ten ha of cultivated land support 36 dairy cows. In addition to corn silage and ryegrass for fodder and hay, the large dairy farm cultivates three ha of permanent pasture with mixed

legume forages. To intensify the productivity of these pastures, the fodder is cut and taken to the cow barns to avoid any trampling damage by grazing animals. Milk yield increases to 5000 liters per cow-year and the useful life of each cow is reduced to six years. Also, great care is taken to improve herd quality through management and the purchase of high quality bull semen.

On large dairies, the milk system is totally mechanized and the cows are milked in a private parlor containing modern refrigeration equipment. In contrast to the other systems, abundant land resources permit a fuller utilization of machine capacity. The large farm typically requires full-time salaried laborers to complement available family labor.

E. Field Crops:

Corn, introduced to the EDM region nearly four centuries ago, has become one of the most important crops in the region. Traditional corn is grown with regional seed and few purchased inputs. The hybrid system uses the modern technology of hybrid seed, limestone to correct for acidity, and a full complement of fertilizers. It also requires an adequate water source. As noted previously, the switch to hybrid corn varieties tends to occur with the intensification of dairying activities.

Both systems require large quantities of labor. Although field preparation is mostly done with custom machinery, all other tasks including weeding, thinning, irrigation, harvesting, and post-harvest care, utilize labor. Improvements in technology result in more intensive use of land and labor to increase yields.

Potatoes are also an important crop in the EDM region. They use the same quality of land as corn, and their planting seasons are virtually identical, thus allowing farmers to shift resources between milk (corn) and potato production. Traditional potato farming uses animal traction for all activities except land preparation which uses machinery. Potatoes are

planted in early spring and harvested during the summer. Even though second-generation potato seed reduces yields, traditional farmers opt for reducing input costs by using a portion of their previous harvest as seed.

In addition to heavy doses of manure, traditional potato farmers use some chemical fertilizers. To defend against fungi and pests, they also use motorized backpack sprayers. Nonetheless, the work is very labor-intensive, especially during the harvest period.

Medium and large potato farmers substitute capital for labor. Fertilizer use remains about the same, but only purchased seed potatoes are used which results in a 33 percent increase in yield over the traditional system. Large potato farmers differ from medium farmers primarily in per-unit machinery costs as a result of their size.

Even though private profitability levels for potatoes are high, farmers are reluctant to specialize in potato production for two reasons. First, the price of potatoes tends to fluctuate widely, making them a market risk. Second, potatoes are very susceptible to a wide array of soil-borne diseases and cannot be produced safely on the same area over consecutive years. Although moving the potato plot can reduce the risk of disease, this would also require a large amount of land relative to the potato plot in order to permit safe rotation patterns. Most EDM farmers do not have this luxury.

F. Wine Systems:

The designated regions of *vinho verde* include all of the EDM and a portion of the Northern Beira Litoral. The low-alcohol *vinho verde* is both a widely consumed household drink and an important market commodity. In fact, in many of the river valleys of the EDM wine production is the principal agricultural activity.

Vinho verde grapes are traditionally grown on elevated arbors called *ramadas* . *Ramadas* are generally three meters off the ground, four meters wide, and form the edges of farm parcels and cultivated terraces. They are supported by stone columns with iron crossbars connected by steel wires. Farmers process *vinho verde* in their own homes, and virtually every farm house has its own winery and cellar. Wine not consumed by the household is marketed to local wholesalers for regional distribution.

Improvements in traditional wine systems could result in greater profitability for wine making. For example, a shift away from the *ramada* system to the *cordão* system--continuous fields of short, vertical trellises that permit easy mechanization of the production process--would reduce labor costs and boost profitability (Finan). Despite the labor-saving advantages of the *cordão* system, there are several disadvantages which may explain why it has not been more widely adopted. For example, the *cordão* system results in less intensive land use and a ten percent decrease in yield per ha. More important is the fact that investment costs are very high, and returns are realized only after several years.

G. Summary:

Table 2.2 summarizes the zonal distribution of crops by representative system. In the Coastal zone, where 74 percent of the sampled farms are in various stages of dairy specialization, there still remains some land devoted to potato and wine production. In the Intermediate zone, where 42 percent of the farms are traditional and 27 percent are transitional into wine specialization, there is virtually no animal fodder apart from regional corn. Whereas in the Mountain zone, comprised mostly of traditional farms (44 percent) and farms transitional into small dairy (15 percent), milharada (a type of low input corn forage) complements regional corn as animal fodder.

Table 2.2: Distribution of Crops by Representative System.

PERCENT OF PARCELS

	SUMMER								
	Corn		Silage	Reg.			Perm	Other/	
	Reg.	HYV	Milharada	Silage	Potato	Wine	Pasture	Fallow	Garden
Coastal									
Trans Dairy	43	5	14		29	All Borda.			10
Small	27	6	8	28	27	All Borda.			5
Med	3	8 (+5)	7	48	20	All Borda.	4		3
Large	8	10 (+1)	4	49	14	All Borda.	3		1
Intermediate									
Traditional	67		1		24	All Borda.			8
Trans Dairy	67		1		6	All Borda.		22	5
Trans Beef	58				7	All Borda.		27	7
Trans Corn	52				19	All Borda.		26	3
Trans Wine	68				28	All Borda.			4
Small Dairy	75			1	8			13	3
Mountain									
Traditional	54		4		6	All Borda.		33	3
Trans Dairy	60		4		11	All Borda.		19	7
Trans Beef	46		26		6	All Borda.	11	6	6
Trans Wine	38		4		2		2	49	4

Note: a) Values in ( ) designate parcels devoted to Sorghum .
b) Trans = Transitional.
c) Intermediate Zone — Trans Corn - really more like Traditional without livestock.
Trans Wine - really like traditional, more bordadura.
d) Borda. = Bordadura

Source: Freguesia Survey, (Langworthy)

III. Farmland Characteristics [2]

The previous section showed the heterogeneity of the farming systems in the EDM region. This section shows that the physical characteristics of the farmland are also heterogeneous. Table 2.3 contains farmland information for the EDM at the parcel level. Parcels are characterized by size, cause of separation, access to both machinery and water, and distance from the farm household. In Table 2.4, the percentage of farms and farmland in each of four farm size categories is broken down by zone.

A. The Parcel Level:

Figure 2.2a shows the parcel size distribution based on Table 2.3. The vast majority of parcels in the EDM are less than 0.25 ha in size. This is mostly the result of the large number of such parcels in the interior zones (i.e., Intermediate and Mountain). In the interior zones, a sharp decrease occurs in the percentage shares of parcels larger than 0.25 ha. However, in the Coastal zone nearly one-third of the parcels are one ha or greater in size, and almost half are between 0.25 and 0.75 ha.

The small size of the parcels in the interior zones indicates greater fragmentation of the farmland. Figure 2.2b shows the cause of parcel separation. The most remarkable thing about the separation of parcels is the large percentages of parcels in the interior zones separated by a change in elevation, a direct result of the uneven terrain. The other major cause of separation in these zones is vineyards that could be removed but usually at a prohibitive cost. Conversely, in the Coastal zone vineyards are the greatest cause of separation followed by a change in elevation. Parcels in this area are already large enough

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2 Data for descriptions in this section were taken from a revised data set of the *freguesia* survey which excluded all parcels solely devoted to gardening and/or less than 100 m^2.

Table 2.3: Parcel Level Information for the EDM

% of Parcels	Coastal	Intermediate	Mountain	EDM
Size (ha):				
< .25 ha	12.0	81.9	87.3	77.8
.25-.5 ha	26.0	11.8	10.2	12.5
.5 -.75 ha	22.9	3.6	1.6	4.5
.75- 1 ha	12.9	1.6	0.7	2.1
≥ 1 ha	27.1	1.1	0.2	3.1
Separation:				
Vineyard	55.0	17.0	10.0	18.0
Road	7.0	10.0	--	6.0
Elevation	25.0	64.0	83.0	68.0
Other	13.0	9.0	5.0	8.0
With Access:				
To Machinery	81.0	46.0	36.0	45.0
To Water	81.0	83.0	87.0	84.0
Distance (m):	1025	436	607	552

Source: Freguesia Survey, Author's revised data set.

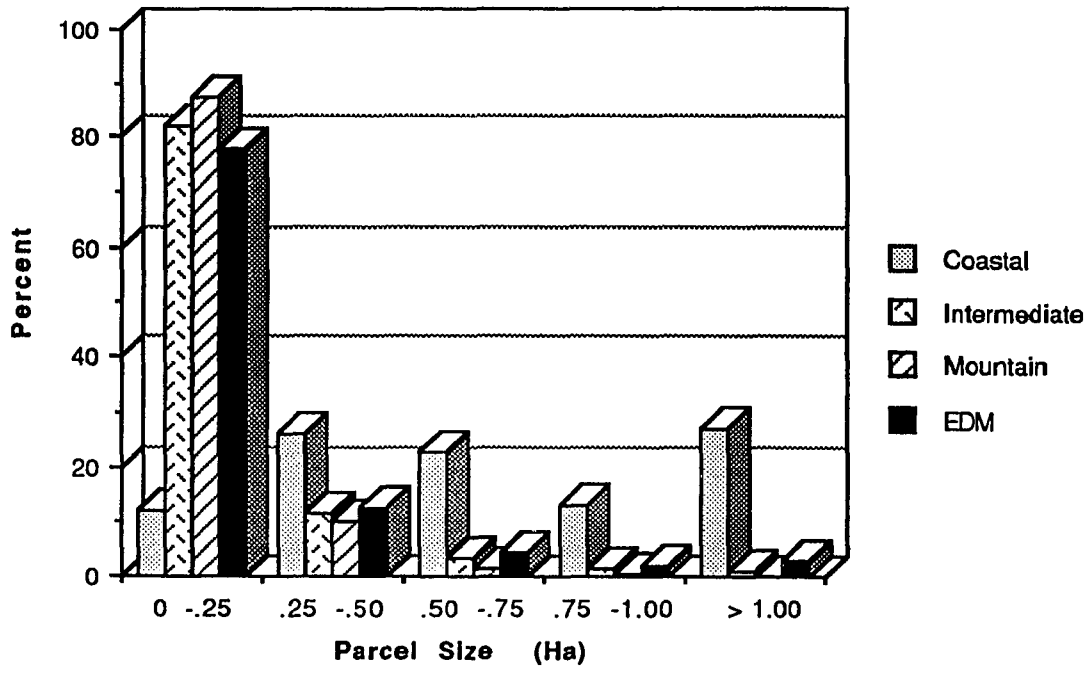

Figure 2.2a **Parcel Size Distribution by Zone**

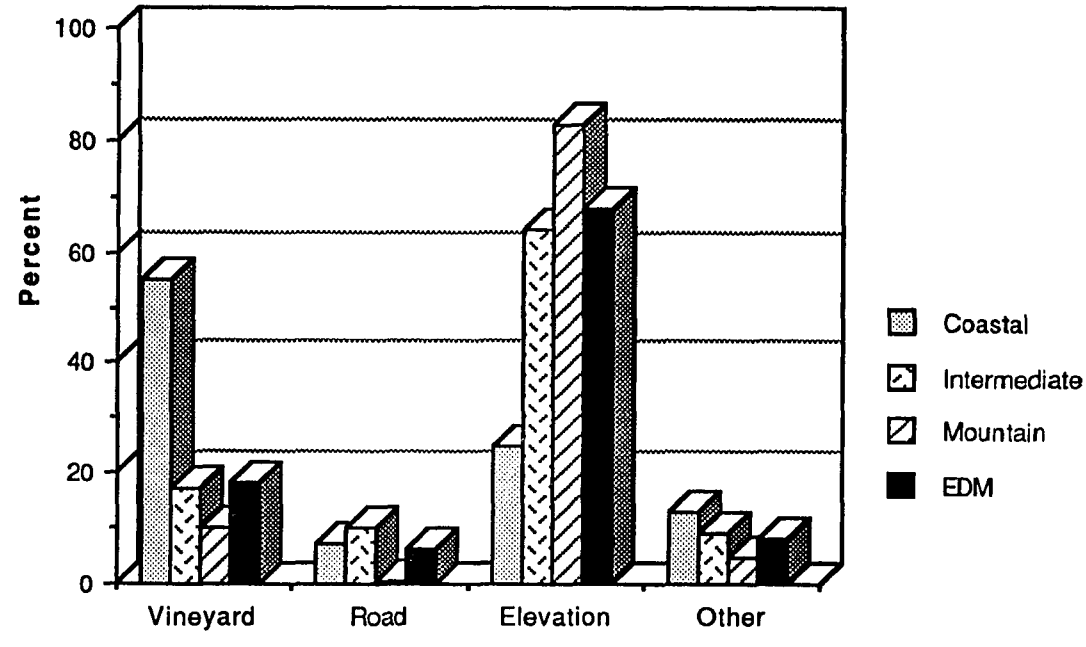

Figure 2.2b **The Cause of Parcel Fragmentation in the EDM**

Source: Freguesia Survey, Author's revised data set.

to allow full mechanization of all operations so fragmentation is not a barrier to technical change.

Uninhibited access of parcels to machinery gives an indication of the potential for machinery use. Table 2.3 shows that while accessibility does not present a large problem in the Coastal zone (where 80 percent of the parcels have uninhibited access), it does present a considerable problem in the Intermediate zone (where less than 50 percent of the parcels have access), and an even greater problem in the Mountain zone (where nearly two-thirds of the parcels have some sort of restriction to access). Availability of water, on the other hand, does not seem to pose a problem in any of the zones, indicating that most of the parcels in the EDM are potentially irrigable. Finally, the last row in Table 2.3 shows the average distance travelled from a farm's work-shed to a parcel. The EDM average is about half a kilometer, while in the Coastal zone it is slightly greater than one kilometer. This is perhaps a result of the greater infrastructure for travel in the Coastal zone.

B: The Farm Level

Figures 2.3 a, b, and c testify to the heterogeneity of EDM farms. A little more than one-third of EDM farms are small (<1 ha), a result of the large number of small farms in the interior zones. However, small farms occupy only 11 percent of the farmland for the entire region. On average, small farms in the interior zones are comprised of seven parcels (the EDM average as well), while in the Coastal zone they average only two parcels.

Medium farms (1 - 5 ha) make up over half of the EDM farms and farmland. In the interior zones well over half the farms and almost three-fourths of the farmland fall into this classification; while in the Coastal zone, medium farms comprise only one-third of the farmland. Further breakdown of medium sized farms into two categories shows that most of the farms in the Intermediate and Mountain zones fall into the one to three ha size (See

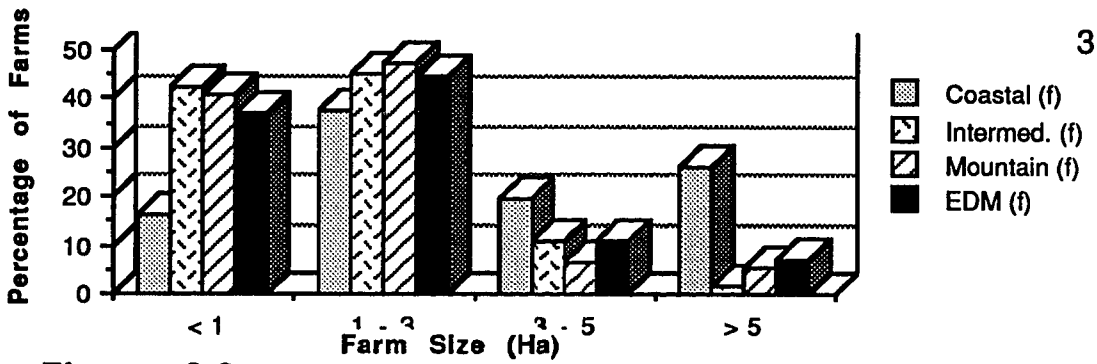

Figure 2.3a: Distribution of Farms by Farm Size.

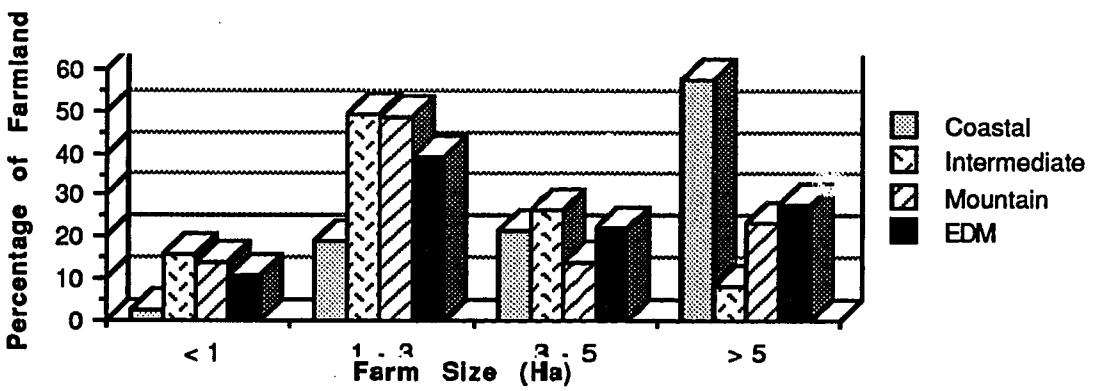

Figure 2.3b: Distribution of Farmland by Farm Size.

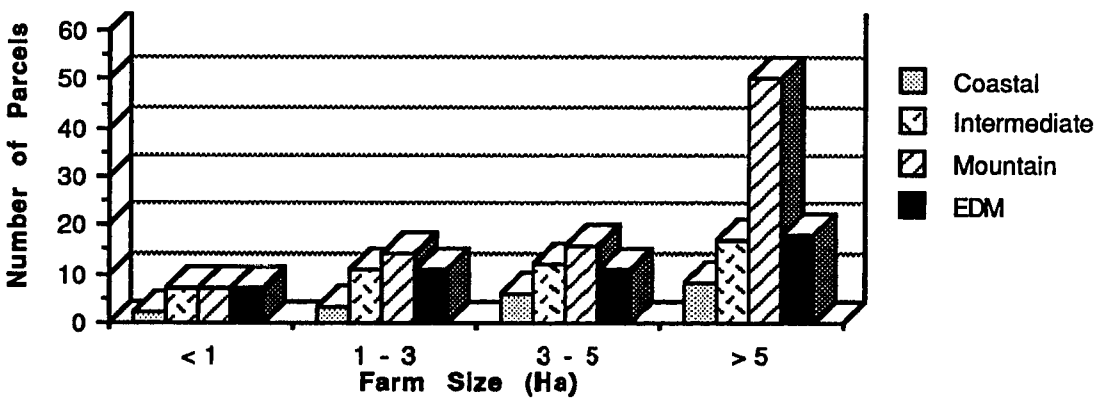

Figure 2.3c: Average Number of Parcels for Each Farm Size.

Source: Freguesia Survey, Author's revised data set.

Figure 2.3b and Table 2.4). In fact, the mean farmland area for these zones is less than two ha (1.6 and 1.7 respectively) and the median near one ha (1.1 and 1.2 respectively).

Large farms (> 5 ha) are most prevalent in the Coastal zone where they make up more than one-fourth of the farms and half of the farmland. These large farms help make the average Coastal farm twice the size of farms in the interior zones with parcels that are four times larger than those in the Intermediate zone, and eight times larger than those in the Mountain zone.

As might be expected, the number of parcels increases with farm size, indicating that larger farms are formed from additional parcels, leading to greater fragmentation. This result is most pronounced in the Mountain zone where large farms consist of 50 parcels on average. It is clear from Figure 2.3c that the fragmentation of farms increases from the Coastal to the Mountain zone.

C. Summary

Even though a certain farming system may appear in more than one zone, the actual use of the farmland will often vary; farm structure (i.e., total size, number of parcels, average area per parcel, and distance) will also be different. A comparison by zone of the predominant farming systems of the EDM is presented in Table 2.5. Transitional dairies are found in each zone, and while those in the interior zones are very similar, a transitional dairy in the Coastal zone is about half the size of those in the interior zones and is less fragmented. The same is true when comparing a small dairy in the Coastal zone with one in the Intermediate zone. Also, the median distance to a parcel in the Coastal zone is almost nine times that of the Intermediate zone. Transitional beef in the interior zones provides another example of heterogeneity; a farm in the Mountain zone is twice the size but has fewer parcels than a farm in the Intermediate zone.

Table 2.4: Farm and Farmland Distribution by Size and Zone

	Coastal	Intermediate	Mountain	
EDM				
≤ 1 ha:				
% of Farms	16.4	42.5	40.9	37.2
% of Farmland	2.5	16.0	13.9	11.0
No. of Parcels	2.0	7.0	7.0	7.0
1 - 3 ha:				
% of Farms	37.7	45.3	47.3	44.4
% of Farmland	19.0	49.3	48.8	39.0
No. of Parcels	3.0	11.0	14.0	11.0
3 - 5 ha:				
% of Farms	19.7	10.6	6.5	11.1
% of Farmland	21.4	26.6	13.8	22.0
No. of Parcels	6.0	12.0	16.0	11.0
≥ 5 ha:				
% of Farms	26.2	1.7	5.4	7.2
% of Farmland	57.3	8.0	23.5	28.0
No. of Parcels	8.0	17.0	50.0	18.0
Farm Char's:				
Farmland (ha)	3.7	1.6	1.7	2.0
Parcel Size (ha)	0.8	0.2	0.1	0.2
No. of Parcels	5.0	10.0	13.0	10.0

Source: Freguesia Survey, Author's revised data set.

Table 2.5: Sample Medians of Total Agricultural Area and Number of Parcels.

	Ag. Area (hectares)	Number of Parcels	Average Area per Parcel	Median Distance of Parcel (m)
Coastal				
Trans Dairy	1.0	2.6	0.38	569
Small Dairy	2.5	3.9	0.64	897
Med Dairy	4.7	6.5	0.72	1113
Large Dairy	8.6	8.1	1.06	1321
Intermediate				
Traditional	1.2	10.2	0.12	491
Trans Dairy	1.6	11.2	0.14	1044
Trans Beef	1.4	16.8	0.08	50
Trans Corn	1.7	8	0.21	520
Trans Wine	1.0	7.6	0.13	288
Small Dairy	4.2	12.7	0.32	142
Moutain				
Traditional	1.6	14.4	0.11	752
Trans Dairy	1.9	10.9	0.17	144
Trans Beef	2.7	15.5	0.17	139
Trans Wine	1.1	9.0	0.12	961

Source: LUSO-American Development Foundation (LADF), Ag Research Project Freguesia Surveys, 1987.

IV. Conclusion

In this chapter, the Entre Douro e Minho region is shown to be heterogenous in many ways. The first section points out how the different EDM zones vary in terms of climate and topography. The Coastal zone is flat and relatively dry compared to the more mountainous and rainy interior zones. These differences are part of the regions heterogeneity, influencing crop choices, production technologies, and livestock activities.

The second section discusses the heterogeneity of the region in terms of farming systems. Dairy systems are more prominent in the Coastal zone. Traditional and transitional systems dominate the interior zones. Even within a particular category of farming system, a difference in crop choice often exists.

Farmland characteristics are the focus of the third section. The size of parcels is shown to vary across zones with parcels decreasing in average size from the Coastal to the Mountain zone. Farm size also decreases from the Coastal to the interior zones while farm fragmentation increases. Finally, the structure of farms in the same farming system category often differs by zone.

CHAPTER THREE

THE LAND MARKET

The accession of Portugal to the European Community (EC) will have many ramifications in the years to come. One such ramification will be the forced decrease in the price of some Portuguese agricultural products regulated by the Common Agricultural Policy (CAP). For example, the real prices of corn, milk, and beef are expected to decline by 30, 32, and 13 percent, respectively (Finan and Fox). CAP impacts will be most severe in the EDM where the agricultural sector is still mostly traditional or transitional.

The decline in output prices will in turn lead to a decline in farm income and returns to labor unless farm efficiency and labor utilization can be improved. Improvements in efficiency can be achieved through various methods. Public investment policies, such as improvements in transportation infrastructure, the construction of irrigation and drainage facilities, electricity infrastructure to run pumps more efficiently, research and development, and the dissemination of new technologies, can lead to increases in efficiency. Factor subsidy policies could be used to encourage the transition to hybrid seeds, fertilizers and other yield enhancing inputs. Finally, efficiency gains could result from increases in farm size. Such growth can be facilitated by early retirement and land consolidation programs, and through supports to land purchasing and rental markets.

All of the forementioned programs would require expenditures from the Portuguese budget. Despite EC transfers amounting to about $US 750 million over the transition period and EC cost sharing over the long-term, program cost will be a limiting factor (Monke and Langworthy). Prior study of the region has revealed that farm sizes in the EDM region adversely affect farm efficiency due to an under utilization of farm labor (Langworthy and Monke). As a result, almost all farm types benefit from growth in farm

size. However, there is limited potential in the EDM for expanding farm size through conversion of uncultivated land. Due to the high population and degree of urbanization in the region, unutilized agricultural land is extremely scarce. Conversion of lands to agricultural uses in most areas would require deforestation that might be undesirable due to a variety of factors--discontinuous ownership, high conversion costs, and complementarity between agricultural operations and use of forest products. Moreover, the location of forest areas on rocky or otherwise poor soils makes them generally unamenable to cultivation.

This chapter discusses ways that land resources can be reallocated to bring about farm-size expansion, and the role to be played by land policy in shaping the pattern and extent of farm-size expansion. With little potential to increase farm size through land conversion, three alternatives remain for consolidating existing farms into larger operations: (1) increased parcel size through land consolidation projects; (2) transfer land resources to more profitable farm types through the sale of existing parcels; (3) expand the cultivated area of farm operations through rental arrangements. The next three sections use data from the *freguesia* survey to individually examine the potential from each of the three alternatives.

I. Land Consolidation

Land consolidation programs are often seen by policy makers as a method of increasing yields while lowering production costs. Typical consolidation investments include road improvements, drainage and irrigation systems, expansion of cultivated area, as well as increases in the average size of farm parcels. The variety of investment possibilities can lead to a confusion about which benefits are actually attributable to land

consolidation. Technically, consolidation refers to reducing the number of parcels of a farm without reducing its total size. Therefore, determining the benefits of land consolidation requires evaluating the change in farm income and returns to labor resulting from investment projects with and without increasing average parcel size, given technological choices and total area cultivated.

Road improvements, adoption of new technology, or expansion of cultivated area can usually be accomplished without land consolidation. In fact, surveys of EDM farms revealed only a few cases where small size or irregular shape resulted in the use of more labor- or animal-intensive cultivation technology when mechanization was preferred. Farmers generally recognized the potential disadvantage of small parcels, so they took steps to avoid creating exceedingly small parcels from partible inheritance or sale. In areas of substantial fragmentation, such as Ganfei, boundaries are represented by markers that do not hinder field operations rather than walls or more substantial impediments. As a result, the most substantial benefits of consolidation occur on the cost side as transportation to and from fields is reduced, and as more regularly shaped and larger parcels permit more rapid performance of many cultivation tasks.

The cause of fragmented parcels in the EDM says a lot about the feasibility of land consolidation. Fragmentation in the interior zones, where sources of income gains are needed most, is mostly caused by changes in elevation. By contrast, the Coastal zone has the greatest percentage of its parcels fragmented by vineyards that can be removed; but large parcel sizes in this zone largely negate the economic necessity of consolidation programs (See Figure 2.2b). Thus, the potential for land consolidation is least where the benefits from it are most needed.

Substantial costs--resource costs, forgone value of labor, capital, energy and raw materials used in consolidation--also constrain consolidation projects. Funds used for such projects have alternative uses, thus creating real opportunity costs even if funds come from sources outside Portugal. In addition to resource and opportunity costs, high transaction costs, incurred in organizing and institutionalizing consolidation projects, create perhaps an even greater hindrance to project implementation. Some of the difficulties inherent in executing a consolidation program include negotiation of land swaps, documentation of ownership, complying with land and credit legislation, and scheduling conversion activities--all of which require substantial amounts of trained management, administration, and time.

In conclusion, net benefits resulting from consolidation would be negative or negligible for the vast majority of parcels in the region (Cory et al.). Positive benefits exist in some areas and for some farm types, but in most cases the benefits are not great enough to create a viable agricultural sector, or to compensate for resource and transaction costs incurred. Also, there are methods for generating reasonable returns to labor besides land consolidation. So, forcing farm-size expansion to coincide with more consolidated farms is an unnecessary restriction.

II. Farm Sales Markets

The purchase of an additional parcel is perhaps the most direct method for an operator to expand farm size. An efficient sales market would permit scarce land resources to be transferred to more efficient operators during periods of declining farm revenues and increasing opportunity costs of labor. Yet, despite the existence of both these factors in the EDM, there has been very little transfer of ownership in recent years. This suggests that farm-size expansion in the region will not likely occur through farmland sales at least in the

farm-size expansion in the region will not likely occur through farmland sales at least in the short run.

A. Recent Market Activity in the EDM:

Table 3.1 summarizes sales activity in the EDM during the 1974-87 period. On average, annual sales involved less than one-half of one percent of the parcels managed by respondents in the survey, and less than a third of the parcels sold were greater than 0.25 ha in size. Moreover, average annual sales of parcels steadily declined throughout this period. For parcels between 0.25 and 1 ha, the economically desirable size range in the EDM, average real price per hectare has steadily increased in the 1974-87 period from 2,556 *contos* per ha in the initial period to 4,082 *contos* per hectare in the final period. Conversely, the price for small parcels (i.e., 0 -0.25 ha) has fallen since the 1980-84 period due to a marked decrease in demand. The recent decline in overall land prices can be attributed to the price declines for both small and large (> 1 ha) parcels.

Prices have fallen steadily for all sizes in the Mountain zone since the 1974-79 period, reflecting the low returns to farmland throughout the zone. As for the proximity of parcels purchased, 100 percent of parcels sold in the Intermediate zone were within a two km radius of the purchasing operator. This was also true in the Mountain zone after 1980. The Coastal zone showed an increase in the purchase of parcels in the 2-5 km range, but this category still only accounted for 20 percent of the purchased parcels in the 1985-87 period.

B. Buyer Characteristics:

Buyers of farmland in the EDM were different in many ways, both across zones and over the 1974-87 period. For the region as a whole, over 50 percent of parcels were purchased by operators managing one to five ha farms with the remaining purchases

Table 3.1: Farmland Sales Activity in the EDM Freguesias Surveyed, 1974-1987.

Parcel Size (Hectares)	1974-1979			1980-1984			1985-1987			1974-1987		
	Number of Sales	Area[a]	Price[b]	Number of Sales	Area[a]	Price[b]	Number of Sales	Area[a]	Price[b]	Number of Sales	Area[a]	Price[b]
0 - .25	106	106,061	3,686	62	58,103	5,903	17	15,351	2,119	187	178,515	4,412
.25 - 1.0	41	204,293	2,556	19	111,373	3,375	11	42,188	4,062	71	357,854	2,991
>1	2	43,370	487	8	123,573	5,105	2	80,030	3,124	12	246,973	3,652
Total	151	353,724		89	293,049		30	136,569		270	783,342	
Ave/yr/ha	25	58,954	2,701	18	58,610	4,608	10	45,523	3,330	19	55,953	3,523

[a] Square Meters.
[b] Real prices in 1,000 Esc/ha.

Note:The 3256 parcels in the 1987 survey had the following distribution: 0-.25 2553, .25-1.0 610. <1 93.

Source: Freguesia Survey, (Cory et al.)

approximately equally divided between small and large operators (<1 ha and ≥ 5 ha). The activity of small farmers in the sales market has decreased six fold over the 1974-87 period (Cory et al.).

Table 3.2 relates parcel and buyer characteristics. The age of the heads of households surveyed ranged from 18 to 83 years, but buyers of farmland were predominantly middle-aged (35-65). The remainder of transactions were equally split between the younger and older farmers. This distribution reflects somewhat the capacity for self-finance. Emigration experience is another indication of capacity for self-finance, and land buyers had substantial experience overall; 16 percent had five to 20 years of experience and 22 percent had more than 20 years. As for off-farm employment, it appears to have played a less significant role in financing purchases; only slightly more than five percent of buyers had more than 26 weeks of off-farm employment per year.

Differences in farms and farmers shows up in the variation of some buyer characteristics. For example, in the Coastal zone, which consists mostly of large and medium farms, there were no purchases by operators with less than one ha; 60 percent of total purchases in the zone were by operators with more than five ha (Cory et al.). By contrast, since 1980, there have been no purchases by large farms in the Intermediate zone, and 56 percent of all transactions involved operators with one to three ha. Remarkably, 32 percent of all purchases in the Mountain zone were by large operations.

Emigration experience also varied by zone (See Table 3.3). The percentage of buyers who had more than five years experience was only ten in the Coastal zone compared to 45 and 37 in the Intermediate and Mountain zones, respectively.

Overall, Tables 3.1 and 3.2 highlight several significant characteristics. Table 3.1 reveals the "thinness" or low transaction nature of farmland sales. In Table 3.2, parcels of

Table 3.2: Parcel Sizes and Buyer Characteristics in the EDM, 1974-1987.

Parcel Size (*Hectares*)	Age of Buyer	EMMIGRATION EXPERIENCE					
		0 - 5 years		5 - 20 years		> 20 years	
		Off-Farm Employment Weeks/Family		Off-Farm Employment Weeks/Family		Off-Farm Employment Weeks/Family	
		0 - 26	26 - 52	0 - 26	26 - 52	0 - 26	26 - 52
0 - .25	20-35	2 (6)	0 (1)	<1 (<1)	0 (0)	0 (0)	0 (0)
	35-65	33 (24)	1 (3)	12 (8)	0 (<1)	17 (6)	0 (<1)
	>65	4 (11)	0 (<1)	1 (1)	0 (<1)	0 (1)	0 (0)
.25 - 1	20-35	1 (2)	0 (1)	0 (<1)	0 (0)	0 (0)	0 (0)
	35-65	14 (5)	3 (1)	2 (1)	0 (0)	4 (1)	0 (0)
	>65	1 (1)	0 (0)	0 (<1)	0 (0)	0 (0)	0 (0)
>1	20-35	<1 (<1)	0 (0)	0 (<1)	0 (0)	0 (0)	0 (0)
	35-65	2 (1)	1 (<1)	0 (<1)	0 (0)	1 (<1)	0 (0)
	>65	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table Entries: Percent of Total Farmland Sales. ( ) Percentage of Farmers Surveyed

Source: Freguesia Survey, (Cory et al.). **Note:** Entries do not sum to 100 because >52 excluded.

less than 0.25 ha in area accounted for 70 percent of all sales transactions; parcels greater than one ha in size accounted for only four percent of transactions. For the entire 14 year period, less than eight percent of the parcels managed by survey participants were sold, and of those only two-thirds were greater than 0.25 ha. A significant percentage of total sale transactions--30 percent--can be attributed to emigrants purchasing parcels less than 0.25 ha in area. These purchases were largely related to homesite acquisition and not to farm-size expansion. Finally, middle-aged buyers with little or no emigration experience and little off-farm employment (i.e., full-time farmers) dominated the sales market for parcels greater than 0.25 ha.

Table 3.3 breaks down the above results by zone. In the Coastal zone, which accounted for only ten percent of EDM transactions in the survey, 79 percent of sales involved parcels larger then 0.25 ha. In general, buyers had limited off-farm income and emigration experience. By contrast, the Mountain zone, which accounted for a little more than half of all transactions, had sales dominated by small parcels (< 0.25 ha). Buyers with more than 20 years emigration experience were involved in nearly a quarter of all transactions in the zone, and they purchased small parcels exclusively. Purchases of large parcels (>1 ha) were virtually nonexistent, reflecting the scarcity of such parcels in the zone. Purchased parcel size and buyer characteristics were more heterogeneous in the Intermediate zone where 64 percent of all transactions concerned small parcels and 45 percent of all buyers had at least five years emigration experience.

Finally, the survey results address two popularly held conceptions: small farmers tend to buy small parcels whereas large farmers mainly purchase large parcels; and large farmers are more willing to buy distant parcels (i.e., parcels more than two km from the farm). There is mixed support in the survey data for the first conception and no support for

Table 3.3 Parcel Size and Buyer Characteristics in the EDM by Zone, 1974-1987.

Coastal

Parcel Size	Age	Emmigration Experience: 0-5 yrs O-FE 0-26	0-5 yrs O-FE 26-52	5-20 yrs O-FE 0-26	5-20 yrs O-FE 26-52	>20 yrs O-FE 0-26	>20 yrs O-FE 26-52
0-.25	20-35	4(1)	0(<1)	0(0)	0(0)	0(0)	0(0)
	35-65	11(3)	2(<1)	0(0)	0(0)	0(0)	0(0)
	>65	2(1)	0(<1)	0(0)	0(0)	0(0)	0(0)
.25-1 (Ha)	20-35	6(7)	0(2)	0(<1)	0(0)	0(0)	0(0)
	35-65	43(20)	2(1)	2(2)	0(0)	2(<1)	0(0)
	>65	4(1)	0(<1)	0(0)	0(0)	4(<1)	0(0)
> 1	20-35	4(4)	0(<1)	0(1)	0(0)	0(0)	0(0)
	35-65	9(14)	2(2)	0(<1)	0(0)	2(<1)	0(0)
	>65	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)

Intermediate

Parcel Size	Age	Emmigration Experience: 0-5 yrs O-FE 0-26	0-5 yrs O-FE 26-52	5-20 yrs O-FE 0-26	5-20 yrs O-FE 26-52	>20 yrs O-FE 0-26	>20 yrs O-FE 26-52
0-.25	20-35	5(7)	0(<1)	0(<1)	0(0)	0(0)	0(0)
	35-65	22(24)	1(3)	17(7)	0(0)	12(2)	0(<1)
	>65	5(15)	0(0)	2(2)	0(0)	0(1)	0(0)
.25-1 (Ha)	20-35	2(2)	0(<1)	0(0)	0(0)	0(0)	0(0)
	35-65	10(4)	7(<1)	4(1)	0(0)	8(1)	0(0)
	>65	0(1)	0(0)	0(<1)	0(0)	0(0)	0(0)
> 1	20-35	0(<1)	0(0)	0(0)	0(0)	0(0)	0(0)
	35-65	2(<1)	1(<1)	0(0)	0(0)	2(<1)	0(0)
	>65	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)

Mountain

Parcel Size	Age	Emmigration Experience: 0-5 yrs O-FE 0-26	0-5 yrs O-FE 26-52	5-20 yrs O-FE 0-26	5-20 yrs O-FE 26-52	>20 yrs O-FE 0-26	>20 yrs O-FE 26-52
0-.25	20-35	0(6)	0(2)	1(<1)	0(0)	0(0)	0(0)
	35-65	46(27)	0(3)	10(10)	0(1)	24(14)	0(2)
	>65	4(8)	0(<1)	0(0)	0(0)	0(0)	0(0)
.25-1 (Ha)	20-35	0(1)	0(<1)	0(0)	0(0)	0(0)	0(0)
	35-65	12(5)	0(1)	1(<1)	0(0)	0(1)	0(0)
	>65	1(1)	0(<1)	0(0)	0(0)	0(0)	0(0)
> 1	20-35	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
	35-65	1(<1)	0(0)	0(0)	0(0)	0(0)	0(0)
	>65	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)

O-FE: Off-farm Employment **Note:**Entries do not sum to 100 because >52 excluded.
Table Entires: Percent of Total Farmland Sales. () Percent of Farmers Surveyed.
Source: Freguesia Survey, (Cory et al.).

the second. In the EDM overall, 56 percent of all purchases were made by intermediate sized operators (1-5 ha), 24 percent by small operators and 20 percent by large operators (See Figure 3.1a). Small operators mainly purchased small parcels. Purchases of large parcels, however, were nearly equally distributed across farm sizes. As for proximity, about 95 percent of purchases involved parcels less than two km from the farm. Nearly all of the parcels purchased by small farms were less than two km away, and almost no farm operators were interested in commuting beyond five km to a parcel of any size. Operations larger than one ha showed a small but equal willingness to buy parcels two to five km from the farm (See Figure 3.1b).

C. Causes and Consequences of "Thin" Farmland Sales Markets

Results of the survey reveal a farmland-sales market that will do little to expand farm size in the EDM. The average annual number of transactions, particularly involving parcels larger than 0.25 ha, has been extremely low and steadily declining for the past 14 years.

Thinness in a market results from forces that reduce demand and/or willingness to supply. Both forces are present in EDM land markets. On the demand side, a variety of legislated constraints reduce the ability of potential buyers to participate in the market. On the supply side, cultural values that place a high value on the ownership of land have reduced the willingness of potential sellers to make cultivable parcels available for sale. The combined effect of these forces accounts for much of the limited transfer activity in recent years and will no doubt influence transfer activity in the near future.

Financing is an important consideration in the purchase of a parcel. In the EDM, where farm income has been low for many years, non-farm sources of income have

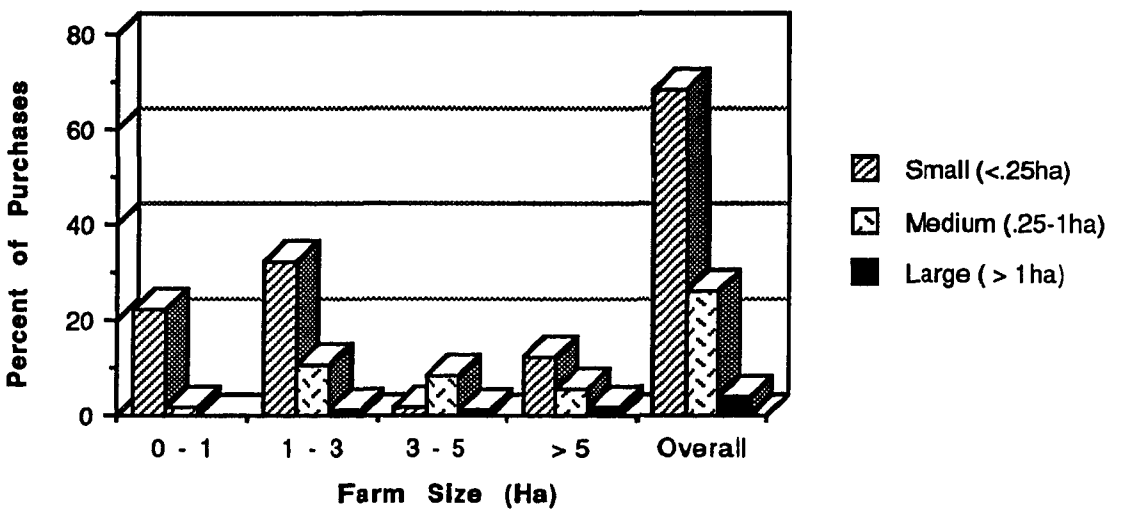

Figure 3.1a: Size of Parcels Purchased by Farm Size.

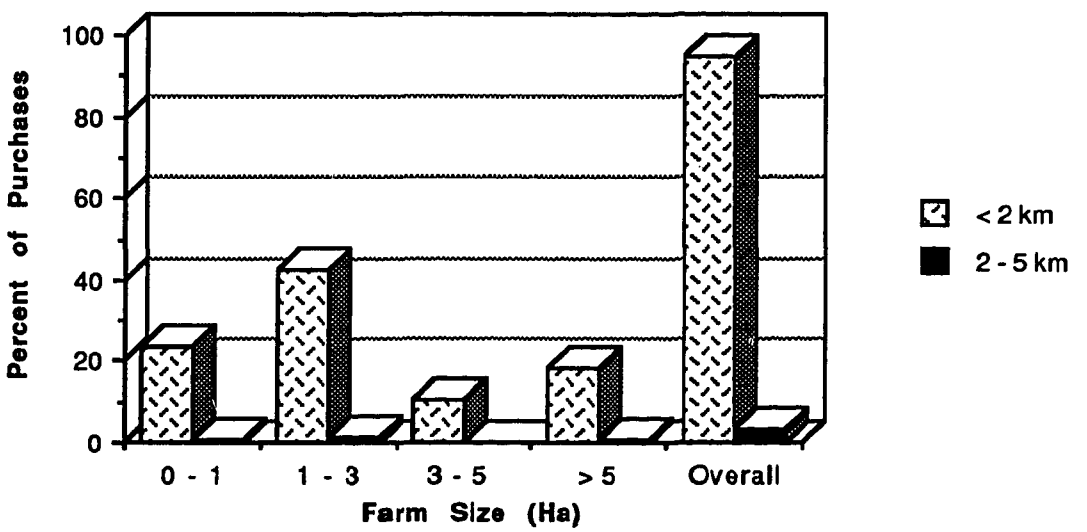

Figure 3.1b: Distance of Parcels Purchased by Farm Size.

become almost essential in financing parcel purchases. Income earned outside Portugal, for example, has played an important role in this regard, and buyers with emigration experience accounted for a substantial share of market activity in the interior zones (See Table 3.3). If savings from farm and non-farm income are not used for financing, then financing for farm-size expansion must come from future farm-income streams through arranging credit. Unfortunately, credit institutions in Portugal are poorly equipped to meet EDM demands for farmland acquisition. This fact is evidenced by the numerous institutional barriers to purchasing that exist in two programs designed to finance land purchases.

The first program, Credit Par, was established in 1980 for two reasons: (1) to prevent fragmentation of farms through partible inheritance by financing compensatory payments to other potential inheritors of a farm (usually siblings); (2) to finance consolidation--the acquisition of parcels contiguous to a parcel already owned by the borrower. The maximum loan allowed is 10,000 *contos* with repayment spread over a 20 year period at an average interest rate of 2.7 percent. Eligibility for the program requires that the desired parcel and buyer satisfy several conditions: The parcel must be contiguous with another parcel of the buyer; The parcel must be cultivated by the buyer for at least three years; Farming must be the major source of income for the buyer; The parcel must be economically and technically viable for agriculture, as determined by the Ministry of Agriculture (by law 202/70, this clause meant that the resulting parcel must be at least two ha in size).

The above conditions resulted in the elimination of the vast majority of EDM parcels and farmers from the program. An extensive publicity campaign in the initial stages of the program lead to 67 applications in just the first three months. But despite this early enthusiasm, applications declined rapidly--54 in the first half of 1981, and almost none

thereafter. One explanation for the decline was an application rejection rate that exceeded 70 percent. Some of the main reasons for rejection were: high sales prices, the borrower's farm not being economically viable, and the borrower being classified as a part-time farmer. In addition to the restrictive conditions, time delays provided ample disincentives. The application process required evaluation by the Ministry of Agriculture and the banks. After approval, the application was sent to the PAR commission for evaluation. If PAR decided that too much time had elapsed since the initiation of the application process, it rejected and returned the application to the borrower to reinitiate the process. Thus, a cycling of applications was created, and borrowers eventually quit trying.

A second program, Regulation EC 797, was created to help farmers buy land as part of an investment program. As with Credit Par, the loan can be used to compensate other heir if it is for a young farmer who will continue farming for at least five years. Loans are limited to 18,000 *contos* and the value of the land in the investment cannot exceed 60 percent of this total.

The government subsidizes one-third of the total loan, or 41 percent in a disfavored region (most of the EDM). Similar to Credit Par, under this program the parcel must be part of a consolidation operation; and the government sets maximum prices for land. Prices are based solely on the capitalized values of agricultural profits. High intrinsic values for land in the EDM often result in farmland sale prices greater than the government maximum. This fact and the fact that EDM farms are predominantly smaller than two ha mean that financing land acquisition through existing credit systems is not a viable option for EDM farmers. Thus, the present credit systems stifle demand for farmland purchases.

On the supply side, seller reservation prices for agricultural land remain inflated in relation to expected net income flows in many parts of the EDM. This price premium is

largely the result of non-income sources of owner satisfaction. Owners of land view it as a source of security during uncertain economic times, and as a source of personal pride and accomplishment enhanced by the fact that land is a more certain form of inheritance than money. These non-income sources of value make up the intrinsic value of the land, and depending on its magnitude, intrinsic value can cause the supply of farmland in the sales market to decrease.

The possibility of increased transfer activity in the EDM seems unlikely. In order for a wider variety of farmers to have access to credit, the existing credit institutions need revision. Such a revision would require the cooperation of various administrative agencies, the Consevatorio (concerned with land registration), and the legislature. Even if all the parties involved were interested in revision, the actual process of negotiating and setting new guidelines would probably be long and complex. In the short-run, credit policy will likely continue to limit demand for farmland purchases.

As for the supply of farmland, the effect of intrinsic value on farmland supply is uncertain. One would suspect that declining output prices and farm profits might make holding land for its intrinsic value too costly for many landowners. Also, the view of land holding intrinsic value may begin to diminish with increases in off-farm income opportunities, particularly among the young heirs to farmland. Even so, there is not likely to be much of a change in attitudes by 1996, and land prices will remain high relative to land rents in the near future. Therefore, it appears that the farmland sales market will remain stagnant, and farm-size expansion in the EDM will have to come about by other means.

III. Farmland Rental Markets

In contrast to the farmland sales markets, the farmland rental markets in the EDM have been very active. Figure 3.2a shows that more than one-third of the farmland and parcels were rented in 1987 in the EDM, with the greatest involvement occurring in the Intermediate zone. For the region as a whole, 27 percent of the farmers rented all of the land they worked and just over 50 percent of farmers were involved in the rental market in some way; the rest, approximately 47 percent, owned or paid no rent for all of the land they worked (See Figure 3.2b). It appears that the rental market is the principal vehicle for transferring land resources among farm operators.

A. Farm Operator Characteristics:

Figures 3.3a and 3.3b break down by age and farm size the participation of EDM farmers in the rental market (See also Table A2.1, in Appendix 2). Young farmers (< 35) operated only 13 percent of farms in the survey, yet they accounted for nearly 20 percent of all operators involved in the rental market because 77 percent of young farmers were involved to some degree in renting farmland. Middle-aged farmers (35-65) operated almost 70 percent of the farms surveyed, and they accounted for about the same percentage of EDM renters with just over half of the middle-aged farmers involved in the rental market. Older farmers (> 65) constituted 17 percent of EDM farmers surveyed, but only five percent of renters. Most farmers rented 100 percent of their farmland.

Zonally, these characteristics show even more variation. In the Coastal zone, a smaller percentage of young farmers rent 100 percent of their land. Middle-aged farmers were more active in the rental market, while older farmers had no involvement in the rental market (See Figure 3.3a). In contrast to the Coastal zone, the Intermediate zone had 35 percent of its older farmers involved in the rental market. Figure 3.3a shows the

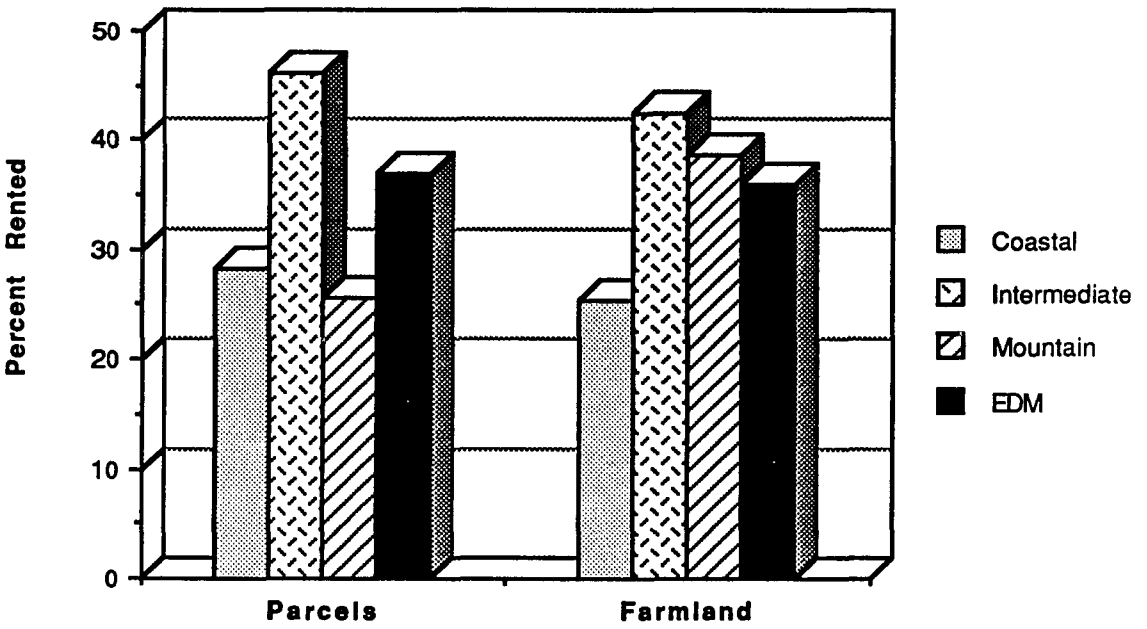

Figure 3.2a: **Rental Activity in Terms of Parcels and Farmland.**

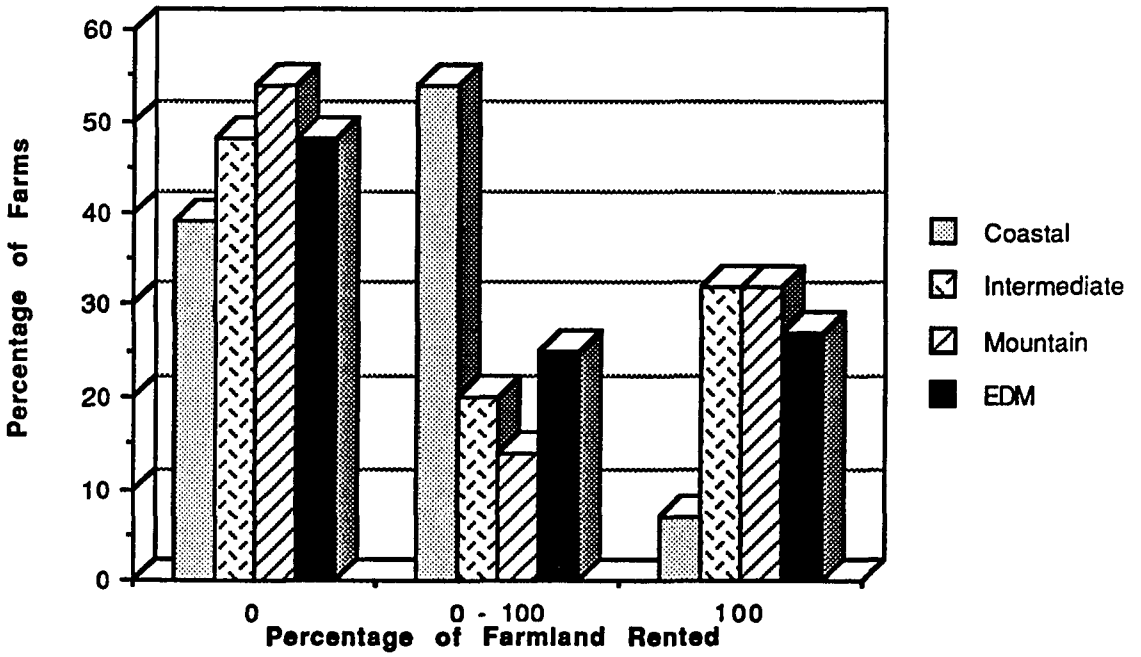

Figure 3.2b: **Rental Market Involvement by Zone.**

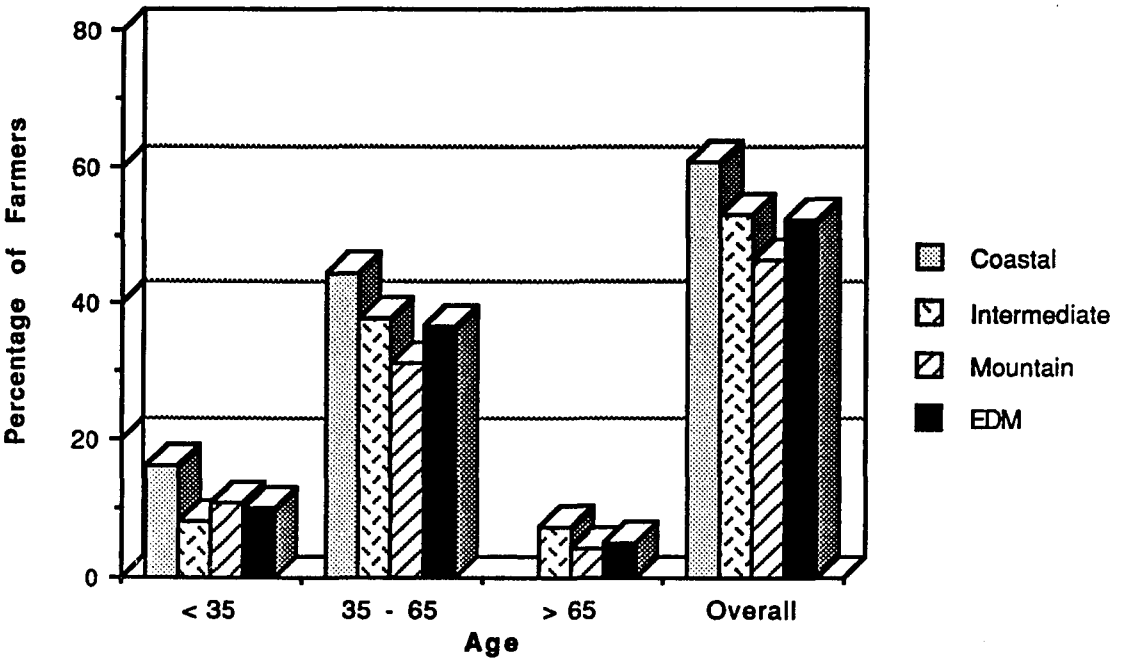

Figure 3.3a: **Rental Market Involvement for Each Zone.**

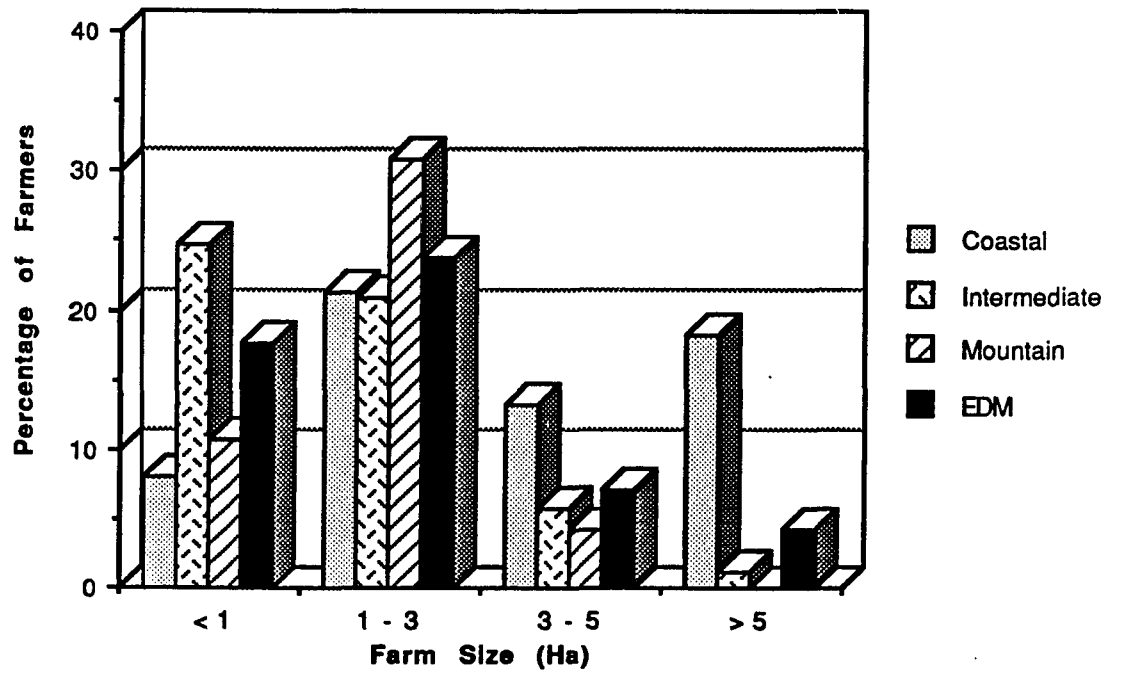

Figure 3.3b: **Rental Market Involvement for Each Zone.**

involvement of the different age groups in the Intermediate zone to be similar to the EDM as a whole. However, recalling Figure 3.2b, the majority of renters in the Intermediate zone rent 100 percent of their farmland. This is also true of the Mountain zone where all of the older farmers rent 100 percent of their farmland (See also Tables A2.2, A2.3, and A2.4).

More than half of EDM farms are of intermediate size (1-5 ha). Operators of these farms accounted for more than half the renters as well (See Figure 3.3b). Overall, operators of farms one to three ha in size were the most common and they were also the most active in the rental market, while better than 50 percent of small-farm operators (< 1 ha) rented no land. Those involved in the EDM rental market were fairly evenly divided between operators who rented some farmland and operators (> 5 ha) who rented all their farmland with the exception of large farm operators who were six times more likely to rent some but not all of their farmland (See Table A2.1).

The activity of different farm sizes in the rental market also varied by zone. For example, small farms accounted for nearly one-fourth of the activity in the Intermediate zone--twice the activity found elsewhere. However, this result can be misleading due to the great number of small farms in the Intermediate zone. In fact, farm operators for all size categories in the Coastal zone were almost as active in terms of the percent of farmers in the rental market as farm operators in the Intermediate zone (See Figure 3.4). However, the percentage of farmland rented in each zone was quite different. For example, there were no farms greater than three ha in the Coastal zone that were entirely rented, while 50 percent of such farms in the Intermediate zone were entirely rented (See Tables A2.2 and A2.3). The big differences in rental activity by farm size occurred in the Mountain zone were only 27 percent of small farm operators and none of the large farm operators were active in the rental market.

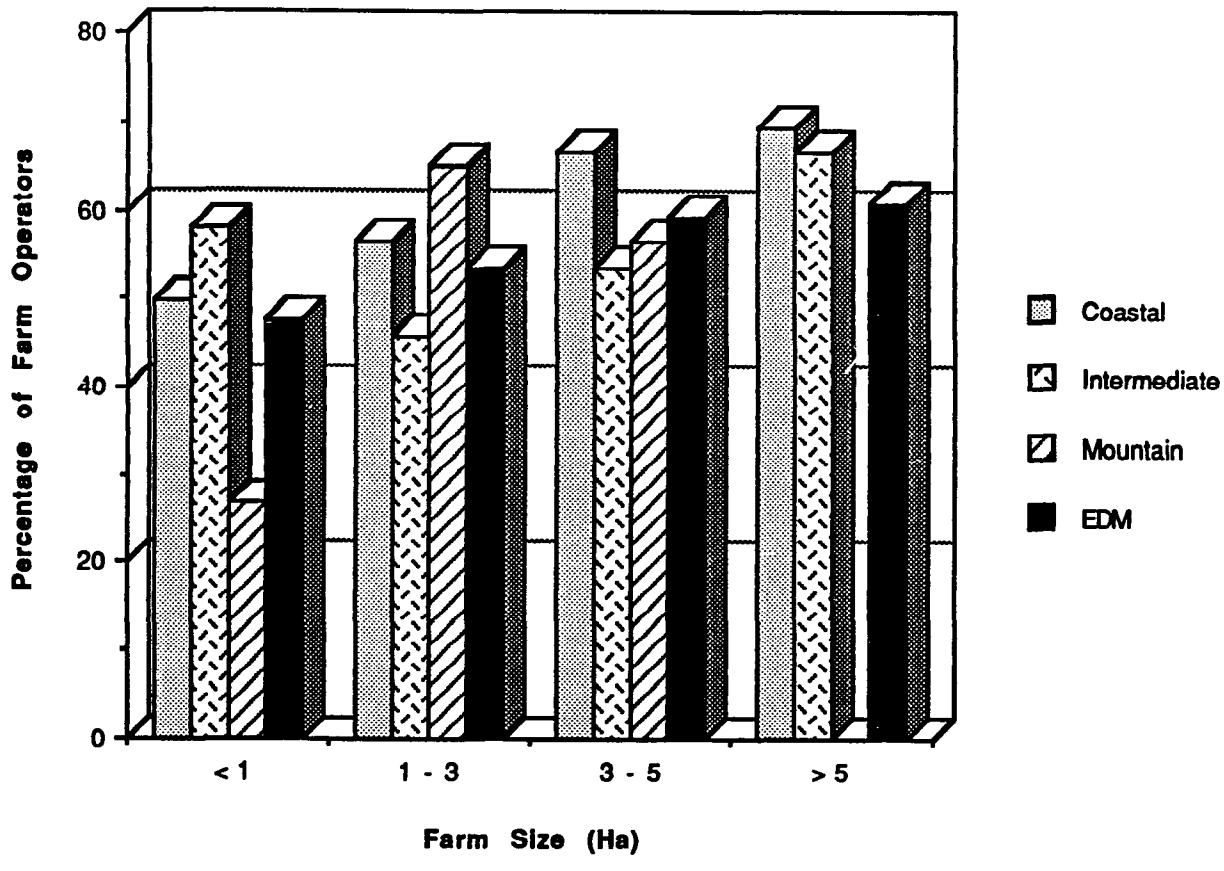

Figure 3.4: **Rental Market Involvement for Each Farm Size Category.**

B. Characteristics of Rented Parcels:

Table 3.4 characterizes--by size and distance--the parcels rented in the EDM in 1987. There were virtually no rental agreements made for parcels more than five km away from the main farm operation; 94 percent of all rental transactions involved parcels within two km, the remainder were almost entirely in the two to five km range in the Coastal zone. This seems to indicate that there existed a clear cost advantage in cultivating proximate parcels which in turn lead to an increased demand for such parcels in the rental market.

Input savings associated with parcel size are important for cost reduction as well. Yet, three-fourths of rental transactions involved small parcels (< .25 ha), reflecting the abundance of such parcels in the region and a willingness of EDM farmers to cultivate small parcels despite higher input requirements. Moreover, larger farms commonly rented small parcels; more than three-fourths of the rentals by farms in the one to three ha class involved parcels less than 0.25 ha in size. Even among farms greater than three ha, small parcels accounted for more than half of total transactions.

The interior zones, because of their heavy representation in the survey, slightly skew the above results. More than two-thirds of the rental transactions in the survey occurred in the Intermediate zone alone where better than 80 percent of the rental activity involved small parcels, compared to just under one percent for large parcels (> 5 ha). Similarly, the percentages for small and large parcels in the Mountain zone were 72.4 and 0.6, respectively. By contrast, the Coastal zone had more large parcels than small parcels rented, 20 and 14 percent, respectively; and large operators were reluctant to rent small parcels (See Table A2.2). Only ten percent of the rental agreements in the Coastal zone concerned operations of more than one ha in total farm area renting small parcels (compared to 40.5 and 64.8 percent, respectively, for the Intermediate and Mountain zones).

Table 3.4: Rented Parcel Characteristics, by Farm Size in the EDM.

Farm Size *(Hectares)*	Parcel Size *(Hectares)*					
	0-.25		.25-1		>1	
	Distance (km)		Distance (km)		Distance (km)	
	0-2	2-5	0-2	2-5	0-2	2-5
0-1	29.7	0.3	0.8	0.0	0.0	0.0
1-3	33.3	0.9	7.9	0.5	0.3	0.0
3-5	10.7	0.8	7.5	0.5	0.3	0.0
>5	1.2	1.2	1.7	1.1	0.3	0.0
Subtotals	74.9	3.2	17.9	2.2	0.9	0.0

Note: Entries do not sum to 100 due to the exclusion of data in the >5 km category. Table entries are percentages.
Source: Freguesia Survey, 1987.

C. Forms of Tenancy (*Caseiros*):

The extensive rental activity and the zonal differences reflect the continued prominence of centuries-old landowner tenant relationships. In the past, absentee landowners gave their land over to tenants (*caseiros*) to be cultivated on a share basis where the landowner received two-thirds of the output. The *caseiro* system has begun to disappear from freguesias like Rates, Ganfei, Refoios, and Parada do Monte due to increased emigration and off-farm demand for labor (Langworthy and Monke). Increases in these off-farm opportunities combined to decrease the supply of *caseiro* labor and provide the capital necessary to finance transfers of land ownership. The rental market in the above freguesias is less active but still plays an important role, and now many landowners are other small farmers rather than absentee owners.

In some of the other freguesias surveyed, the traditional *caseiro* system continues to exist, especially in the Mountain zone freguesias of Cavez and Arnoia where off-farm opportunities have been less available and *caseiro* labor remains the only employment option. The *caseiro* system also continues in some of the Intermediate zone freguesias, such as Santa Cruz and San Torcato, where local labor supplies are not yet consumed by off-farm employment and absentee landowners have managed to retain large tracts of land. Yet, even in these freguesias, competition for *caseiro* labor is growing. Children of *caseiro* tenants often prefer to leave their community and seek permanent employment in other regions. In response to the shortage in the supply of *caseiro* labor, landowners have, on average, reduced the rental share by 50 percent from two-thirds to one-third of production. In addition, landowners now pay one-half of purchased input costs. The improved terms of share contracts and the strong desire to avoid official rental legislation might explain the continued prominence of share contracts. This subject will be further discussed in Chapter

continued prominence of share contracts. This subject will be further discussed in Chapter Six.

IV. Conclusion

This chapter discussed several ways in which land resources could be redistributed to allow for greater returns to land and labor in the face of EC-mandated declines in the output prices of many EDM commodities. Public Investment policy can facilitate the process of adjustment by expediting the transfer of land resources to more efficient operators while minimizing the transition costs incurred by EDM residents exiting the agricultural sector for opportunities elsewhere.

Because the possibilities for land conversion are so limited in the EDM, this chapter focused on three alternatives for increasing farm size: land consolidation, farmland sales markets, and the farmland rental markets. Recently, land consolidation has played an important role in Portuguese credit policy. However, the results of the first section show that there is little potential to increase farm size through consolidation, especially where the benefits from farm-size expansion are needed most (i.e., the interior zones). In addition, land consolidation would involve substantial resource and transaction costs.

The second section reveals thin farmland sales markets in the EDM that are ineffective for farm-size expansion. Difficulty in financing purchases through existing credit institutions is one cause of the thin markets. As a result, self-financing of purchases with income earned through emigration has become a common practice, especially in the interior zones. However, much of this sales activity can be attributed to the purchase of small parcels for homesites and not for farm-size expansion. High intrinsic values for farmland also result in a thin sales market because they reduce the supply of farmland to the

farmland also result in a thin sales market because they reduce the supply of farmland to the market.

Finally, the third section shows that in contrast to consolidation and the farmland sales markets, the farmland rental markets have been very active throughout the EDM and constitute the most likely means of reallocating land resources to accommodate farm-size expansion. Unfortunately, present rental legislation does nothing to increase the efficiency of rental markets in the region. In fact, the legislation promotes both inefficiencies and inequities in rental outcomes, resulting in widespread avoidance of rental legislation. Subsequent chapters examine the theory of share tenancy and how it might apply to the rental legislation in the EDM.

CHAPTER FOUR

SHARE TENANCY, SHARECROPPING: A REVIEW

Since the 18th century when Adam Smith wrote Wealth of Nations, economists have disagreed about the efficiency of sharecropping compared to other forms of tenancy (e.g., fixed-rent or wage contracts). In general, the discussion of share tenancy in the literature focuses on agriculture (i.e., sharecropping) and has much less to say about share tenancy in other areas such as retail sales, beauty salons, gasoline stations, or oil.

Today, the mention of sharecropping conjures up images of serfdom and exploitation of share tenants by landlords. This negative perception of sharecropping can perhaps be attributed to economists Adam Smith, Alfred Marshall, and others. A history of the development of share tenancy theory might explain its negative perception by many economists.

I. The Classical View

British economists, such as Adam Smith and Arthur Young, contributed most to the original theory that sharecropping is less desirable than fixed-rent tenancy. Smith contended that *metayers* , sharecroppers in France, would have little interest in the improvement of land due to the large share, or "tax," as he called it, that must be paid to the landowner. Thus, share contracts lead to a decline in the productivity of farmland, resulting in a lower income for both tenant and landowner (Smith). For this reason, classical economists viewed sharecropping as a less efficient form of tenancy. About the metayage system, Young wrote:

> There is not one word to be said in favor of the practice, and a thousand arguments that might be used against it... In this most miserable of all the modes of letting land, the defrauded landlord receives a contemptible rent; the farmer is in the lowest state of poverty; the land is miserably cultivated; and the nation suffers as severely as the parties themselves... Wherever this system prevails, it may be taken for granted that a useless and miserable population is found (pp. 241-42).

Young believed that under a sharecropping system the "defrauded" landlords, the poor farmers, and the nation as a whole would all be worse off because of "miserably cultivated" land that would lead to a lower income for both the landlord and the tenant. As for the "thousand arguments" against sharecropping, Young was not specific.

Smith, for his part, did not elaborate on the meaning of economic efficiency as it relates to sharecropping. Rather, he only considered the misallocation of resources, i.e., the disincentive to land improvement that resulted from sharecropping. He also strongly supported the British leasing arrangement--a free hold with a fixed rent and a lease for life--as more developed than those elsewhere in Europe.

From his observations in France, Smith concluded that over time fixed-rent farmers would replace sharecroppers just as sharecroppers had replaced "slave" cultivators (Smith, p. 365). However, this has not been the case in countries where landowners and farmers are given a choice (e.g., the United States).

It should be mentioned that not all of the literature on sharecropping found it inefficient. Simonde de Sismondi, a *metayer* landlord, wrote favorably about the Italian *metayer* system:

> The system of cultivation by *metayers* ...contributes, more than anything else, to diffuse happiness among the lower classes, to raise land to a high state of culture, and accumulate a great quantity of wealth upon it...Under this system, the peasant has an interest in the property, as if it were his own... (Simonde, pp. 41-42).

This endorsement of the metayage system contrasts the condemnations by Young. However, both sides of the metayage issue were not taken up until after John Stuart Mill's review of the literature in 1857. Mill noted that "the *metayer* system has met with no mercy from English authorities." He did, however, accept Smith's view that share rent is analogous to a tax and, thus, came to Smith's conclusion that the tenant would have no interest in "improvements." Therefore, "the improvements must be made with the capital of the landowner," but "custom" is "a serious hindrance to improvement." Mill concluded that the metayage system in Europe was influenced by custom and not by competition (Mill, pp. 363-367).

Cheung disagreed with Mil, arguing that the lack of explicitly stated factor prices in a share contract gives the appearance of no competition. For example, Cheung wrote that, *ceteris paribus*:

> A reduction in farm size represents either a fall in the wage rate (or in the cost of nonland inputs) or a rise in the rental price of land; or that a fall in the rental percentage represents either a rise in the wage rate or a fall in the rental price of land (Cheung, 1969, p. 38).

So, what would be a large increase in the wage rate in a wage contract, could, under a share contract, be accomplished through small changes in the rental share, labor input, and land size.

In conclusion, the early critics of sharecropping never fully developed the argument against sharecropping. In fact, as Cheung pointed out, they were so unclear in their criticisms that he was unsure whether "they laid the blame on the product sharing or on the nonperpetual lease" (Cheung,1969, p.38).

II. The Neoclassical View

The rental share paid by a farmer was first called a tax by Smith, but it was Alfred Marshall who developed this idea more fully into what is now referred to as the "tax-equivalent" approach. According to this approach, share tenants will supply less labor than under cash leases because they receive only a fraction of the value of their marginal product (MP).

The tax-equivalent model--as used by Bardhan and Srinivason, Bell et al., and Pant --assumes, either explicitly or implicitly, the following: (1) The renter has no role in determining either the rental share or the amount of land share-leased; (2) The opportunity cost of the renters time is the prevailing wage; (3) All resource allocation decisions are made entirely by the renter; (4) All relevant variables are known with certainty. Also, much of the literature assumes "an adversarial relationship between renter and landowner" (Bernat).

With the tax-equivalent model, Marshall showed that under a form of tenancy other than share tenancy the amount of labor supplied by a tenant would be up to where the MP of labor equalled the opportunity cost of labor (i.e., the prevailing wage). Under share tenancy, however, the tenant receives only a fraction of the MP of labor, and therefore, equates the fraction of the MP to opportunity cost, resulting in a lower level of labor input. (This result assumes that the MP of labor is positive and a declining function of labor.)

Following the above line of reasoning, Marshall concluded that share tenancy resulted in less than the efficient quantity of labor ("Efficient" meaning the level of labor input where the MP of labor equals its opportunity cost.) A less than efficient use of labor would lead to lower overall incomes for both tenant and landowner and to a less than efficient use of complementary inputs, such as, water, fertilizer and capital. Even a small

impact on efficiency at the farm level could have a significant impact when aggregated over the whole economy. It is for this reason that there is so much interest in the efficiency of share tenancy versus other forms of tenancy.

III. The Cheung (Equal-Efficiency) Model

The first economist to argue strongly for the idea of equal efficiency was Steven Cheung. About the tax-equivalent approach Cheung wrote:

> In the tax-equivalent approach, the writers generally fail to realize that the percentage of shares and area rented under share tenancy are not mysteriously "fixed," but are competitively determined in the market (1969, p. 30).

From the above quotation it is clear that Cheung believed the share percentage should be treated as a discretionary variable. In addition, he assumed that wealth maximization was subject to the constraints of private property rights in a free market, and that the cost of contracting was zero.

Unlike previous analysts, Cheung discussed the division of land in a general equilibrium framework. So, at equilibrium, not only was it necessary for the value of the MP of labor to equal the wage rate, it was also necessary for the landowner's return from share-leased land to equal the return from cash-leased land. If this were not the case, tenants would have an income in excess of their income from wage labor alone. Similarly, landowner's would receive less than the equilibrium return to land. In a competitive free market, the tenant's surplus would then be extracted by the landowner's search for tenants willing to supply the "optimal" amount of labor (Cheung, 1968).

In Cheung's analysis, it is the landowner who chooses the level of labor input, not the tenant. The tenant's choice is between share tenancy, fixed-rent tenancy, and wage labor. The level of labor input is chosen to maximize the landowner's income, subject to

the constraint that the tenant's income equal what could be earned as wage labor. Here, the assumption of zero transaction and enforcement costs is crucial.

Ip and Stahl argued that even though no output differences between share and cash tenants were observed, share leasing would be inefficient simply because enforcement costs are not zero. Bernat concluded that the equal-efficiency model depended upon "the operation of implicit contracts or the presence of fixed coefficient technology, in which case specification and monitoring of input levels is greatly simplified." He also pointed out that the equal-efficiency view contradicts two commonly accepted postulates of economic behavior. First, the tenant's maximization process is one of equating average returns and marginal returns (which Bernat believes may in fact be correct). Second, output levels will be the same for both risk-averse and risk-neutral operators. (Standard economic theory predicts that risk-averse operators will have lower levels of output) (Bernat, pp. 9-10).

Cheung recognized that his assumption of zero transaction costs was unrealistic. However, the presence of risk explains the existence of several forms of tenancy. It is the balancing of risk aversion and transaction costs that determines lease choice. Landowners might prefer cash leases over share leases that are more costly to enforce. However, tenants might prefer share leases because of the "risk spreading" they provide. Cheung concluded that wherever the gains from risk sharing exceed the higher transaction costs, share leasing will be chosen over fixed-rent leases.

IV. Summary

The debate over the efficiency and desirability of share tenancy has continued to today with supporters on both sides. Further development of share tenancy models has lead to the inclusion of risk preferences, uncertainty, and enforceability. These models

show that indeterminate solutions exist under certain conditions, and only through empirical study can a conclusion be made about which form of tenancy is more desirable.

An in-depth summary of the various theories of share tenancy was recently published by Otsuka and Hayami. In it, they use the general theory of agency-principal relations (the agency theory) to review past literature on share tenancy. In the context of share tenancy, "agent" refers to the tenant and "principal" refers to the landowner.

The authors begin by developing a basic unified framework of a general model of tenancy contract. Then, they clarify contradictions they perceive in the Marshallian, tax-equivalent theory. They later incorporate the aspects of enforcement and uncertainty into their model. Table 4.1 gives a good summary of the various assumptions affecting the conclusions about share tenancy.

V. Arguments for the Existence of Share Tenancy

Despite the variety of arguments that suggest share tenancy leads to inefficiency, share tenancy persists in many parts of the world. This raises the question, "why?". Several competing theories have been advanced. The following is a discussion of those theories.

A. Self-Selection :

The self-selection model, developed by Hallagan to rationalize the existence of share tenancy under certainty, is also referred to as the "Screening Approach". Hallagan, in his effort to explain the coexistence of cash leases, share leases, and wage contracts, cited the fact that landowners have imperfect information regarding the ability of individual tenants. In his model, he made the following assumptions: (1) Output is an increasing

Table 4.1:

Relative Magnitudes of Output, Input, Land Rent, and Tenant Income from Farming per Hectare among Three Land-Tenure Classes, Implied from Different Assumptions about Share Tenancy Contracts

Assumption:	Yield (& Input) per Ha	Rent per Ha	Tenant Income from Farming/Ha
Under Certainty:			
Enforceable	S = R = OF	S = R	S = R
Unenforceable	S < R = OF	S < R	S <=> R
Under Uncertainty:			
Enforceable	S = R = OF	S => R	S <= R
Unenforceable:			
σ < 1	S < R = OF	S > R	S < R
σ = 1	S = R = OF	S => R	S <= R
σ > 1	S > R = OF	S <=> R	S <=> R

Note: S = share tenancy, R = fixed-rent, OF = owner farming
σ = elasticity of substitution of the inputs: land and labor

Source: Otsuka and Hayami, p. 40.

function of two types of labor, basic and managerial; (2) All tenants possess the same amount of basic labor but different amounts of managerial labor; (3) Landowners, who also possess managerial labor but no basic labor, cannot tell how much managerial labor is possessed by a tenant until after a contract is signed .

The optimal strategy according to this theory is to let tenants choose the contract that maximizes their income. More specifically, high ability tenants could choose cash leases, low ability tenants could choose share leases with the landowner's providing managerial input, and wage contracts would be for individuals with the least managerial ability. In the last case, landowners would provide all managerial input.

A tenure ladder, where young farmers are considered to have less ability than older farmers, can be viewed as consistent with the screening approach. Bernat suggests that according to screening theory "the youngest, least experienced farmers will therefore maximize their expected income under fixed wage contracts..." (p. 5). However, the existence of tenure ladders is suspect, and Otsuka and Hayami point out in their article that Hallagan considered only the worker's optimization and failed to consider the landowner's. They went on to argue:

> If the landowner has no information on the ability of workers, he will propose the fixed-rent contract alone and let the workers choose either that or wage employment (p. 41).

Allen (1985) went one step further than Hallagan by incorporating the landowner's optimization behaviors. According to his model, landowners offer self-selection to workers as a way to prevent tenant default on rent payments. Where the possibility of default exists, landowners can force the production function to shift down by limiting the amount of land rented to people of unknown ability. This would ensure that low-ability workers prefer to be wage laborers.

If one assumes the real possibility of default, as Allen does, then Allen's model can be used to show that share and fixed rent tenancy can achieve the same resource allocations and income distributions. However, this assumption is very suspect especially in the rural communities of developing countries where advanced payment of fixed-rent is widely practiced.

B. Transaction Costs of Nonlabor Input:

Murrel, Datto et al., and others have suggested a "transaction cost model" in an attempt to explain the existence of share tenancy. This model assumes that the incentive for the tenant to gain from abuses to farm land and capital (e.g., over cultivation of the soil and failure to maintain equipment) increases with the share of output kept by the tenant (α). Conversely, the cost of enforcing the terms of a contract with respect to labor input varies indirectly with α (See Figure 4.1).

Accepting that both the cost curves of monitoring labor input and land quality are convex and independent as shown in Figure 4.1; $\alpha *$ is at the point where MC's are equal in absolute terms which is the necessary condition of total transaction cost minimization for the landowner. Given $\alpha *$, equilibrium can be reached through the adjustment of a fixed payment (i.e., a wage payment to the tenant or a fixed-rent payment by the tenant) in such a way so as to assure the tenant's income at the level of reservation income or utility.[1]

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1 Two things should be pointed out here: (1) The joint costs of supervising the tenant's labor input and land abuse may be less than the sum of the two curves as shown in Figure 4.1 (Alston and Higgs); (2) "the solution is not Pareto optimal, and its solution is expected to have the same properties as those of the unenforceable contract shown in Table 1"(i.e., Table 4.1) (Otsuka and Hayami, p.44).

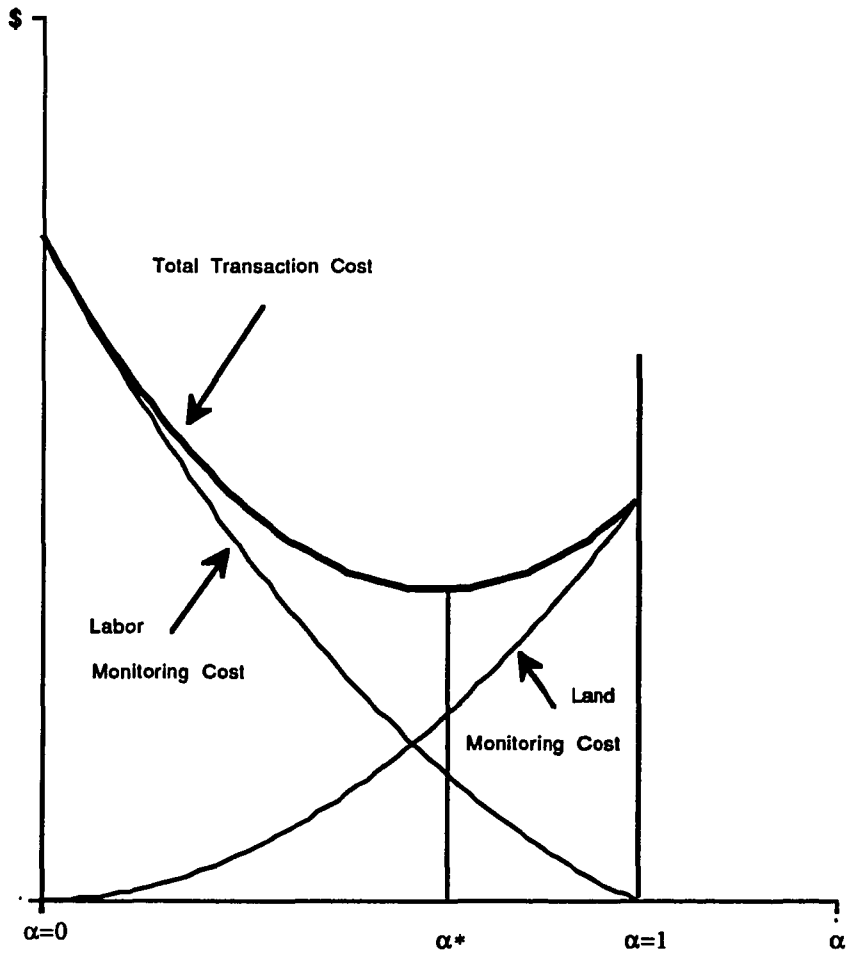

Figure 4.1: **The Transaction Cost Model of Contractual Choice.**

Source: Otsuka and Hayami, p. 45.

Otsuka and Hayami concluded in their article that the transaction cost model is:

> The only model developed, so far, that is able to offer a consistent explanation for the existence of share tenancy under the assumption of unenforceable contract and the absence of risk aversion under certainty. Its validity must be ultimately judged on empirical data (p. 46).

C. Enforceable Contracts Under Uncertainty:

Economists have often used the existence of uncertainty in agriculture to explain the existence of share tenancy. The rationale which relates uncertainty to share tenancy's existence is simply that share tenancy plays a role in risk sharing.

Assuming that contracts are enforceable, Otsuka and Hayami show that a landowner will maximize utility--subject to the constraint that the tenant is assured of receiving reservation utility--in such a way that the expected marginal land productivities between owner-farming and tenanted land will be equal (assuming a linear homogeneous production function). They also derive a result which "implies that the marginal rates of substitution between risky income and riskless income are the same between the tenant and the landowner" (p. 46).

With the combination of uncertainty and enforceable contracts, three contracts are possible: (1) a wage labor contract where the landowner is risk-neutral (Stiglitz; Mitra); (2) a fixed-rent contract when the landowner is risk-averse and the tenant is risk-neutral (Otsuka and Murakami); (3) a share contract when both the landowner and the tenant are risk-averse (Stiglitz; Sutinen). A summary of these results appears in the third row of Table 4.1. The inequalities result from what is in effect the payment of a risk premium by a share tenant.

Newbery (1976,1977) questioned whether the presence of uncertainty justifies the existence of share tenancy since the same risk sharing can be achieved through a linear combination of fixed-wage and fixed-rent contracts, assuming constant returns to scale and

no transaction costs. Later, Stiglitz and Newbery argued that scale economies in a tenant's production function resulting from the indivisibility of inputs (e.g., entrepreneurial ability, family labor, and draft animals) could justify share tenancy's existence. However, Allen (1984) countered that even if scale economies exist, then a mixture of wage and rent contracts can be identical to share contracts, assuming zero transaction costs.

D. Conclusion:

In the end, real world contract choices will be determined by both risk preferences and transaction costs. For example, where contractual enforcement of labor input requires significant cost under uncertainty, share contracts will be chosen if tenants are risk-averse (Stiglitz; Hiebert). Unless the elasticity of substitution, σ, between inputs (i.e., land and labor) is one, the expected marginal productivities (EMP's) of land for tenanted and owner-farming areas will not be equal. In general, the EMP of land for owner farming is greater (less) than the EMP of land for tenant farming for $\sigma < 1$ ($\sigma > 1$). This implies that labor input and, hence, output per hectare of land under share tenancy tend to be lower (higher) than those of owner farming and fixed-rent tenancy for $\sigma < 1$ ($\sigma > 1$). However, the results for rent and income are indeterminate when $\sigma > 1$ (Otsuka and Hayami, p. 49).

The implications for resource allocations and income distributions of share tenancy compared with other forms of land tenure under unenforceable contracts with uncertainty are summarized in rows four through six in Table 4.1.

CHAPTER FIVE

THE THEORY OF SHARE TENANCY

This chapter examines the theory of share tenancy both mathematically and graphically. This analysis follows the presentation of Cheung and uses his notation (Cheung 1969). First, the Marshallian (Neoclassical, tax-equivalent) model will show that share tenancy is less efficient than fixed-rent tenancy. Then, the more general Cheung (equal-efficiency) model will demonstrate that share tenancy can be as efficient as fixed-rent tenancy. Further generalization of Cheung's model, through the addition of uncertainty, risk aversion, and enforceability, can result in an indeterminate solution where share tenancy may or may not be more efficient than fixed-rent tenancy. The results of this chapter will lead to the generation of testable hypotheses to argue that Portugal requires a flexible rental law for its diverse agricultural systems.

I. The Marshallian Model

In the Marshallian model, the only tenant input is assumed to be labor, t. Tenant output is a function of both land, h, and labor; $q = q(h,t)$. The wage rate of labor, W, is exogenously determined and represents the opportunity cost of tenant labor at the margin. Further, it is assumed that the tenant has no role in determining either the rental share or the amount of land leased. All subsequent input decisions are made entirely by the tenant.

A. Mathematical Presentation:

In order to simplify the analysis, the price of a unit of output is fixed at unity. Therefore, the value marginal product (VMP) and the marginal product (MP) of any input are equal. Also, the amount of tenant labor, t, refers only to labor used in farming the rented land. Now, letting T represent the total amount of labor an individual can supply,

and c, the per acre cash rental price, net income, y, for a fixed-rent tenant can be expressed as:

$$y = q(h,t) - ch + W(T-t)$$

Maximizing y with respect to tenant labor input, t, and solving the first order condition,s results in the VMP of tenant labor being equal to the marginal tenant cost; that is,

$$\partial q/\partial t = W$$

This result is used as an indication of efficient resource use.

Now, consider the case of a share tenant instead of a fixed-rent tenant. The share tenant's net income is expressed as:

$$y = (1-r)q(h,t) + W(T-t)$$

where r is the landowner's share of output ($0 < r < 1$). Here, the share tenant maximizes net income by equating the tenant's share of the VMP with the marginal tenant cost; or,

$$(1-r)\partial q/\partial t = W$$

Because r is greater than zero, the VMP of labor exceeds the market wage rate under a share contract. It is this result that leads Marshall to conclude that share tenancy results in less than efficient resource use, and in an equilibrium where the quantity of labor supplied by the tenant would be less than under fixed-rent tenancy (assuming of course that $\partial q/\partial t > 0$ and $\partial^2 q/\partial t^2 < 0$).

B. Graphical Illustration:

Figure 5.1 provides a graphical representation of the results from the preceding subsection. Tenant labor, t, is measured along the horizontal axis, and $\partial q/\partial t$ represents the MP of tenant labor for a given parcel of land. In a competitive market, the marginal cost of tenant labor, $\partial(Wt)/\partial t$, is simply the prevailing wage, W. As shown in Figure 5.1 this cost is invariant with respect to the level of tenant-labor hired. If the landowner

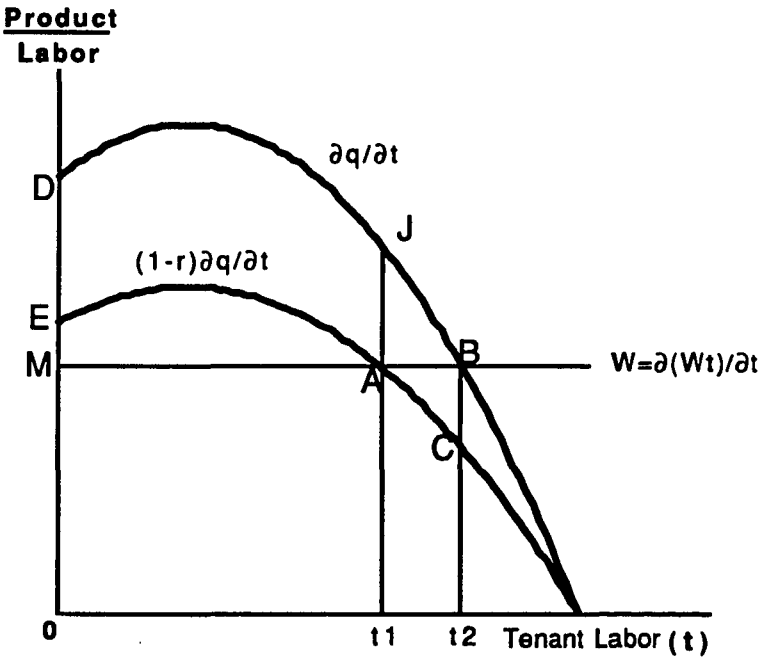

Figure 5.1: The Marshall (Tax-Equivalent) Approach Illustrated

Source: Cheung, 1969, p. 43.

were to hire wage labor to cultivate the land, equilibrium would be at B, and the quantity of farm labor hired would be t_2. At point B, the marginal equality is $\partial q/\partial t = \partial(Wt)/\partial t = W$. The same result occurs when the land is cultivated solely by the land owner with t_2 units of labor or when the landowner provides less than t_2 units of labor and hires additional laborers at wage W (assuming that all labor is homogeneous with the same opportunity cost). The area MDB represents the total rent as a return to land received by the landowner. In a competitive market, this amount equals that of a fixed-rent contract because under competition the amount a fixed-rent tenant receives must equal the possible alternative earnings (i.e., area $OMBt_2$).

Under share tenancy, however, the marginal tenant receipt net of rent, $(\partial q/\partial t)(1-r)$, shifts downward. Since the tenant receives only a portion of the product, an income-maximizing tenant will only work on the farm as long as the marginal receipt is greater than or equal to the prevailing opportunity cost of labor (i.e., the prevailing wage). Therefore, the equilibrium will occur at A, where $(\partial q/\partial t)(1-r) = \partial(Wt)/\partial t$. Here, t_1 is the amount of tenant labor supplied, and $ODJt_1$ represents the total product of which the landowner receives rent equal to area EDJA, and the tenant receives a share equal to area $OEAt_1$.

At a level of tenant labor equal to t_1, the tenant receives area MEA over and above the alternative earning (area $OMAt_1$). However, as Marshall pointed out, with equilibrium at A the MP of tenant labor is higher than the marginal tenant cost (W). Therefore, share tenancy is inefficient in the use of labor and results in economic waste of area JAB. Unless the share tenant can find some way to earn income with the unused labor, $t_2 - t_1$, share tenancy will result in lower incomes for both the tenant and the landowner. Also, the inefficiency in labor use leads to less than efficient use of complementary inputs such as

water, fertilizer, and capital. When aggregated over the entire farming sector, the impact on the economy of inefficiency could be significant.

II. The Cheung Model

As stated in the previous chapter, Cheung approached the analysis of share tenancy differently than Marshall. In Marshall's analysis, optimization is from the tenant's point of view with no consideration of the landowner's optimization. Cheung questioned why a landowner would agree to share tenancy when it results in a lower level of total rent to the landowner. In response to the neglect of the landowner's optimization, Cheung used a general equilibrium analysis starting from the landowner's point of view subject to the tenant receiving an income equal to the next best alternative (i.e. wage labor). In addition, Cheung assumed that income maximizing was subject to the constraints of private property rights in a free market, and that the costs of contracting and enforcement were zero.

A. Mathematical Presentation:

In the mathematical presentation of Cheung's analysis, the following assumptions apply. First, there are two homogeneous factors of production, h and t; h is the amount of land per tenant farm and t is the amount of labor per farm. Second, the production functions of each tenant farm are identical [1]. It follows that in equilibrium the land size, h, and rental percentage, r, contracted for each tenant farm will be identical.

The first assumption results in each tenant farm's production function being $q = q(h,t)$. As for land size, h, it is the ratio of total landholding of the landowner, H, to the

---

1 Not all tenant families are equally productive. The landowners cannot successfully discriminate among tenants of varying efficiencies even if there are no costs associated with discrimination because landowners employing marginal tenants (least productive tenants) will bid the more productive tenants away from a discriminating landowner (Cheung 1969).

The first assumption results in each tenant farm's production function being $q = q(h,t)$. As for land size, h, it is the ratio of total landholding of the landowner, H, to the total number of farms, m; that is,

$$h=H/m$$

Thus, the landowner's total rent, R, equals the number of farms times the rent per farm; or,

$$R = mrq(h,t)$$

Under competition, the share tenant's income from farming equals the possible alternative income. That is,

$$(1-r)q(h,t) = Wt$$

where W is the market wage rate of the tenant labor.

The problem for the landowner is to maximize R, through the choice of m, r, and t [2], subject to the constraint of competition; that is,

$$\max_{\{m,r,t\}} R=mrq(h,t) \quad \text{s.t. } Wt = (1 - r)q(h,t)$$

After forming the Lagrangean expression, the problem becomes the maximization of

$$£ = mrq(h,t) - \lambda\ [\ Wt - (1 - r)q(h,t)\ ]$$

The resulting necessary conditions are:

$$\partial £/\partial m = rq(h,t) + mr(\partial q/\partial h)(dh/dm) + \lambda\,(1 - r)(\partial q/\partial h)(dh/dm) = 0 \qquad \textbf{(5.1)}$$

$$\partial £/\partial r = mq(h,t) - \lambda\, q(h,t) = 0 \qquad \textbf{(5.2)}$$

---

2 Note that t and m need not be treated separately. Given t, an adjustment of m yields the same result as adjusting t while holding m constant. They are separated here for the purpose of conveniently deriving all the conditions in equilibrium.

$$\partial £/\partial t = mr(\partial q/\partial t) - \lambda W + \lambda (1 - r)(\partial q/\partial t) = 0 \qquad (5.3)$$

$$\partial £/\partial \lambda = - [Wt - (1 - r)q(h,t)] = 0 \qquad (5.4)$$

Equation (5.2) gives $\lambda = m$, and equation (5.1) becomes:

$$rq + mr(\partial q/\partial h)(- H/m^2) + m(1 - r)(\partial q/\partial h)(- H/m^2) = 0$$

(where $- H/m^2 = dh/dm$); that is:

$$rq - h(\partial q/\partial h) = 0 ; \quad \text{or} \quad rq/h = \partial q/\partial h .$$

This implies that the rent per acre of land equals the MP of land in equilibrium, a condition identical to that of a fixed-rent contract.

Equation (5.3) results in the VMP of tenant labor equal to the wage rate; or,

$$\partial q/\partial t = W$$

This condition is also identical to that of a wage contract. Therefore, share tenancy can be as efficient as a fixed-rent or a wage contract.

Solving (5.1) and (5.4) for r gives:

$$r = (\partial q/\partial h)/(q/h) = (q - Wt)/q$$

That is, in equilibrium, the rental percentage must simultaneously satisfy the last two terms: the elasticity of output with respect to land, $(\partial q/q)/(\partial h/h)$, and the total yield net of tenant cost as a portion of the total product, $(q - Wt)/q$.

B. Graphical Illustration:

Figure 5.2 diagrams the tenant income and rent paid by a single share tenant on a landowner's land. Here, H is the total area of land belonging to the landowner. The land area held by the tenant is denoted by h and the product is denoted by q. The share of the product, r, charged by the landowner as rent, varies between 0 and 1, and the MP of land,

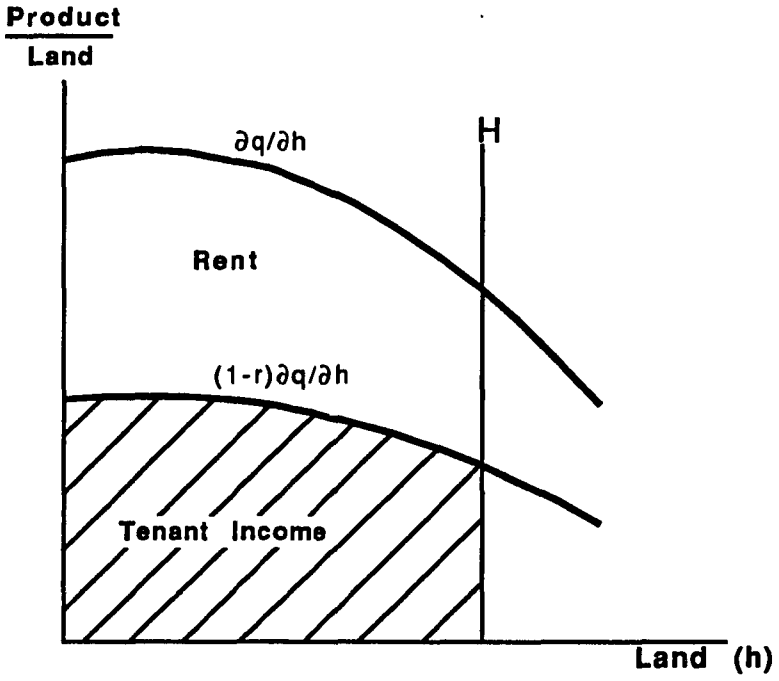

Figure 5.2: Sharecropping with One Tenant..

Source: Cheung, 1969, p. 17

$\partial q/\partial h$, diminishes as h increases (i.e., $\partial^2 q/\partial h^2 < 0$). The marginal tenant income, $(\partial q/\partial h)(1-r)$, is the vertical distance between $\partial q/\partial h$ and $(\partial q/\partial h)\,r$.

In order to maximize rent, the area between $\partial q/\partial h$ and $(1-r)\partial q/\partial h$, the landowner will raise the rental percentage until the tenant's income from farming, the shaded area below $(1-r)\partial q/\partial h$, equals the alternative earning.

The rental percentage is not the only variable which the landowner can adjust to maximize wealth. By parceling the land to several tenants, the landowner can obtain a greater total rent (See Figure 5.3). Therefore, to maximize rent, the landowner will maximize the difference between the integral of the MP of land and the integral of the tenants' incomes. However, as the area of land assigned to each tenant becomes smaller, the rental percentage the landowner charges must be lower for the tenant to obtain an amount equal to the alternative earning. Thus, for the landowner to maximize rent, the land size per tenant and the rental percentage must be simultaneously determined [3].

Figure 5.4 geometrically represents how simultaneous determination of h and r can be achieved. The dimensions here are the same as for Figure 5.3 except here only one tenant is considered. The curve q/h represents the average product of land with one tenant family employed. Fixed total tenant farming cost divided by land area, f/h, is the cost of farming inputs (other than land) needed to yield the expected average product, q/h. Assuming that all nonland farming inputs are borne by the tenant, the f/h curve includes the cost of labor, seeds, fertilizers, and farming equipment necessary for the period of

---

3 "Defining homogeneous land as land physically identical and having the same rental value per unit--that is, the (q-f)/h curves in different tenant farms yield equal heights at their peaks-- the land sizes for different tenants will differ if the production functions of these tenants differ. This also implies that the rental percentage for different tenant farms may not be the same...In equilibrium, given homogeneous lands, the marginal productivity of land for each farm must be equal at every margin, for it is at the highest value of (q-f)/h that land sizes are divided." (Cheung, 1969, p. 25)

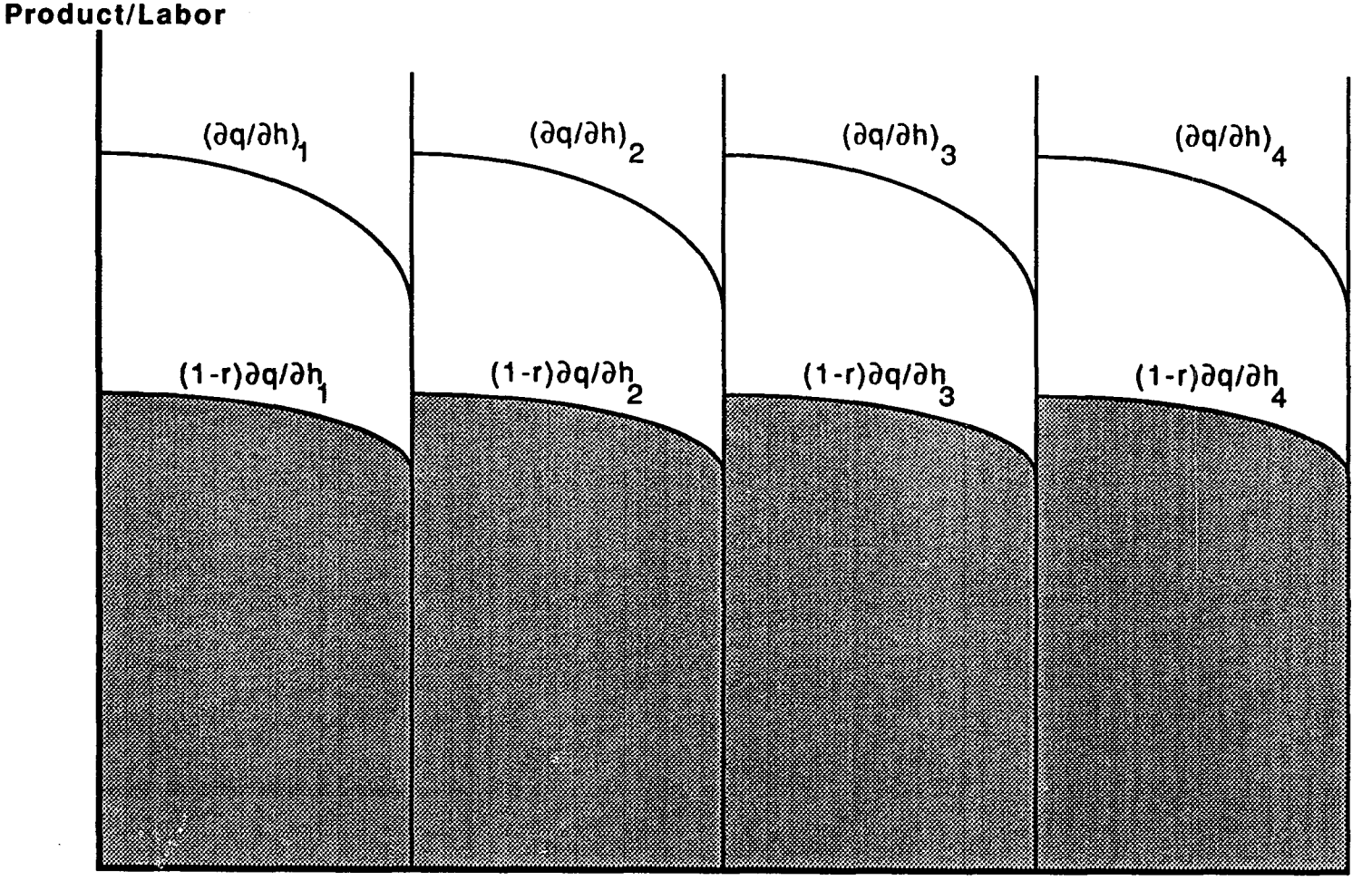

Figure 5.3: Share cropping with Multiple Tenants.
Source: Cheung, 1969, p.18

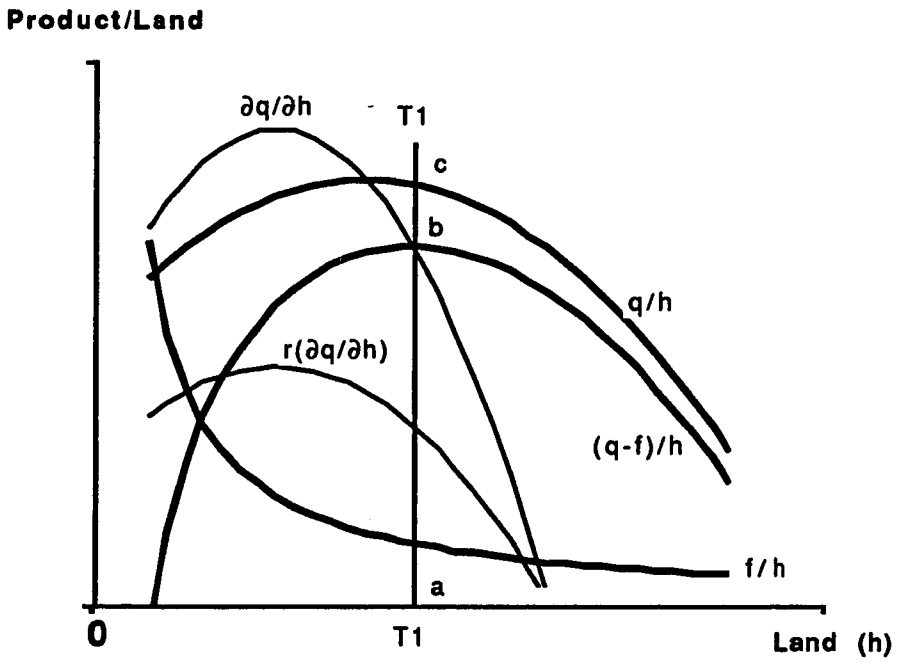

Figure 5.4: **The Determination of Rental Percentage and Land Size in One Share Contract of One Tenant.**

Source: Cheung, 1969, p.22

production. As seen earlier in the presentation of the Marshallian model, the tenant will commit less than the efficient level of labor (i.e., where $\partial q/\partial t=W$) under a share contract. For this reason, Cheung's analysis requires that the total amount of tenant inputs which define f/h be contractually stipulated.

Now, holding the farming inputs constant results in the f/h curve being a rectangular hyperbola. The vertical difference between q/h and f/h defines $(q-f)/h$, the rent per unit of land, taking into account the alternative cost of the tenant. In his book, Cheung states:

> Under mutual agreements, economic theory implies that the total amount of tenant inputs contracted will be the amount which yields the highest $(q-f)/h$, or which yields the highest rent per unit of land (Cheung 1969).

Therefore, determining the highest $(q-f)/h$ is necessary before the rental share can be stipulated.

Because f is a constant, the marginal farming cost always equals zero and the highest value of $(q-f)/h$ is derived in the following manner. Each increase in the stipulated amount of tenant input results in an upward shift of the f/h curve as well as the q/h curve. The former represents the marginal nonland cost, which increases at a constant rate; the latter represents the MP of additional tenant (i.e., nonland) input, which increases at a decreasing rate. The highest $(q-f)/h$, associated with a specific f/h curve, is obtained when the marginal upward shifts of f/h and q/h are equal, or when the MP of tenant input equals the marginal tenant cost. The highest value defines the cost of land per acre as a factor of production.

In Figure 5.4, the MP of land, $\partial q/\partial h$, cuts q/h and $((q-f)/h$ at their highest points. The land size assigned to the tenant in equilibrium is T_1, where $(q-f)/h$ is at a maximum, thus maximizing rent to the landowner. After determining the equilibrium tenant land size,

T_1, the equilibrium rental percentage, r, can also be determined. That is, $(q\text{-}f)/h$ divided by q/h (at T_1), or

$$(q\text{-}f)/q$$

The above ratio is labeled as ar/ap in Figure 5.4. Now, given the equilibrium percentage, r, the marginal contract curve, $(\partial q/\partial h)r$, can be plotted.

Because the percentage of the total product is contractually stipulated, the cost of land is no longer a constant with respect to the amount of land the tenant will use. In order to maximize income, the tenant would like to employ land up to where the MP of land is zero (while holding farming inputs constant as stipulated in the contract). This, of course, would not be acceptable to the landowner who wishes to limit the tenant's land area to T_1 and parcel the remainder to other tenants under similar contractual arrangements [4].

In summary, the solution conditions are as follows: (1) The highest value of rent per unit land, $(q\text{-}f)/h$, is derived when the marginal tenant cost equals the associated MP of tenant input; (2) The highest value of $(q\text{-}f)/h$ leads to the land size per tenant (T_1); (3) The rental percentage,r, will be ab/ac (as illustrated in Figure 5.4); (4) At the dividing line T_1, the rent per acre of land-- ab, $(q\text{-}f)/h$ or rq/h, equals the MP of land, $\partial q/\partial h$. Also, at T_1 there is the unique condition for rental percentage:

$$r = (\partial q/\partial h)/(q/h) = [(q\text{-}f)/h]/(q/h) = (q\text{-}f)/q \qquad (5.5)$$

which is identical to the mathematical solution:

$$r = (\partial q/\partial h)/(q/h) = (q\text{-}Wt)/q$$

since it was assumed in the mathematics that there was only one tenant input, $f = Wt$.

---

4 If the land size of the last plot assigned to a tenant family is smaller than the equilibrium size, then part of the tenant resources must be employed elsewhere.

If inputs other than labor are considered, then the farming cost (other than the cost of land) may be shared by the tenant and landowner jointly. Cheung argues in his book that it does not matter whether the landowner required the tenant to invest more in land and charges a lower rental percentage or whether the landowner invests in the land and charges the tenant a higher rental percentage; the investment will be made if it leads to a higher rental annuity.

III. Comparison of Marshall and Cheung

Marshall and Cheung make alternative assumptions that affect the results of their analyses. As mentioned in the first section, Marshall assumed that a tenant plays no role in determining either the rental share, r, or the amount of land leased, h. On the other hand, the tenant makes all resource allocation decisions.

In contrast to Marshall, Cheung allows both r and h to vary to accommodate both the landowner and the tenant. Because of this difference, Marshall's model can be seen as a simplification of Cheung's model. Cheung's correction of what he refers to as the "neoclassical" error shows how by relaxing Marshall's assumptions the result of equal efficiency can be obtained.

To Figure 5.1, Cheung adds the following curves: q/t, $(1-r)q/t$, $(1-r^*)q/t$, and $(1-r^*)\partial q/\partial t$. The end result is Figure 5.5. As drawn, the tenant's share is still higher than the alternative earning (area $OMBt_2$). Given the marginal tenant receipt, $(1-r)\partial q/\partial t$, the corresponding average tenant receipt will be $(1-r)q/t$. The landowner can therefore stipulate that the tenant work up to t_3, where the average tenant receipt, $(1-r)q/t$, equals the wage rate.

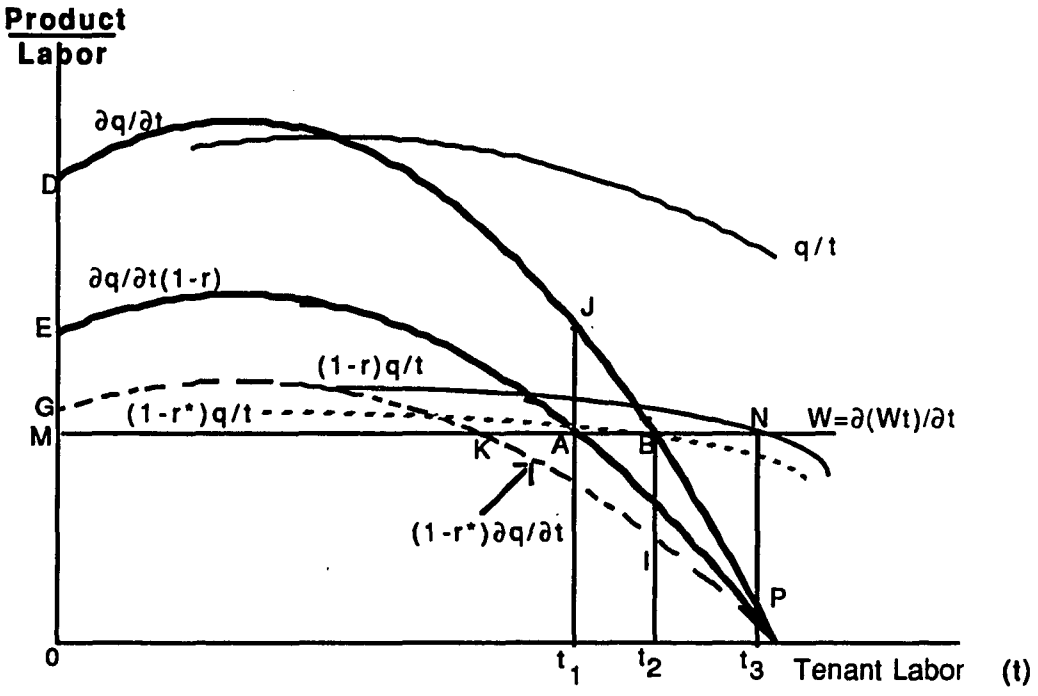

Figure 5.5: The Tax-Equivalent Approach Compared witn the Standard Theory of Share Tenancy.

Source: Cheung, 1969, p. 52.

With tenant input t_3, however, the total rent received by the landowner will be equal to area MDB minus area BNP, an amount of rent smaller than that of owner cultivation, a wage, or a fixed-rent contract. Therefore, the landowner will raise the rental percentage to r^* in order to maximize wealth with a share contract subject to the constraint of tenant cost. This lowers the marginal tenant receipt, $(1-r)\partial q/\partial t$, to the point where the area MGK equals the area KBI. With the rental share stipulated at r^* and tenant labor stipulated at t_2, the tenant's share equals area $OGIt_2$, which is no greater than the alternative earning (area $OMBt_2$). At B, the resulting equilibrium condition is:

$$\partial q/\partial t = \partial(Wt)/\partial t = (1-r^*)q/t$$

Here, the marginal tenant cost, $\partial(Wt)/\partial t$, is equal to the average tenant receipt net of rent (at r^*), $(1-r^*)q/t$, rather than the marginal tenant receipt net of rent (at r), $(1-r)(\partial q/\partial t)$, as is the case of Marshall's tax-equivalent analysis. According to Cheung, the marginal tenant receipt curve, $(1-r)\partial q/\partial t$, is the source of confusion in the tax-equivalent approach, and it is only "illusory for decision making under unrestrictive private property rights."

Further generalization of the Cheung model by incorporating uncertainty, risk aversion, and enforceability of contracts can result in an indeterminate solution. For example, if the elasticity of substitution of the inputs (land and labor) is not equal to one and contracts are unenforceable, Otsuka and Hayami's model predicts that the solution will be indeterminate.

In general, the literature on share tenancy suggests that empirical analysis is necessary to determine whether share tenancy or fixed-rent tenancy results in the most desirable solution. Table 4.1 from the previous chapter summarizes the possible results when uncertainty and enforceability are considered.

IV. Summary and Conclusions

Marshall's model concludes that an income maximizing fixed-rent tenant uses $\partial q/\partial t=W$ as the decision making rule, while an income maximizing share tenant uses $(1-r)\partial q/\partial t=W$. Unless W is zero, the level of labor input, as well as the levels of other complementary inputs, will be different under the two forms of tenancy. An application of Marshall's model to Northwest Portugal requires an investigation of how W and the demand for wage labor vary over regions.

Cheung's model concludes that an income maximizing fixed-rent tenant and a share tenant effectively use the same decision rule (i.e., $\partial q/\partial t=W$). However, Cheung's model allows the rental share, r, to vary and the level of tenant input to be contractually stipulated in order that both the tenant and the landowner are satisfied with the solution. The value of r in equilibrium must equal the elasticity of output with respect to land, $(\partial q/\partial h)/(q/h)$, and the total yield net of tenant cost as a portion of the total product, $(q-f)/q$. The latter result can be investigated with the use of models of tenant profitability for various crops in the EDM region.

Finally, the main question to be addressed is: Does the additional flexibility that share tenancy offers truly benefit both landowners and tenants alike, or is there no situation where share tenancy would be desirable in the EDM region?

CHAPTER SIX

ANALYSIS OF LEGISLATION AFFECTING THE RENTAL MARKET

As noted previously, given current practices, EDM farmers will face declines in farm income and returns to labor as a result of CAP price regulations after 1996. One way to counteract these impacts is for farmers to increase farm size, another is through investment in farm modernization. Chapter Three concluded that farmland rental markets hold greater potential for farm-size expansion than either farmland sales markets or consolidation programs. This chapter analyzes, in light of the preceding description of tenancy theory and the region, Portuguese legislation that affects land rental markets.

I. Description of Legislation Affecting Rental Markets

Government policy interventions in Portugal since 1969 have affected the rental markets both directly and indirectly. Examples of indirect intervention are the credit institutions (discussed in Chapter Three) and fragmentation laws. Direct impacts come from the rental-market legislation which sets maximum rental rates and stipulates tenure conditions. This section describes the fragmentation and rental-market legislation which result in official Portuguese rental rates well below one percent of sales prices compared to market rental rates typically between two and four percent [1] (Monke, et al., 1986). The actual EDM market rental rates for irrigated land ranged from 20 to 45 *contos* per ha while official rental rates ranged from 8 to 10 *contos* per ha (Monke, et al., 1986, Table 6).

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1 By comparison, the ratio of rent to value for irrigated farmland in the United Stated for 1986 averaged 7.6 percent, ranging from 5.1 percent in Texas to 10.6 percent in Nebraska (USDA).

A. Fragmentation Legislation:

Fragmentation laws adopted in 1970 are perhaps the most significant laws affecting northern land markets. These laws establish "minimum units of cultivation" for each region and reflect government opinions about the minimum size parcel that can sustain economically profitable technologies. For the North, minimum sizes are 0.5 ha for horticultural crops, 2 ha for field crops receiving some irrigation and 2-3 ha for non-irrigated soils. Land belonging to a single owner cannot be subdivided into units smaller than the minimum unit; exceptions are allowed if the renter already holds a contiguous parcel of land and the remaining portion of the parcel comprises at least one minimum unit. This creates a situation where landowners holding contiguous parcels have preferential rights for purchase or rental of parcels offered on the formal market.

More recent legislation has solidified the influence of agricultural profitabilities on sales and rental rates. In November 1982, an Agricultural Reserve was established (Decreto-Lei No. 451/82) to include all Class A, B, and part of C quality soils currently used for agricultural purposes. In freguesias where A and B soils are scarce or nonexistent, all Class C soils are considered a part of the Agricultural Reserve. Most non-agricultural uses of the Reserve are forbidden. However, exceptions are allowed for the construction of farm infrastructure (e.g., farm housing, barns,irrigation...) and for areas that will be incorporated into municipalities. Most exceptions must be approved by the Regional Ministry of Agriculture.

Enforcement of fragmentation legislation varies from region to region and often is hampered by the lack of *cadastral* surveys. In non-surveyed regions, government officials have difficulty judging non-compliance particularly where a contiguously cultivated parcel is composed of multiple parcels in the official land registry. Enforcement of Agriculture

Reserve legislation has also been erratic, but substantial fines (from 500-50,000 *escudos* per square meter plus the costs of returning land to its natural state) limit the extent of violations.

Data presented in chapter two shows that EDM farms are small (< 3ha) with farms in the interior zones even smaller. The average farm size ranges from 3.7 ha in the Coastal zone to 1.6 ha in the Intermediate zone. Perhaps even more important is the average parcel size which ranges from 0.8 ha in the Coastal zone to 0.1 ha in the Mountain zone. In addition, the primary cause of parcel separation in the interior zones--change in elevation--cannot be easily remedied (See Table 2.3). There is virtually no way farmers can abide by the fragmentation legislation in their efforts to increase farm size through official rental markets. Not surprisingly, the vast majority of rental activity in the EDM remains unofficial. The fragmentation legislation places an insupportable burden on EDM farmers. If farm-size expansion is to occur, relaxation or revision of existing fragmentation legislation will be necessary.

B. Rental-Market Legislation:

In addition to legislation concerning credit institutions and fragmentation, there exists rental-market legislation which concerns both rental cost and tenant-owner relationships. The 1976-77 land reform laws gave the Division of Land Reform (DIRA) the authority to estimate maximum rental rates for land. Before 1984, rental rates were intended to reflect a "just" share of the value of average gross revenues. Subsequently, rates have been calculated on the basis of cost and return calculations for principal crop rotations. Variable inputs (including all labor) are evaluated at market prices, and rental rates are used to approximate the costs of capital equipment. Calculation of the rental rate for a parcel will vary depending on the type of soil. Four qualities of dryland and three

qualities of irrigated land are recognized in the legislation, and relatively high yields are used in the calculations in an effort to establish a realistic maximum rental rate. Finally, the landowner may receive four-fifths of the remaining profit as the maximum rental rate. Despite the substantial increases in the official rental rates relative to previous methods of calculation, the rates remain well below the actual market rental rates in all regions (Monke et al., 1986, Table 6).

As for tenant rights, they have been strengthened by the establishment of contract relationships that prevent land sales without tenant consent. Initial rental contracts last for six years, with an option to renew for one three-year contract. Rental rates are fixed at three-year intervals, based on the official DIRA schedule. After the nine-year period, tenants may appeal to the courts to prevent eviction. For the courts to rule in favor of a tenant, the tenant need only show proof that the eviction would result in personal economic harm. Therefore, the legislation regarding tenant rights basically insures lifetime tenancy of all tenants.

As a result of the low legislated rents and the fear of lifetime tenure, segmented land rental markets have developed as owners of farmland avoid renting their land officially or choose to stay out of the rental market altogether. Many absentee landowners are reluctant to risk having a lifetime tenant on their land, yet they do not desire to leave their land completely vacant. So, landowners offer tenants subsidized, and in many cases even negative, rental rates in return for cultivating and monitoring the land in the their absence. In turn, the tenant agrees to vacate the land upon the request of the landowner, usually when the owner has accumulated enough off-farm income to secure desired capital improvements and /or housing facilities.

C. Rental-Market Activity:

The combination of the fragmentation and rental-market legislation creates strong incentives for landowners to avoid the official market. Table 6.1 clearly shows the widespread avoidance of the official land rental market. In the EDM, 98 percent of all contracts identified in the survey were verbal. Zonally, the percentages ranged from 82 percent in the Coastal zone to 99 percent in the Intermediate zone. Though some of these verbal contracts were likely between family members, the very high percentage indicates the high rate of avoidance of the official rental market. Table 6.1 also reveals a strong preference for share as opposed to cash (i.e., fixed-rent) contracts. Nearly 98 percent of rental contracts were share with 98 percent of those verbal. There were virtually no written contracts in the entire EDM for small parcels ($\leq$ .25 ha), and only the Coastal zone had a significant percentage of written contracts for parcels larger than .25 ha. The Coastal zone was also the only zone that had a significant percentage of fixed-rent, cash contracts (14.5 percent). This is not surprising since the Coastal zone has by far the highest output prices and the greatest returns to labor, thus removing some of the desire for the risk sharing found in share contracts. Still, over 87 percent of the fixed-rent contracts in the Coastal zone were verbal. They were also fairly evenly divided across the parcel size categories, indicating that no systematic relation existed between fixed-rent contracts and parcel size. In all, Table 6.1 reveals the strong tendency for EDM farmers to avoid the official rental markets and a strong preference for share over fixed-rent contracts. Mill might have argued, as he did with the metayer system in Europe in the 1800's, that the strong preference for share tenancy in the EDM occurs as a result of custom. That argument appears to be an oversimplification. The high percentages of both verbal and share contracts seem to indicate a high correlation between the two types of contracts. So, the

Table 6.1: Rental Contracting in the EDM Zones, 1987.

COASTAL:

Parcel Size (*Hectares*)	Percentage of Rental Contracts			
	V/S	W/S	V/C	W/C
0 -.25	9.2	0.0	5.3	0.0
.25 - 1	43.4	15.5	5.3	1.3
> 1	14.5	1.3	4.0	1.3
SUBTOTAL:	67.1	16.8	14.6	2.6

INTERMEDIATE:

Parcel Size (*Hectares*)	Percentage of Rental Contracts			
	V/S	W/S	V/C	W/C
0 -.25	81.6	0.1	0.5	0.0
.25 - 1	15.8	0.6	0.5	0.0
> 1	0.7	0.2	0.0	0.0
SUBTOTAL:	98.1	0.9	1.0	0.0

MOUNTAIN:

Parcel Size (*Hectares*)	Percentage of Rental Contracts			
	V/S	W/S	V/C	W/C
0 -.25	71.9	1.4	1.1	0.0
.25 - 1	24.5	0.0	0.0	0.0
> 1	0.5	0.0	0.0	0.0
SUBTOTAL:	96.9	1.4	1.1	0.0

V/S: Verbal share contract.
W/S: Written share contract.
V/C: Verbal cash contract.
W/C: Written cash contract.
Note: Cash contracts refer to fixed-rent contracts paid in cash.

SOURCE: Freguesia Survey, (Draft Report, Ch. 6).

desire to avoid official rental contacts by making verbal agreements leads to a preference for share contracts over fixed-rent contracts. Therefore, tradition should not be singled out as the only reason why share tenancy remains so prevalent in the EDM.

II. Analysis of the Legislation in Light of Tenancy Theory

Portuguese legislation accepts the Marshallian view that fixed-rent tenancy is always preferable to share tenancy. However, as noted above, this is far from what actually occurs in the rental markets where nearly 100 percent of rental contracts in 1987 were share contracts. This section analyzes in light of tenancy theory the portion of rental legislation that concerns the calculation of maximum rent.

A. The Cheung Model:

Cheung argued in his analysis that an efficient share contract should allow for consideration of the productivity of the land--in relation to soil quality and size--as well as the productivity of the labor. The Portuguese legislation includes provisions for variation in soil quality. However, one could argue that landowners and/or tenants are better judges of the productivity of a certain parcel of land. Moreover, the government, for the sake of rendering its calculations less cumbersome, limits itself to only seven soil types. This fact alone can lead to inaccuracies. It might be argued that this limitation in the legislation could result in benefits for either the tenant or the landowner. Nevertheless, inaccuracies in the calculation of rental rates create disincentives for either or both parties to avoid an official contract. Besides, the data show that the official rental rates are consistently well below market rates and thus favor the tenant.

There are several causes of this consistent underestimation of rental rates. First, official estimates use market prices to evaluate the cost of variable inputs (including all labor). This brings into question the government's ability to determine the optimal level of

all variable inputs and to place values on them. Granting that the quantity and value of all non-labor variable inputs are accurate, estimates for the opportunity cost of labor alone will result in lower than market level rental rates because off-farm employment opportunities are scarce.

Even though the minimum agricultural wage rate of 1200 *escudos* per day is generally respected throughout Portugal, the likelihood of obtaining employment at that wage (or any other) can vary greatly. As seen in Chapter Three, off-farm employment is much greater in the Coastal zone than in the interior zones. Because the official estimations of rental rates consider the opportunity cost of tenant labor to be the official market wage, even if no employment can be found at that wage, the estimates overstate the value of tenant labor and thus underestimate rental rates.

Figure 6.1 recreates Figure 5.4 with the addition of the curve $(q-f')/h$ where $f' > f$. This diagram following Cheung's model shows that as tenant input costs increase (i.e., f becomes f') and tenant productivity remains constant, the optimal share percentage will become de/df. Equation 5.5 identifies the optimal share percentage according to Cheung's analysis as $r=(q-f)/q$. Therefore, if there is an increase in f with no change in q (as would be the case if f were overstated) then the share rate, r, necessarily decreases. Simply put, an increase in input costs with no increase in productivity leads to a decrease in the rental share.

Another reason for the consistently low official rates is the provision in the legislation that the landowner receive four-fifths of the remaining profit as the maximum rent, in contrast to Cheung's conclusion that the landowner receive all of the remaining profit. Referring again to Equation 5.5, the optimal rental share is $r=(q-f)/q$. Therefore, a landowner receives total rent per unit land equal to $rq=(q-f)$. But, the maximum official

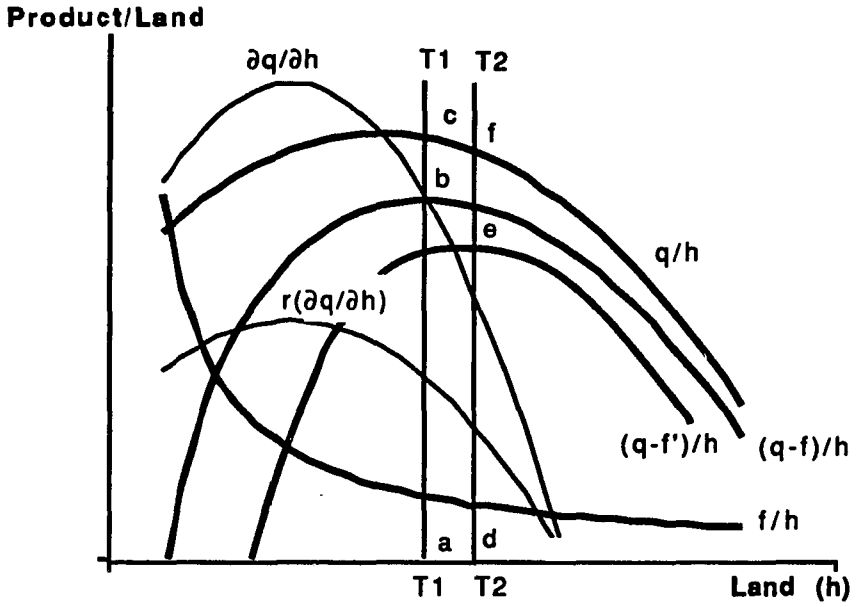

Figure 6.1: The Effect of an Increase in the cost of Production on the Determination of the Rental Share.

rent per unit land that a landowner can receive is $rq=4/5(q-f)$. The additional 20 percent of net profits received by the tenant is said to be a return to farm management that is often solely the responsibility of the tenant. Cheung might argue that return to farm management on the part of the tenant ought to be included in the tenant's opportunity cost of labor and thus be factored into input costs, f. In effect, this provision is simply a completely arbitrary addition to the agricultural wage rate which has already been overestimated.

B. The Marshallian Model:

The above arguments explain why official maximum rates are consistently below market rates, thus encouraging landowners to avoid the official market. However, tenants must also find avoiding the markets to be in their best interest. Figure 6.2 is based on the Marshallian model and Figure 5.1. The additional curve $(1-r')\,\partial q/\partial t$ represents a decline in the rental share received by the landowner (i.e., $r'<r$) as a result of the rental-market legislation. With the rental share equal to r', tenant income would equal area $0Fat_1'$ plus any off-farm income at wage W [i.e, $W(T-t_1')$].[2] It appears that the tenants are better off as a result of the legislation. So why do they agree to avoid it in such large numbers? The answer comes from an analysis of the legislation's impact on landowners.

In Figure 6.2, the rent received by the landowner equals the integral of $\partial q/\partial t - (1-r')\partial q/\partial t$ (or $r'\partial q/\partial t$) from 0 to t_1' (i.e., the shaded area FDGa). A landowner will not continue to willingly rent land if the return from renting does not justify the costs involved in renting. If forced to rent land that would not otherwise be rented, landowners might refuse to cooperate with tenants in sharing input costs or making farm improvements. In

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2 See Equation 5.1.

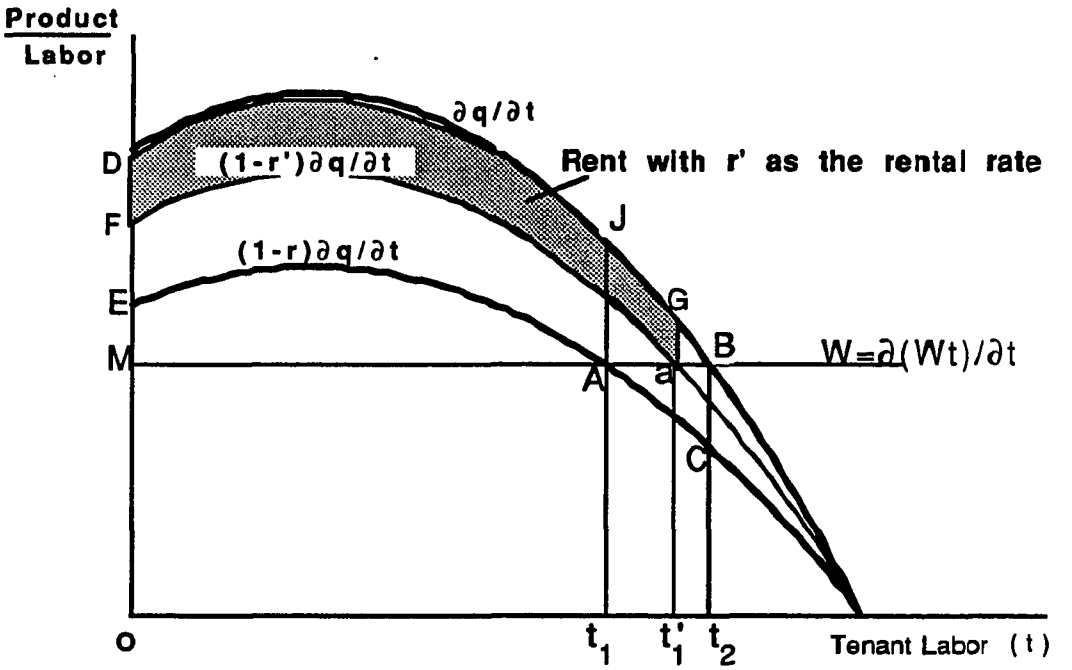

Figure 6.2: Impact of the Lower Official-Rental Rate on Rent Received by the Landowner.

this way, landowners might hope to "drive" tenants from their land.[3] A situation similar to this seems to exist in the EDM. Tenants opt for share contracts with the landowner sharing in the input costs, as opposed to pursuing enforcement of the rental laws.

In the absence of the security of tenure provisions, EDM tenants might still choose to avoid the official rental markets even without a lower share rate because laborers often face an all or nothing situation in the labor market. That is, individuals cannot realistically expect to work part-time as farmers and then supplement their income with off-farm wage labor because off-farm positions usually require that work be done at specific times. If anything, an individual with off-farm employment might receive supplemental income from working a small piece of farmland, but not vice-versa. The rental-market legislation combined with the environment for off-farm employment in the EDM create a situation where both landowners and tenants have incentives not to comply with the legislation.

III. Consequences of Rental-Market Legislation.

In spite of the legislation restricting rental markets, the unofficial rental markets remain very active and allow some farmers to increase farm size. However, there exist some negative ramifications of the rental legislation when enforced and even when unenforced. Therefore, keeping the status quo may not be desireable.

A. Impact on Farm-Size Expansion:

Figure 6.3 illustrates the effect of rental legislation on the supply of land to the rental markets. In this figure, Q_N ha of land are offered at subsidized rates (along supply

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3 Many parallels could be drawn between what often happens to rental property where rent-control legislation exits (e.g., declines in quality and quantity), and what happens to farmland that landowners are forced into renting.

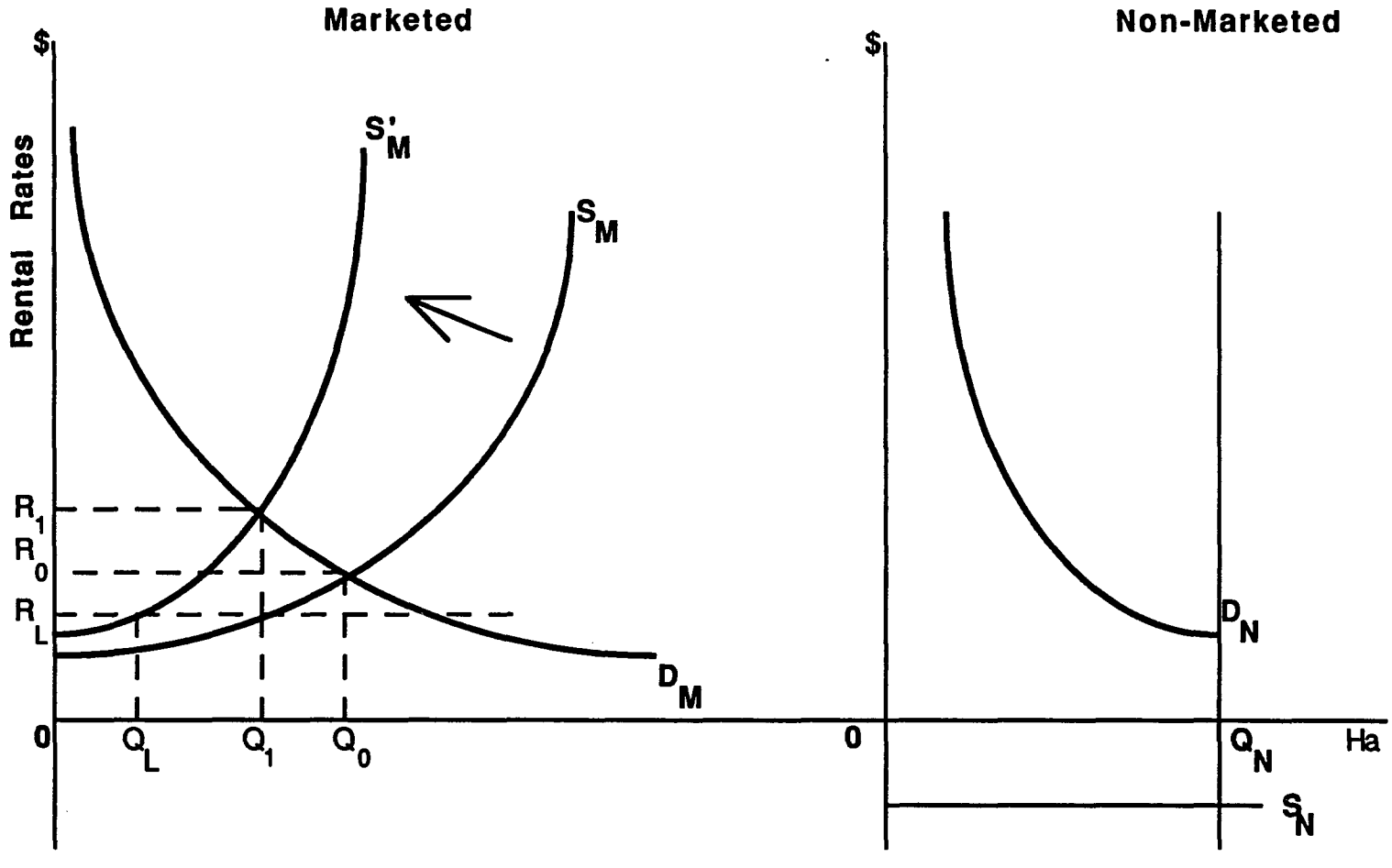

Figure 6.3: Impacts of Legislation on the Supply of Farmland to EDM Rental Markets.

curve S_N) by landowners who wish to avoid the possibility of life-time tenure for rented land, thereby effectively reducing the supply of rental land in ordinary markets from S_M to S_M' (or Q_0 to Q_1). The decrease in the supply of marketed farmland causes rental rates to increase from R_0 to R_1. Now, if legislated rental rates were vigorously enforced at R_L, the quantity of rental land supplied would be further reduced to Q_L as owners opted for self-cultivation over uneconomic rental agreements. In practice, the legislated rate is neither enforced nor complied with; actual rates are invariably above legislated rates as owners and tenants agree to rental contracts based on traditional sharecropping arrangements. Also, it is suspected that share rates are below what the rental market would support (R_1) because landowners fear enforcement of the rental laws if rates get too high; however, further empirical study would be necessary to evaluate the magnitude of the difference.

The reduced supply of land to the rental markets makes it more difficult for farmers to obtain much needed farm-size expansion. Table 6.2 presents estimates of gains to labor from increased farm size for various farming systems. In the Coastal zone, returns to labor on transitional dairies could be increased by 39 percent if farm size increased to 3 ha. Similar gains could be achieved in the Intermediate zone if transitional beef expanded to 3 ha. The greatest increase in the Mountain zone is for transitional beef as well, but farm size would have to increase substantially to 7 ha. However, a 31 percent increase could be realized if traditional farms in the Mountain zone increased to 3 ha. Still, even with farm-size expansion in the Mountain zone, only transitional dairies show a return to labor greater than the official rate of 1200 *escudos* per day.

B. Impact on Investment:

In addition to reducing the supply of farmland to the rental markets, rental-market legislation, if enforced, would create strong disincentives for the landowner to invest.

Table 6.2: Returns to Land and Labor per Man Day and Labor Requirements by Representative Farm System and Farm Size.

Representative Farm System	Representative Farm Size (1) RL/dl (2)	3 Ha Required FEEs	3 Ha RL/dl	5 Ha Required FEEs	5 Ha RL/dl	7 Ha Required FEEs	7 Ha RL/dl
Coastal:							
Trans Dairy	1539	1.171	2139 (39)				
Small Dairy	3134	1.008	3717 (19)				
Medium Dairy	4097			1.23	4493 (10)		
Large Dairy	7794					2.34*	8648* (11)
Intermediate:							
Traditional	1165	1.46	1417 (22)				
Trans Dairy	1266	1.49	1382 (9)				
Trans Beef	1159	1.52	1609 (39)	2.53	1621 (40)	3.56	1623 (40)
Trans Corn	1132	1.43	1233 (9)	2.31	1287 (14)	3.19	1312 (16)
Trans Wine	1240	1.58	1572 (27)	2.56	1628 (31)	3.45	1653 (33)
Small Dairy	1704			2.61	1722 (1)		
Mountain:							
Traditional	898	1.30	1180 (31)				
Trans Dairy	1514	1.17	1647 (9)				
Trans Beef	600	1.67	605 (1)	2.75	626 (4)	3.39	804 (34)
Trans Wine	639	2.05	790 (24)	3.40	804 (26)	4.78	812 (27)

(1) See Table 2.5 for land areas of representative farm systems.

(2) 1996 Returns to land and labor per man day (real 1986 escudos).

* Values are for an increase to 10 (not 7) ha.

( ) Indicates percent increase.

FEE Full-Time Employment Equivalent.

Source: Freguesia Survey, (Draft Report, Ch. 5).

A landowner might wish to invest in farm improvements--mechanization, irrigation, crop specialization...-- that require managerial skills beyond those of the present tenant, but since the tenant might decide to renew the rental contract indefinitely, the investment would not be made. Also, the low rate of return on any investment caused by low rental rates would further discourage investment.

On the other hand, in the case where the rental agreement is unofficial, because the landowner wishes to avoid the official rental market, it is the tenant who has a disincentive to invest in the rented land since the landowner could fail to renew the contract once the tenant makes the investment. In this situation, the landowner might also be reluctant to invest for fear that the government might try to enforce the rental legislation.

Table 6.3 contains estimates of changes in revenues, costs, and labor requirements of modernized systems relative to base systems in each zone. The modernization includes changes in cropping patterns as well as increased mechanization. Table 6.4 shows the possible impact on returns to labor and labor requirements as a result of modernization for each representative system. Returns to labor in the Intermediate zone increase most as a result of the modernization prescribed in Table 6.3. Transitional wine has almost a 500 percent increase by converting all land to *cordão* vineyards. All the improvements prescribed for the Intermediate zone result in returns to labor that exceed the official wage rate for each farming system. However, this is not the case for the Mountain zone, where only transitional dairy has a return to labor substantially above the official wage.

Since investments in farmland can takes years to show returns, both the landowner and the tenant need some sort of assurance before either will invest in the farmland. Present rental legislation encourages avoidance of official rental agreements thus creating a situation where the tenant has no assurance of receiving the benefits of investments in

Table 6.3: *Changes in Cropping Patterns, Revenues, Costs, and Labor Requirements of Modernized Systems Relative to Base Systems, 1996.*

Representative Farm System	Change in Cropping Patterns	Changes relative to base systems, 1996 — Revenues	Total Costs	Capital Costs	Labor Requirement
		(percent)			
Coastal					
Trans Dairy	Regional corn/beans (2000 kg/ha corn, 320 kg/ha beans) using animal traction replaced with mechanized hybrid corn (5500 kg/ha). Garden tractor replaced with tractor-pulled forage chopper.	11.3	-5.6	11.3	-29.2
Small Dairy	Regional corn/beans (2000 kg/ha corn, 320 kg/ha beans) using animal traction replaced with mechanized hybrid corn (5500 kg/ha). Garden tractor replaced with tractor-pulled forage chopper.	28.1	8.3	6.4	-32.0
Med Dairy	Bordadura vineyards removed and replaced with corn silage.	6.2	6.2	11.8	-28.3
Large Dairy	Bordadura vineyards removed and replaced with corn silage and potatoes.	4.7	-0.6	3.7	-28.5
Intermediate					
Traditional	Bordadura vineyards removed. 620 sq. meters of cordao installed. Regional corn/beans replaced with hybrid corn (6500 kg/ha).	37.8	0.4	31.9	-32.0
Trans Dairy	Bordadura vineyards removed, replaced with cordao vineyards (100% white grapes), same total area. Hybrid seeds, increased mechanization increase corn yields from 4000 to 6500 kg/ha.	26.1	-15.1	8.4	-64.8
Trans Beef	Bordadura vineyards removed. Traditional corn/beans replaced with hybrid corn (5500 kg/ha.)	56.8	-8.1	12.5	-36.5
Trans Corn	Bordadura vineyards removed, replaced with cordao vineyards (100% white grapes), same total area. Hybrid seeds, increased mechanization increase corn yields from 4000 to 6500 kg/ha.	32.2	-2.5	37.7	-54.4
Trans Wine	All land put into cordao vineyards.	27.7	-41.9	-16.9	-79.6
Small Dairy	Bordadura vineyards removed. Regional corn/beans replaced with hybrid corn (5500 - 6500 kg/ha).	-1.0	-8.5	44.3	-54.4
Mountain					
Trad Dairy	Bordadura vineyards removed, replaced with milharada in summer oats in winter.	33.5	16.1	38.7	-13.7
Trad Wine	Bordadura vineyards removed, replaced with cordao vineyards (100% white grapes), same total area. Hybrid seeds, increased mechanization increase corn yields from 4000 to 6500 kg/ha.	31.9	-11.3	52.2	-86.1

Source: Langworthy and Monke, 1989.

Table 6.4: Returns to Land and Labor per Man Day and Labor Requirements of Modernized Systems, By Representative System.

Representative Farm System	RL/dl (1)	Percent Increase in RL/dl (2)	Labor Requirements per Hectare
Coastal:			
Trans Dairy	3297	114	0.29
Small Dairy	6618	111	0.20
Medium Dairy	7539	84	0.16
Large Dairy	12675	62	0.17
Intermediate:			
Traditional	1868	60	0.43
Trans Dairy	2534	100	0.31
Trans Beef	1829	58	0.37
Trans Corn	2335	106	0.31
Trans Wine	7393	497	0.10
Small Dairy	3446	102	0.22
Mountain:			
Trans Dairy	2420	60	0.32
Trans Wine	981	53	0.63

(1) Returns to land and labor per man day (real 1986 escudos).

(2) Percent increase in RL/dl in 1996 relative to unmodernized systems.

Source: Freguesia Survey, (Draft Report, Ch. 5).

rented farmland. Fear that present rental legislation might be enforced also discourages the landowner from investing. With the decline in output prices eminent, the gains from agricultural investment are becoming more important.

IV. Share Tenancy vs. Fixed-Rent Tenancy

It is clear that revisions need to be made in the Portuguese rental legislation that would encourage investment and farm-size expansion. However, it is not clear whether or not share tenancy should be universally discouraged. Governments often discourage share tenancy in an effort to prevent exploitation of tenants on the part of landowners. However, as mentioned in Chapter Two, labor markets in many areas of the EDM have changed to favor tenants and in response, share rates have decreased by 50 percent for some crops.

The Marshallian model, which concludes that share tenancy is inefficient, cannot be used to argue for the exclusion of share contracts because the assumptions in the model do not apply everywhere in the EDM. First, it does not consider the possibility that the opportunity cost of labor can be low enough that the efficiency losses are negligeable. Second, unlike the Cheung model, it does not allow for share tenancy agreements that stipulate input levels. At the same time, the Cheung model cannot be assumed to apply universally to the EDM either because of certain assumptions. For example, the Cheung model assumes that the transaction costs involved in formulating an agreement (e.g., stipulating input levels) are zero. It also assumes that contracts are enforceable.

To come to a more conclusive opinion about share tenancy in the EDM, further empirical study needs to be done so the following questions can be answered: (1) Are tenant farmers operating under conditions of certainty about output levels and output prices? (2) Are rental contracts enforceable? (3) What is the elasticity of substitution of land and

labor? With the answers to these questions, Table 4.1 can be used to compare share tenancy to fixed-rent tenancy and owner farming.

V. Conclusions

Present Portuguese fragmentation and rental-market legislation will continue to be avoided by EDM landowners and tenants because the costs of compliance outweigh the benefits. Fragmentation legislation fails to recognize the extremely small average parcel size and the cause of fragmentation in the interior zones of the EDM. As a result, farmers who wish to expand their farms must disregard the law. Rental-market legislation has two major problems. First, it attempts to calculate maximum rental rates with a procedure that grossly overestimates the cost of labor. Second, the security of tenure provisions essentially result in a guarantee of lifetime tenure. The combined effects of these two aspects of the legislation are: (1) an extremely high rate of avoidance of the official rental markets; (2) a decrease in the supply of farmland to the rental markets; (3) a disincentive for both landowners and tenants to invest in farmland.

As for whether revisions in the rental-market legislation should discourage any form of share tenancy, as the Marshallian model suggests, or whether share tenancy should be allowed as an option, as the Cheung model suggests, further empirical study needs to be done on the degree of uncertainty in Portuguese agriculture, the enforceability of rental contracts, and the elasticity of substitution of land and labor before any conclusions can be made.

CHAPTER SEVEN

SUMMARY AND CONCLUSIONS

As a whole, Portugal has a lot to gain from its accession to the EC. However, if care is not taken in the transitional period, individual regions and sectors of the economy could suffer severe impacts from the accession. One region in particular is the EDM because of CAP-forced declines in the prices and/or output of the principal products of the EDM: corn, milk, wine and beef. These declines will cause severe reductions in returns to labor and farm income in much of the region unless changes in present agricultural policy are made.

Previous study has shown that the EDM agricultural sector could offset the losses to farm income and returns to labor through increased investment (i.e., modernization) and increased farm size (Langworthy). However, there exists very little land to be converted to farmland in the EDM, and consolidation of parcels is hindered by the fact that over two-thirds of the parcels are separated by a change in elevation. In addition, the farmland sales markets have been extremely thin due to credit regulations that all but exclude the sale of parcels smaller than 2 ha, which is the average size of an EDM farm (the average parcel size is 0.2 ha). This paper concludes that the greatest potential for farm-size expansion in the near future is through the farmland rental markets.

Although rental markets have been very active, 98 percent of this activity has avoided the official rental markets through the use of verbal arguments which were almost entirely share contracts. Several motivations for avoidance of official rental markets exist: fragmentation legislation that restricts rental agreements to situations where the resulting parcel is larger than most EDM farms; provisions in the rental legislation which set maximum rental rates well below market rates; provisions in the rental legislation which

maximum rental rates well below market rates; provisions in the rental legislation which essentially guarantee lifetime tenure.

Despite the fact that there is little enforcement of the legislation mentioned above, the legislation limits the potential for farm-size expansion through rental markets and discourages investment. Thus, the legislation hinders EDM farmers from taking actions that could counteract the CAP price declines. In order to facilitate the changes necessary for a healthy agricultural sector in the EDM, this paper strongly recommends that the following actions be taken:

* Abolish or at least revise the fragmentation legislation so that EDM farmers can increase farm size without having to disregard the legislation.
* Change the procedure for calculating the opportunity cost of labor when determining maximum rental rates. The present procedure assumes that all tenant labor could be employed full-time at 1200 escudos/day. This grossly overestimates the opportunity cost of labor because it fails to recognize that off-farm employment is scarce in most of the EDM.
* Change the maximum rental rates to allow the landowner to receive 100 percent of the profit (net of all costs (including labor) instead of the present procedure which arbitrarily reduces the maximum rental rate by 20 percent.
* Modify the security of tenure provisions in the rental legislation so that both the landowner and the tenant have incentives to invest in the farmland.

In addition to the above changes, the issue of share tenancy versus fixed-rent tenancy should be addressed. Presently, the legislation does not allow for share tenancy agreements. This could have negative impacts on yield, rental income, and tenant income

depending upon certain market conditions. Table 4.1 provides a complete description of the impacts of various market conditions. For example, under the assumptions of Cheung's model--certainty and enforceable contracts--there is no difference between share tenancy and fixed-rent tenancy. However, once certainty and enforceability are in doubt, yield and the distribution of income depend on the elasticity of substitution of substitution of the inputs: land and labor. Therefore, in order to determine whether or not share agreements are consistent with the efficiency and equity goals of the government further empirical study of the market conditions--certainty, enforceability and the elasticity of substitution of the inputs--is necessary.

Finally, difficult decisions of equity versus efficiency will have to be made because farm-size expansion will necessarily result in a decrease in agricultural employment. This is of special concern in the Mountain zone where there appears to be no potential for increasing returns to labor (through farm-size expansion and/or investment) to a level near the minimum of 1200 *escudos* per day. Farmer's incomes will need either direct or indirect subsidies (i.e., transfer payments or price supports).

APPENDIX: 1:

DESCRIPTION OF THE FREGUESIA SURVEY.

The *freguesia* (community) survey included 341 farm households from eight different freguesias. The freguesias selected incorporate the major known sources of variation in the EDM. They were distributed over the three major zones and vary in terms of prominent farming systems, degree of integration with local urban and industrial centers, farm size, and fragmentation. Table A1 identifies the sample freguesias and summarizes the selection criteria.

São Perdo de Rates is representative of the Coastal zone. Dairy is the main agricultural activity, and the whole range of dairy systems exists. Major urban centers close to Rates provide off-farm employment which allows a significant share of the small farmers to operate on a part-time basis.

The Intermediate zone is represented by four freguesias. Santa Cruz and Refoios produce high quality grapes although they vary somewhat in terms of production and wine processing techniques. The location of São Torcato near the major industrial center of Guimaraes permits most households to specialize part-time in dairy production. Ganfei, located in the Minho river valley along the Spanish border, consists mainly of traditional agriculture with no commodity specialization. The farms in Ganfei are highly fragmented, much like those in the Mountain zone.

The freguesias Parada, Arnoia, and Cavez represent the Mountain zone. They vary in terms of isolation, commodity emphasis, average farm size (1.2, 2.1, and 2.7 ha respectively), and degree of fragmentation (19.6, 11.7, and 15.9 parcels respectively).

Table A1: Principal Sample Characteristics for Selected Freguesias.

Selected Freguesias	Geographic Location		Predominant Product	Predominant Farm Type	Urban Integration	Sample Size
	Concelho	Zone				
S. Pedro de Rates	Povoa do Varzim	Coastal	Milk	Specialized Medium Size	Medium	61
S. Torcato	Guimaraes	Intermediate	Milk, Meat	Part-time Small Size	Great	30
Ganfei	Valenca	Intermediate	Corn	Traditonal Small Size	Some	24
Refoios de Lima	Ponte de Lima	Intermediate	Red Wine	Traditional Small Size	None	86
Santa Cruz do Douro	Baiao	Intermediate	White Wine	Traditional Small Size	Some	41
Parada do Monte	Melgaco	Mountain	Corn, Meat	Traditional Small Size	None	20
Arnoia	Cabeceiras de Basto	Mountain	Corn, Wine	Traditional Small Size	None	41
Cavez	Celorico de Basto	Mountain	Corn, Meat	Traditional Small Size	Some	38

Source: Freguresia Survey , (Finan and Fox).

APPENDIX: 2

ADDITIONAL TABLES OF FARM SIZE AND RENTER CHARACTERISTICS

Table A2.1: Farm Size and Renter Characteristics

EDM

Farm Size (Ha)	Age of Operator	Percent Rented 0	0-100	100	Subtotal
0-1	< 35	0.9	1.5	1.5	
	35-65	13.2	5.1	7.2	
	> 65	5.4	0.6	1.8	
	Subtotal	19.5	7.2	10.5	37.2
1-3	< 35	0.6	2.4	2.4	
	35-65	13.5	8.7	7.5	
	> 65	6.6	0.3	2.4	
	Subtotal	20.7	11.4	12.3	44.4
3-5	< 35	1.2	1.6	0.3	
	35-65	3.3	1.5	3.6	
	> 65	0.3	0.0	0.0	
	Subtotal	4.8	3.1	3.9	11.8
> 5	< 35	0.3	0.6	0.3	
	35-65	2.4	3.0	0.3	
	> 65	0.0	0.0	0.0	
	Subtotal	2.7	3.6	0.6	6.9

Table Entries: Percentage of Farmers Surveyed.

Source: Freguesia Survey, 1987. Author's revised data set.

Table A2.2: Farm Size and Renter Characteristics

Coastal

Farm Size (Ha)	Age of Operator	Percent Rented 0	0-100	100	Subtotal
0-1	< 35	0.0	0.0	1.6	
	35-65	3.3	4.9	1.6	
	> 65	4.9	0.0	0.0	
	Subtotal	8.2	4.9	3.2	16.3
1-3	< 35	0.0	4.9	0.0	
	35-65	9.8	13.1	3.3	
	> 65	6.6	0.0	0.0	
	Subtotal	16.4	18.0	3.3	37.7
3-5	< 35	3.3	6.6	0.0	
	35-65	3.3	6.6	0.0	
	> 65	0.0	0.0	0.0	
	Subtotal	6.6	13.2	0.0	19.8
> 5	< 35	1.6	3.3	0.0	
	35-65	6.6	14.8	0.0	
	> 65	0.0	0.0	0.0	
	Subtotal	8.2	18.1	0.0	26.1

Table Entries: Percentage of Farmers Surveyed.

Source: Freguesia Survey, 1987. Author's revised data set.

Table A2.3: Farm Size and Renter Characteristics Intermediate

Farm Size (Ha)	Age of Operator	Percent Rented			Subtotal
		0	0-100	100	
0-1	< 35	1.1	2.8	1.7	
	35-65	11.2	6.2	10.1	
	> 65	5.6	1.1	2.8	
	Subtotal	17.9	10.1	14.6	42.6
1-3	< 35	0.6	1.7	0.6	
	35-65	16.2	7.3	7.8	
	> 65	7.8	0.6	2.8	
	Subtotal	24.6	9.6	11.2	45.4
3-5	< 35	1.1	0.0	0.6	
	35-65	3.9	0.6	4.5	
	> 65	0.0	0.0	0.0	
	Subtotal	5.0	0.6	5.1	10.7
> 5	< 35	0.0	0.0	0.6	
	35-65	0.0	0.6	0.6	
	> 65	0.0	0.0	0.0	
	Subtotal	0.0	0.6	1.2	1.8

Table Entries: Percentage of Farmers Surveyed.

Source: Freguesia Survey, 1987. Author's revised data set

Table A2.4: Farm Size and Renter Characteristics
Mountain

Farm Size (Ha)	Age of Operator	Percent Rented			Subtotal
		0	0-100	100	
0-1	< 35	1.1	0.0	1.1	
	35-65	23.7	3.2	5.4	
	> 65	5.4	0.0	1.1	
	Subtotal	29.2	3.2	7.6	40.0
1-3	< 35	1.1	2.2	7.5	
	35-65	10.8	8.6	9.7	
	> 65	4.3	0.0	3.2	
	Subtotal	16.2	10.8	20.4	47.4
3-5	< 35	0.0	0.0	0.0	
	35-65	2.2	0.0	4.3	
	> 65	1.1	0.0	0.0	
	Subtotal	3.3	0.0	4.3	7.6
> 5	< 35	0.0	0.0	0.0	
	35-65	4.3	0.0	0.0	
	> 65	0.0	0.0	0.0	
	Subtotal	4.3	0.0	0.0	4.3

Table Entries: Percentage of Farmers Surveyed.

Source: Freguesia Survey, 1987. Author's revised data set

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