Large, mechanized farms are often viewed as more efficient than small ones. This myth has often included policy makers and technicians to favor large commercial farms depending on mechanization and hired labor, or large collectives or state farms rather than smaller family farms. However, detailed economic research has demonstrated that this is an illusion. Large farms typically have lower total productivity, while small family-operated farms utilize inputs more productively. Thus, redistributing land from collective farms, large haciendas and tenanted estates and large scale commercial farms to smaller family-operated farms can often improve efficiency as well as equity.

What Farm Studies Reveal

Many studies have been undertaken of the productivity of farms of different sizes across all continents, but these frequently suffer from methodological flaws. Some fail to adjust results for differences in land quality and Agro-climates, or do not distinguish between operational holdings and owned holdings. Many studies incorrectly compare the yields of small and large farms, whereas the appropriate measure of efficiency is total factor productivity, which takes into account the efficiency of use of all factors. Studies that avoid these pitfalls include those of the Muda River region of Malaysia and Northeast Brazil (1979), of India (1993) and of South Africa (1994). These suggest that the advantage of small farms is less than indicated by earlier studies, but nevertheless positive.

The advantage of smaller farms arises mainly from the high motivation and low supervision costs of family labor—large farms have problems supervising and motivating hired laborers. Farms, even if mechanized cannot be supervised in the same fashion as industries, as is sometimes imagined. Industries generally use stationary machinery, whose operation by a large number of workers can easily be supervised in a single location. But farm machinery and labor have to move over substantial distances, making supervision more difficult. Heterogeneity of soils and seasonality provides less opportunity for specialization and increases the supervision burden. The net result of these effects is illustrated in the table below that depicts the productivity of small and large farms in Brazil, Pakistan and Malaysia:

<table>
<thead>
<tr>
<th>Farm Size†</th>
<th>Northeast</th>
<th>Punjab, Pakistan</th>
<th>Muda, Malaysia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largest Farm</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>(Size in hectares)</td>
<td>(500+)</td>
<td>(20+)</td>
<td>(5.7-11.3)</td>
</tr>
<tr>
<td>Small Farm</td>
<td>563</td>
<td>274</td>
<td>148</td>
</tr>
<tr>
<td>(Size in hectares)</td>
<td>(10.0-)</td>
<td>(5.1-)</td>
<td>(0.7-1.0)</td>
</tr>
</tbody>
</table>

† 100 = Largest farm size

The main findings of these studies are:

- Productivity tends to decrease as farm size increases.
- The advantage of small farmers is greatest in areas with the greatest land inequality—Latin America and Africa, and smaller in land-scarce Asian countries where land inequality is more modest.
- The highest output per acre is often achieved not by the smallest but second smallest group. This suggests that the smallest farms may have part-time owners or be especially credit-constrained. There could also be scale economies within the farm size that can be operated by a family.
- Plantation crops, such as sugarcane in Brazil, do not necessarily exhibit an inverse relationship between size and productivity.
- Where large farmers adopt green revolution techniques, optimal farm sizes increase, but family farm remain most productive.

**Reasons for Large-Farm Bias**

Why, despite this evidence, have so many countries favored large farms over small ones? The major reasons are:

(1) It is often thought that lumpy inputs such as tractors, combine harvesters, and management skills can only be used fully by farms of a certain minimum size. However, experience shows that scale economies rarely exist beyond the farm size that can be operated by a family. A wide range of modern farms in Wisconsin, USA shows virtually no scale economies beyond 60 hectares. The average farm size in Europe ranges from 3.97 hectares in Greece to 67.8 hectares in the UK despite large subsidies that encourage large farms. Farms in Asia are often much smaller, but many in Eastern Europe, Latin America and southern Africa exceed 10,000 hectares.

Experience shows that rental markets usually develop that enable small farmers to rent large capital inputs, such as threshers, combine harvesters or even tractors. They may even buy these and rent them out when not required for their own use. Rental markets break down only for the most time-bound operations, e.g., sowing, where delays threaten crop losses. Rental markets thus greatly diminish the impact of large machines on the optimal scale of operation.

Management skills are also lumpy. These are needed to harness new technologies in growing, marketing and processing crops. On the one hand, rapid technical change means that a skilled farmer can handle an increasing amount of land. On the other hand, private agencies tend to provide specialized technical services that small farmers can hire, and get others free through the government, such as extension services.

(2) Large farmers may enjoy scale economies because they constitute better creditors than small ones. The large ones have more collateral to offer banks, and are better able to absorb losses caused by adverse weather or other circumstances. Moreover cost of lending are lower for banks if they concentrate on large clients instead of many small ones. However, experience shows that rural credit systems can be designed to lend successfully to small farmers.

(3) Scale economies exist for plantation crops such as tea, sugar cane, oil palm or bananas. This is not because scale economies exist in farm production, but because the plantation crops have to be processed immediately after harvest in factories and shipped to distant destinations. Plantation crops must be processed or shipped shortly after the harvest, or the product is lost. Processing and shipping is done most cheaply in large plants or large boats. The coordination required between harvesting and processing makes it attractive for the processing or shipping firm to operate large farms themselves rather than rely on an uncoordinated market. The benefits from better coordination outweigh the higher labor cost. An alternative to plantation operation has, however, become increasingly common.
Contract farming can be used for efficient smallholder production of even these items. Kenya has become a leading tea exporter by getting smallholders to sell green tea-leaves to factories for processing. Thailand has achieved similar success in sugar.

In the 1950s, mainstream economic theory held that small farmers were backward, unenterprising and should be induced to move to cities to provide labor to industries. Land released by migrants should then be organized into large, mechanized farms, and run by managers as modern industrial enterprises. Subsequent experience has shown that such mechanization is inappropriate when labor is abundant and wages low, and such a strategy requires subsidies for large-farm operation that have proved unsustainable.

Experience also demonstrates that small farmers who are denied access to education, credit, markets and technology are also less productive. With sufficient public investment in education and health, agricultural research and extension and transport to improve market access, small farmers rapidly adopt new technology. They often obtain yields that are higher than the largest farm. By relying heavily on the use of family labor they create significantly more employment than large scale mechanized farms.

Ruling elites often have a private agenda that biases them against family-operated farms. In the Soviet Union, Chayanov and his associates at the Institute for Agriculture in Moscow assembled empirical evidence in the 1920s on the higher productivity of smallholders. But Stalin was determined to collectivize all farms since he saw private farmers as a potential political threat. The Institute was closed and Chayanov murdered when his ideas and evidence became politically inconvenient.

In many developing countries, especially in Latin America and Africa, colonists appropriated huge areas of land and then created economic systems that made land ownership especially profitable. They increased the availability of labor—thus, driving down wages—through slavery and indentured labor, e.g., in Brazil, the Caribbean, South Africa, by expropriating the best land from indigenous people and obliging them to pay a variety of taxes; they prohibited local people from growing export crops—Kenya; or they created monopolies for marketing—Zimbabwe, Kenya. Many of these practices ended some time ago. But even after that, many countries have continued to benefit unfairly the politically powerful in rural areas, through subsidies, tax breaks and exclusive marketing rights. These policies make large farms profitable for their owners at the expense of the fiscal health of the countries concerned.

The bottom line is that while large farms may enjoy some scale economies, usually because of the market imperfections of policy distortions, these are generally outweighed by the superiority of highly-motivated family labor over hired labor.

However, if the superiority of large farms is a myth, the strong economic forces of rental and sale markets should gradually undermine existing patterns of land distribution and encourage the transfer land from large to small farmers. Why does this happen so rarely in practice?

Why Big Farms Stay Intact

Under perfectly competitive markets, the value of land is equal to the capitalized stream of future profits. If the future profits from a unit of equal quality land are inherently greater for a small than a large farms, the small farmer should be as creditworthy and be able to buy out large, inefficient farmers. In practice, distortions, re-
sulting from subsidies, drive up the price of land, making it uneconomic for big owners to sell or for small ones to buy, even if they latter could get access to credit at reasonable rates of interest.

The main reasons for high land prices are:

- Many countries partly exempt agriculture from income tax. This means rich people in high-tax brackets use farm land as a tax shelter. They sometimes can also use it to shelter the profits from non-farm activities. The tax advantage gets capitalized into land prices and drives them beyond the reach of poor farmers.

For a rich person facing a marginal tax rate of 50 percent, one dollar of tax-free farm income is really worth two dollars, while it remains worth just one dollar to a small farmer below the taxable limit. Since tax breaks drive land prices above levels justified by farming alone, it makes sense for those who realize greatest private financial gains to purchase from those who do not benefit from the tax break. Thus, the large, farmer will tend to displace the smaller, poorer one, even though overall agricultural efficiency declines in the process. Ironically, this displacement process has often been misinterpreted as showing the transfer of land from inefficient, small farmers to large, efficient agribusiness operations.

- Most countries subsidize farm credit, irrigation, fertilizers or farm output. These effects are further magnified by tax breaks, and all get capitalized in the price of land. This exacerbates the process of large farmers displacing small ones. It explains why African-Americans, who were once prominent and skilled farmers in the southern USA, have largely ceased farming.

- Many countries protect certain crops against cheap imports. To the extent this artificially improves overall farm profitability, this too drives up the price of land and places it beyond the reach of the poor.

- Even where there are no credit subsidies, large owners are viewed as the most creditworthy and so pay lower rates of interest, which also gets capitalized into land prices.

- In periods of macroeconomic instability, land is an excellent hedge against inflation. So an inflation premium gets incorporated in the land price. One study estimates that 28 per cent of the land price increase in Brazil between 1966-89 was due to the inflation premium.

- With populations growing and rural areas becoming more urbanized, land may become part of a speculative urban investment portfolio, and the expected capital gains from its alternative uses as commercial or industrial space drive up its price. These capital gains are only realized when the land is sold, so a regular stream of income is possible only by steadily selling subdivided parcels of land. This is an option not available to smallholders without surplus land to sell.

Many of these distortions in the land market represent the deliberate manipulation of economic systems by politically influential landowners to drive up the price of land. The result is that large estates remain privately profitable even though they erode both efficiency and equity.

Technical change and the availability of specialist providers of farm services mean that a single family can progressively handle more land. This in turn means that the optimum farm size is steadily becoming larger. The key parameter appears to be family operation, not absolute size. There is an overwhelming case for breaking estates, which often run into thousands of hectares in Eastern Europe, Latin America and southern Africa, into family-operated farms.
Suggested Reading:


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