Large Farms: Land Without Buildings
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Material that Wunderlich censored is shown in bold italics

DRAFT, 14 December 91

(Tables and Chart at the end)

Large Farms: Land without Buildings

Mason Gaffney

"AELOS"[1] is the first U.S. Census output since 1940 to report farm land values separate from building values. AELOS reports tantalizingly few of the survey results, but enough to shine light in several dark corners. My purpose here is to infer what one can from the data released, and suggest more runs to brighten more dark corners. AELOS also is the first farmland survey in decades to report on ownership separate from operations. The leaders of this project have done a great service, as I hope to show by using the data.

My prime findings are these: 1, farmland is the major farm asset; 2, concentration has continued to rise, faster than usually perceived; 3, concentration is as high when measured by value as by acreage; 4, the land share in farm assets rises with size of farm; 5, land in larger farms is less fully utilized; 6, landownership is more concentrated than land management.[2]

#1 and #2 may seem humdrum to some, but are disputed by others, and worth updating. #3, #5 and #6 controvert cherished inferences drawn by other analysts from these same data. #4 is a new topic opened up by having the relevant data; it bears on progressive tax policy.

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[1]AELOS is a 1988 supplement to the 1987 Census of Agriculture 3(2), Agricultural Economics and Land Ownership Survey.

[2]These findings support many of the deceptively casual pronouncements of Thorstein Veblen, 1923, Absentee Ownership, New York: B.W. Huebsch, Inc., pp.129-41. One suspects Veblen slyly consulted the three Censi of Ag, 1900-1920, before caricaturing their subject in his sardonic style.

An easily-understood highlight of this study, epitomizing its findings in lay terms, is the interstate comparison. I ranked 50 states by the ratio of land value to land-plus-building value (henceforth LSRE, for Land Share of Real Estate). Florida is tops, at .85; Wisconsin lowest at .53. It turns out there is an entire socio-economic Gestalt distinguishing the two states (Table 2). Florida is also higher than Wisconsin in land-value/farm; acres/farm; land-value/acre; Gini Ratio[3] by acres and by sales; real estate/all assets; and livestock/machinery. Wisconsin leads Florida 3/1 in output per dollar of land value. Wisconsin's property tax rate (PTR) exceeds Florida's 4/1 - possible grist for those who see property taxation as a constructive instrument of public policy.

It is not just Florida vs. Wisconsin. Ranking by LSRE, the top 8 with Florida are Arizona, New Mexico, Hawaii, Montana, North Dakota, Wyoming, California and Texas. The lowest 8 with Wisconsin are Delaware, Maine, Pennsylvania, New York, New Hampshire, North Carolina, Oklahoma and Ohio. The top group generally fit the Florida pattern, and the bottom group the Wisconsin pattern.

Farm Land is the Major Farm Asset

Land and Building values (henceforth L+B) were 79% of U.S. farm assets in 1988. Machinery and Equipment (M&E) were 9.8%; livestock was 6.1%; stored crops and miscellany were the rest.[4] Separate land values (L) and building values (B) are harder to

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[3]The Gini Ratio is a measure of concentration used for frequency distributions that are extremely skewed, like income and wealth. It can range from .00 (complete equality) to 1.00 (complete inequality). Its essence is explained in Gene Wunderlich, 1963, "Satisfying the Economic Demands for Natural Resources: Some Policy Issues for the United States," in Howard Ottoson (ed.), Land Use Policy and Problems in the U.S. Lincoln: University of Nebraska Press, p.424. It is in many texts, e.g. Douglas Needham, 1978, The Economics of Industrial Structure and Performance, NY: St. Martin's Press, p.424. A fuller discussion is in Mary Jean Bowman, 1945, "A Graphical Analysis of Personal Income Distribution in the U.S.," AER 35:607-28. A difficult exposition is in The New Palgrave under "Gini Ratio." Cf. n.27, infra.

[4]AELOS T.27, p.55

find, even in AELOS. AELOS reports these separately for two subgroups, "owner-operators,"[5] and "landlords with debt."[6] I summarize these data by calculating L/[L+B], the Land Share of Real Estate (LSRE for short - this is your last reminder). For owner-operators, LSRE = .71; for "landlords with debt,"[7] LSRE = .89. Owner-operators have about 55% of the land, so the overall LSRE is between .71 and .89, somewhere near .79.[8]

Is it just humdrum to say land is the major farm asset? Not to everyone: Theodore Schultz, now a Nobel Laureate, won professional acclaim for writing "The Declining Economic Importance of Agricultural Land."[9] Probably most writing on farm size routinely overlooks land cost by perceiving and treating economies of scale mainly in terms of spreading fixed costs of machinery over more acres: a 9.8% tail wagging a 79% dog?[10] At

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[5]AELOS T.70, p.229.

[6]AELOS T.64, p.219.

[7]It is not clear how landlords without debt have offended, but they were purged from this part of AELOS.

[8]Those LSRE numbers actually overstate the true land share because they lump raw land value with all immovable capital other than buildings: with fences, farm roads and bridges, terraces, trees, vines, gates, bunkers, ditches, tiles, pipes, leveling, alfalfa beds, vine supports, loading ramps, etc. Citrus or avocado trees may add $6,000 to an acre worth only $1,000 bare, and all be reported as "land." An ideal Census would correct for this and measure raw land value (L) in strict economic terms, using soil and climate maps and expertise. Meantime I am glad to get buildings separately reported, and will work with that.

[9]Theodore Schultz, 1953, The Economic Organization of Agriculture. New York: McGraw-Hill, Chapter 8. As with all influential writing, it both reflected and molded its times.

[10]Actually, M&E/AFA (where AFA = All Farm Assets), as a function of acres/farm, is remarkably flat at 10%. (Calculated from AELOS, T. 27, p. 58.) The establishmentarian view of M+E dominating scale economies implies a drop-off of M&E/AFA above medium acreages, (and probably an arc-shape over the full range of sizes). Instead it is building's share of value that drops with acreage.

In either case, if farms had been expanding to achieve economies of scale, the top bracket would have grown from its bottom, lowering its mean size. Instead its mean acres/farm has

the other extreme, some tax analysts portray the real estate tax, especially its land portion, as a peculiar burden on farming. We need facts and numbers to judge such inconsistent presuppositions.

I do not imply LSRE is higher on farm than city land: it may not be. The point here is rather that LSRE varies widely among farms: intra-farming differences exceed farm-city differences. LSRE differs among locations, soils, crops, states, counties, tenures, and sizes of farm. It would vary more if we measured strictly economic land value naked of fixed capital improvements.[11]

I do not imply LSRE is stable over time. It was .79 in the 1900 Census; rose to .83 in 1920; and fell to a low of .69 in 1940. After that the Census of Ag stopped reporting it.[12] *1972-81 saw a five-fold rise in farmland values in Minnesota and Iowa,*[13] *and sympathetic movements elsewhere,*[14] *which of course raised LSRE.*[15] *1982-87 saw a slump of 50-60%, lowering it again. LSRE was probably about .79 in 1988, piecing together fragments*

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been rising, faster than any other bracket.

[11]The ratio of land price/gross sales is higher in most farming than most commerce and industry because most farming is an upstream or primary industry with lower turnover. Gross sales should not be confused with net income, however. Even within farming, downstream feeders show much higher turnover than upstream grain and cow-calf operations.

[12]USDA estimates (non-Census) had it back up to .77 by 1959, and .80 by 1963. These values seem too high; I doubt that they are precisely commensurable with Census values. (Reported in The Economic Almanac 1960, p.32; and 1964, pp. 203-04.)

[13]Philip Raup, 1989. "Some Lessons from Land Price Booms and Busts." Staff Paper P89-52, Department of Agricultural and Applied Economics, University of Minnesota, pp. 1-4.

[14]Not everywhere: New England was unsympathetic.

[15]Building values are more stable because buildings are reproducible. Therefore, LSRE rises in land booms and falls in slumps.

of data.[16] Had AELOS data come from a 1981 survey, instead of 1988, LSRE would have been higher. In 1940 it was lower. AELOS is a still shot of a moving target. One hopes for regular future reports; meantime AELOS can instruct us amply.

I do not equate farmland with "farmers." 45% of all farmed acres were under lease in 1988[17] (up from 35.4% in 1950[18]). Some landlords also farm, but this does not make them farmers of land they rent out.[19] This leased land is of at least average value/acre, but is far below average in improvement: its LSRE is 89%, compared to 71% for owner-operated land.[20] Past researchers have demonstrated firmly that leased land is generally the best land, as a worldwide rule.[21]

I do not imply that all farm land value derives from strictly farm income. Some other sources of value are mineral

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[16]Basis of estimate is in Paragraph One of this Section, above.

[17]AELOS T.1, pp. 1-2.

[18]1950 Census of Agriculture 5(5):13.

[19]It is misleading, and almost tribal, to discount land leasing because some landlords are also active or retired farmers, or heirs of farmers, and "farm folks are good folks." One could make a case that nearby landlords are better stewards than distant ones, but no one has tried on a national scale for 91 years, since the 1900 Census special study on ownership of rented farms (which was a good job - there is also an incomplete effort by J.A. Turner in 1920). One could also make a case that non-farmer landlords are bigger, and live farther away, as Inman and Fippin did in 1949 (U.S.D.A. Misc. Pub. #699), p.55.

[20]AELOS, T. 64, p.219, and T. 71, p.230. The landlord data are strictly just for "landlords with debt." AELOS does not report land separately for other landlords. It is not clear why not: all landlords reported. The data having been reaped one would think they should be delivered, not bonded like surplus crops.

[21]The older evidence is marshaled in M. Gaffney, 1956, "Land Speculation," Ph.D. dissertation, U.C. Berkeley, (available University Microfilms), pp. 122-33. Outstanding work was done for the U.S. Census in the 1920s by E.A. Goldenweiser and Leon Truesdell. The rule also extends back in history, at least as far as Boeothia, classical region of rich land and dulled people.

rights, urban potential, water licenses (including possibilities of separate sale of surplus water to cities), timber, recreation and retirement, and tax shelter. These factors generate capricious aberrations in L.

Growing Concentration

The mean acres/farm remained fairly constant for 65 years, 1870-1935, at around 155 acres. After that it took off, and tripled to 462 acres by 1987. *At the same time, the national average of farm property tax rates dropped from 1.32% in 1930 to 0.77% in 1945, stabilizing around that level - they were 0.85% in 1987.*[22] *Several kinds of farming became income-tax-shelters, in effect enjoying negative taxation. Government payments, many of them for retiring land, became "entitlements."*[23] *Urban tax and ratepayers subsidized farm public works and utilities. Farmland became a fount of political rent, attractive as a "store of value," i.e. a place to park slack money.*

As farm numbers fell, population rose. In 1900 there was one farm per 11 Americans; in 1987 only one per 113. Real wage rates have not risen as fast as real land prices since 1955, and not at all since about 1975,[24] raising the labor-price of land. Coupling this with rising acres/farm, the labor-price of a farm roughly tripled from about 6 years' wages (before payroll deductions) in 1954 to about 17 years' in 1987.[25]

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[22]1930 and 1945 rates from USDA, cit. The Economic Almanac, 1960, p.33. 1988 rate from AELOS, T.50 p.179. Earlier information is fuzzy, but before 1930 there were no state sales taxes and few state income taxes: both local and state governments relied primarily on property taxes.

[23]AELOS reports government payments as being considerably more than all "other farm income." This seems shocking, but wants interpreting before one cries outrage: another whole study is called for.

[24] In constant dollars, average hourly earnings of non-supervisory production labor in U.S. manufacturing peaked in 1975, dropping about 7% to 1988. (BLS, 1991, Handbook of Labor Statistics, Bulletin 2340, T.80, p.312.)

[25]Average hourly earnings before tax of non-supervisory production workers were $1.71 in 1955, and 8.57 in 1985. L+B/farm was $20,400 in 1954, and $289,000 in 1987. Figuring 2,000 working

P/e ratios, another barrier to entry when high, have moved up and down. They are now higher than in 1945-50, when food prices outpaced farmland prices for a few years, and a window of entry-opportunity opened. A Census special study on P/e ratios would be useful, although difficult. A surrogate for P/e might be [L+B]/sales, which was very low (2.56) in 1945 when the gloomy market looked for a postwar depression, and buyers got lucky. It rose to 4.0 in 1954, rose more to 5.9 in 1982, and fell again to 4.35 in 1987.[26] High P/e values block entry into farm ownership, even for the well-funded.

1. Gini Ratios: farms ranked by acres/farm[27]

In 1900 the Census began publishing farm data ranked and grouped by "Size of Farm" - meaning acres/farm. Calculating the Gini Ratio (GR) for each Census year, it was .58 in 1900, rising only slowly to .63 in 1930. After that it shot up to .70 by 1950, plateaued there for 15 years, then rose again to .76 by 1987.[28] (By comparison, GRs for personal income run lower,

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hours/year, we get the labor-cost of a farm in year-wages. ******NEEDED: DATA FOR EXACT YEARS********

I have understated both the the rise and the years by using "earnings" instead of disposable pay after payroll taxes, which have risen sharply. Also, I've allowed nothing for layoffs, sickness, injury, unemployment, etc.

[26]1987 Census of Ag, T.1, p.7, for 1954-87 data. 1950 Census of Ag 2(10):775-76 and 2(9):753, T. 1, for 1945. Earlier years require some piecing out, but are roughly as follows. 1900 = 4.55; 1910 = 5.56; 1920 = 3.85; 1930 = 4.17; 1940 = 4.17. Within those spare numbers lie the stories, follies, hopes, heartbreaks, delusions, labors, savings and lives of millions of Americans, every one of which would be worth recounting, had we but world enough and time.

[27]*For the meaning of Gini Ratio, see n.3. GR is a pure index that sums up and standardizes long columns of disparate data in one number. A rise in GR means the big got bigger and/or the small smaller. This is useful, but so highly abstracted as not to translate itself in terms of the original data. GR = .76 for example, is the index to a series in which the top 3.2% of the farms have 48% of the acres (U.S. farms, 1987). GR = .25 when the top 10% have 21% (renters, 1988).*

[28]*Calculated from Censi of Agriculture. The full set of numbers is: 1900 = .58; 1910 = .57; 1920 = .60; 1925 = .62; 1930*

around .40, and are much more stable over decades.) The fast rise, 1930-date, coincided with the rise of mean acres/farm, and the fall of property tax rates. The combined impact of higher GR values, fewer farms, higher acre values, and higher share of land under lease is to blockade entry into farming, except for those with surplus funds to store and non-farm income to shelter.

GR as a measure deals only with concentration among a given number of farms: industrial economists fault it for not reflecting the loss of farms, or the fate of the former farm families. One may modify it, however, to combine both effects: add the ghosts of departed farms to the lowest bracket, as farms with zero acres. 4.5 million farms were lost, 1935-88. Adding them to the bracket of farms with less than ten acres raises GR for 1988 from .76 to .92. That is unconventional, but responds to the critics. It also makes a point. Doing it this way we get a better feel for how concentration shot up after 1930-35. In The Great Depression small farms were refuges for the jobless and homeless; today this refuge is closed.

Some additional factors amplify this rise of concentration. [L+B]/acre in the top bracket (farms of 1,000 acres and up) has risen relative to [L+B]/acre for all farms. For easy recall, label this ratio "PAVLOVSDOG" (Per-acre Value of Land on Vast Spreads, Divided by Ordinary Grade). PAVLOVSDOG for L+B was .26 in 1900; .30 in 1940; and .61 in 1987.[29] *This indicates the*

= .63; 1935 = .65; 1940 = .67; 1945 = .70; 1950 = .70; 1959 = .71; 1969 = .71; 1982 = .75; 1987 = .76. Cf. a reproduction of a graph labeled NEG. ERS 1245-62(7) in Gene Wunderlich, 1963, "Satisfying the Economic Demands for Natural Resources: Some Policy Issues for the United States," in Howard Ottoson (ed.), Land Use Policy and Problems in the U.S. Lincoln: University of Nebraska Press, p.427. The GR values reported there follow the same broad time-path as mine, but show 1910 at GR = .53, vs. my .57. This difference exaggerates the rise before 1930, thus obscuring the acceleration after 1930. I have double-checked my source (1910 Census of Ag V:257) and calculations, and vouch for them.

[29]1987 Census of Ag T. 51, p.93. 1940 Census of Ag 3:78-79, 82; and 1950 Census of Ag 2:776. In 1940 and 1950 the "top bracket" was 1,000 acres and up; in 1987 it was 2,000 acres and up. I adjusted for this by combining the top two brackets in 1987.

concentration of L+B value is growing faster than that of farm acres. The rate of rise after 1940 is much faster than before.

In addition, LSRE in the top bracket (1,000 acres and up) has risen faster than overall. As a result, PAVLOVSDOG for L alone rose faster than for L+B. PAVLOVSDOG for L rose from .31 in 1900 to .38 in 1940 (the last year the Census published separate data on land values). In 1940 there were at least 9 states within which PAVLOVSDOG > 1.[30]*. There is cause to put the 1988 U.S. nationwide PAVLOVSDOG somewhere near .75.*[31] *That is a steep climb from the 1900 starting point of .31. PAVLOVSDOG (for Land alone, without Buildings) seems headed up towards 1.00 or more, meaning no more drop-off of acre values with size.*

A cognate indicator is the share of harvested cropland, by size of farm. This share in the top bracket has risen relative to the share for all farms. This ratio in 1925 was 8.5%/37.3%, or .23. It rose to .37 in 1950, and .69 by 1987.[32]

Another amplifying factor is the rising concentration of irrigated land. When irrigation was young in Anglo-America, 1890-1914, it was the recourse of small farmers struggling for land against bonanza wheat farmers and ranchers, the familiar grist of horse operas. Then, big spreads were subdivided to create small irrigated farms. There was drastic subdivision and

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[30]PAVLOVSDOG values by states, 1940: MA = 1.04; NY = 1.42; NJ = 1.28; PA = 2.04; OH = 1.57; DE = 2.33; MD = 1.35; KY = 1.42; MS = 1.17; AR = 1.37. (Calculated from 1940 Census of Ag III, T.14, p.82 ff. Calculation is unusually laborious; I may have left some on the table.)

[31]For 1988 AELOS gives data on pure L for owner-occupied farms (not for all farms as in 1940). For them, PAVLOVSDOG of L is up to .60. That undoubtedly means it is well above .60 for all farms, because the PAVLOVSDOG that we do have (for L+B) is much higher for rented acres (PAVLOVSDOG = .65) than for owned acres (PAVLOVSDOG = .52). Reasoning from that comparison, PAVLOVSDOG for pure L in 1988 would be about .75. To reprise, that would mean the value/acre of land in farm operations of over 1,000 acres is 3/4 as high as the value/acre for all farms.

[32]1925-50 data from 1950 Census of Ag II:780-82. 1987 from 1987 Census of Ag T.51, pp. 90-91. To maintain comparability it is necessary to consolidate the top two brackets in 1987.

intensification, 1900-30.[33] Land in farms of 1,000 acres and over actually dropped (nationally) by 15%, 1900-1910, the only such drop on record. Now, however, 34% of all irrigated land is in the top bracket, farms of 2,000 acres and over.[34] Control of irrigated land means control over water. Control of water gives control over arid lands roundabout. Ownership and control based on water has become highly concentrated. For farms with irrigated land, GR = .82.[35]

An independent study by Don Villarejo illustrates the trend, 1940-82, in a specific area intensively studied by Edwin Wilson and Marion Clawson in 1940. The study area was irrigable and irrigated land in Kern and Tulare Counties, California. Replicating the study in 1982, Villarejo concludes that "land ownership has become more concentrated as more land has been placed in irrigated farms ..."[36]

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[33]Benjamin F. Rhodes, 1943, "The Thirsty Land." Ph.D. dissertation, U.C. Berkeley, available UCB Main Library, and on microfilm, HD1740, M6R4.

[34]1987 Census of Ag, T.8 p.16; T.51, p.84. The movement in California is documented in some detail in independent studies by Fellmeth, Robert, 1973, Politics of Land, NY: Grossman Publishers; Goodall, Merrill, 1991, "Property and Water Institutions in California," draft, pp. 1-18, Claremont Graduate School; Roberts, Polly, 1971, "Power and Land in California," a summary of the Nader Report chaired by Robert Fellmeth, 1971; Taylor, Paul S., 1979, Essays on Land, Water and the Law in California, NY: Arno Press; Villarejo, Don, and Judith Redmond, 1988, Missed Opportunities --Squandered Resources, Davis: California Institute for Rural Studies; Zonlight, Margaret A. Cooper, 1979, Land, Water and Settlement in Kern County, California, 1850-1890, New York: Arno Press.

Re concentrated control of water in Hawaii see Perry Philipp, 1953, The Diversified Agriculture of Hawaii (Honolulu: University of Hawaii Press), pp. 18-20.

[35]Calculated from 1987 Census of Ag T.8, p.16. Because of the peculiar arrangement of data, this figure needs cautious interpretation. For other confirmation, however, see infra.

[36]Don Villarejo, 1986, How Much is Enough? Davis: California Institute for Rural Studies, Inc., p.108.

2. Gini Ratios: farms ranked by L+B.

FIND OR STRIKE.**********

These GR values have risen from .*** in **** to .63 in 1987. These values are not comparable with acreage values, because they include B (Building Value), which is not a measure of land, and is much less concentrated than L. However, these GR values are comparable with each other over time: their rise confirms that concentration climbs on.

3. Gini Ratios: farms ranked by sales

GR values run higher when we measure and rank farm size by gross sales. These GRs have risen from .50 in 1900 to .67 in 1950 to .80 in 1987.[37] These values are not directly comparable with acreage or L+B values. They are, however, comparable with each other over time. Their trend confirms that concentration climbs on.

4. Rising P/CF ratios (CF = cash flow)

LSRE almost certainly rose from 1940, when land prices were depressed, to 1987. I estimate it rose from .69 to over .80. The boggling process of splicing disparate tables to get comparable data is explained in the note.[38]

Higher LSRE bears on concentration because it means a higher P/CF (Price to Cash Flow) ratio. This is because CF from buildings and other capital includes capital consumption allowances (CCA). These CCA are part of CF, but not part of earnings; price is capitalized only from earnings (CF-CCA).

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[37]Calculated from 1950 Census of Ag V, Part 6:51-55. 1987 Census of Ag T. 52, p.104; 1900 Census of Ag, p.230.

[38]In 1940, the last previous Census report separating L and B, LSRE was .69 overall, with no separate report on owner-operators. In AELOS, 1988, we have the owner-operators but not the overall figure. How compare 1940 with 1988? It is fair to assume owner-operators' LSRE was well below the average then, as now. From that I will "ballpark" it at .60 for 1940. In 1988 owner-occupiers' LSRE was measured, and was up to .79, a big jump. This implies a big jump in overall LSRE, too.

Thus, the price of capital is capitalized from less than its
The price of land, in sharpest contrast, is capitalized from
than its CF: it is from CF plus the current increment to lan
price.[39] In addition, land price captures expectations of ca
and service flows from various non-farm elements, many of wh
are deferred and speculative.

Thus, a higher LSRE implies a higher P/CF ratio, which
barrier to entry. The ordinary story is that high Machinery
Equipment (M&E) requirements of modern farm technology are t
barrier to farm entry. That doesn't wash.[40] M&E is much sma
than L+B, and also it is much smaller relative to its CF. L
invested in M&E are normally self-liquidating from CF; loans
to buy land often mean negative CF for a few years.

Higher mean acreages tell us there are fewer farms over
Higher labor-prices per farm tell us aspiring new farmers la
prior wealth can no longer buy in. Higher Gini Ratios tell
land is less equally shared among a given number of farms.
Higher P/CF ratios tell us it is harder for a newcomer to ac
any farm acres. The combination means the agricultural ladd
has been pulled up. Entry is nearly impossible for most; ex
and latifundiazation proceed apace.

Efforts to Downstate Concentration

Many analysts, even the best, sporadically downplay concentration and absentee ownership of land. The 1987 Censu highlights a "tenancy rate" of 11%, while burying the leased

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[39]The standard cap formula (omitting the property tax ra
is P=CF/[i-g], where P is land price, CF is current cash flo
is interest rate, and g is annual growth rate of CF. Rearran
terms, P=[CF+Pg]/i. Pg is the current annual increment to la
price. The formula is simplified, but in the market brokers
been capitalizing and selling Pg for ages, using this basic
and variations.

[40]Historians would not expect it to: latifundia did in
Italiam millenia before modern technology. Veblen, supposedl
technocrat, didn't buy the farm technology story either. A f
boy and and an historian, he saw farm machinery rather confo
to the Procrustean bed of speculative landholdings. (Veblen,
cit.)

rate, 45%.[41] *Several analysts stress the lower values/a farms with larger acreages. Some intimate that broader with larger families. Census tables make out that most owners are really family farmers, their numbers few and weight light. Foreign ownership is not a real concern, exercises "hysterical alarmists." Farms expand only to economies of scale for the general welfare, releasing s labor to higher uses. Perhaps it is just human nature rationalize, but it may violate some facts.*

As to family size, many studies of people/land rat found an inverse relationship between family size and f For brevity, I submit that as "common knowledge."[42] *Pove prolific.*

Some writers discount the GR for farms measured by because the acre values of the largest farms are below average for all farms.[43] *(We noted earlier that PAVLOVS risen since 1900, but it is still less than one.) They from this that "the value of land was more evenly distr*

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[41]The "tenancy rate" is in T.16, p.20, where it sta like a neon flasher. The rest of T.16 is cryptographic, data-weary eye alights on the only message in plain vie "tenancy rate." It is impossible to decode the amount o land from T.16 or any other page in the 1987 Census, un 1988, T.1, pp.1-2.

[42]An early study making this point is Carter Goodri al., 1936, Migration and Economic Opportunity. (Philade University of Pennsylvania Press,) p.72. Using 1930 Cens he shows that small farms in the Appalachians had fewer acres/farm, but more people/farm, than Iowa farms. (He they produced more per dollar of L+B.)

It is only symbolic, but mnemonic, that the owner land receiving subsidized irrigation water, whose name the leading case of Ivanhoe I.D. v. McCracken, 357 U.S. 1958, was a single person.

[43]Wunderlich, Gene, 1964. Owner Characteristics an Distribution of Land Ownership in the Eastern Great Pla Washington, USDA/ERS/RDED/ERS-197, pp. 4-7.

Wunderlich, Gene, 1959. Land Ownership in the Grea Washington, USDA, ARS, ARS 43-93, 1959, pp.23-24. In a they doubly understate concentration by using L+B in li as discussed later.

than acreage, ..."[44] The error there ("Regression Fallacy") is that not all the farms in the top 1% by acres are in the top 1% by value. They are displaced by another set, from lower acreage groups.[45] The entering set may contain a higher share of L than the exiting set contains of acres.

In this case, the possibility is highly probable, from several clues. One is that land in farms in what is now the 2nd highest bracket, 1,000 - 1,999 acres, is worth more per acre than the mean for all farms ($521/acre vs. $447/acre, estimated).[46] In the brackets from 260 acres to 1999 acres there are more farms worth $1 million or more than there are in the top bracket, 2,000 acres and up. Half the farms in the top bracket are worth less than $1 million @.[47]

Another clue is that yields/acre of most crops stay level or rise with harvested acres/farm.[48] The most likely reason for that is that quality of land rises with quantity. There is a trade-off between quality and quantity, which many writers stress exclusively. However, there is also a bond: whoso can afford

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[44]ERS-197, op. cit., p.5.

[45]Allen Wallis and Harry Roberts, 1956, Statistics. Glencoe: The Free Press, preceding p. 263. Lawrence Klein, 1962, Introduction to Econometrics. Englewood Cliffs: Prentice-Hall. George Stigler, 1946, "Labor Productivity and Size of Farm: a Statistical Pitfall," JFE 28:821-25. A.E. Waugh, 1943, Elements of Statistical Method, New York: McGraw-Hill, pp. 387-89. There is a clear little piece by Harold Hotelling making this point in response to a writer who said industrial concentration was falling because several firms in the top group in one year were not there a few years later. The fallacy never dies, however: now we have a school of urbanists telling us cities are becoming more alike because the largest ones of past years are regressing towards the mean.

[46]L+B values from 1987 Census of Ag., T.51, p.84 ff. L estimated by applying LSRE factor derived from AELOS T.20, p.229. This is very rough because the AELOS series applies just to owner-occupied farms.

[47]56,355 farms vs. 35,484 farms over 2,000 acres. 1987 Census of Ag T.51, p.93.

[48]1987 Census of Ag T.44, p.36.

more can afford better. Which effect is stronger? That is the question.

The question can be resolved by data, if available. The Census does supply one non-monetary surrogate for land quality: land irrigated. Irrigated land is generally flatter, lower and warmer, but in addition the water supply itself is an easement over more land (the watershed, whose acreage is not counted with acres/farm). The Census ranks farms by acres harvested, crop by crop. The share irrigated rises steeply with acres/farm, for almost all crops.[49]

Taking alfalfa, 67% of acres in the top class are irrigated, compared with 23% for all farms producing alfalfa. The ratio of those percentages forms an index, SOLIVARAF (Share of Land Irrigated on Vast Acreages, Relative to All Farms).[50] For example, for alfalfa SOLIVARAF = .67/.23 = 2.9. Other crops are given in the end note.[51]

This finding is very strong because it runs against the ranking bias. These farms are ranked by all acres harvested; that bias alone tends to make SOLIVARAF < 1. If the Census ranked these same data by acres irrigated, the trend shown would be much stronger.

Comparing different crops, high values of GR go with crops that are mostly irrigated. Here is a comparison of tomatoes and silage corn. 85% of tomato acres are irrigated; 14% of silage corn acres. For tomatoes, GR = .91; for silage corn, GR = .52. Those GR index numbers come from raw data like the following. For tomatoes, the top bracket contains 1.1% of the farms, 45% of

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[49]1987 Census of Ag T.44, p.36.

[50]This is the counterpart of PAVLOVSDOG, used supra under "Growing Concentration."

[51]SOLIVARAF values by crops, calculated from 1987 Census of Ag, T.44, p.36. Cash corn = 2.1; silage corn = 3.3; sorghum = 0.8; wheat = 1.0; barley = 1.3; oats = 3.2; cotton = 1.4; tobacco = 1.8; soybeans = 2.0; dry edible beans = 1.5; potatoes = 1.1; sugar beets = 1.5; peanuts = 1.8; alfalfa hay etc. = 3.3; other hay = 7.5; seeds = 1.4; vegetables = 1.3; tomatoes = 1.2; sweet corn = 1.6; berries = 0.9; orchards = 1.2; rice = 1.0.

the harvested acres, and 52% of the irrigated acres in tomatoes. For silage corn, the top bracket contains 1.0% of the farms, 11.3% of the harvested acres, and 26% of the irrigated acres in silage corn.

The Census also ranks farms by gross sales. In 1950, the top class (at that time, farms with sales > $25,000/year) were 1.9% of all farms with 26% of the sales, and 41% of the irrigated land.[52] Again, this finding is very strong because it runs against the ranking bias, which is to put a higher share of sales in the top bracket.

I used 1950, above, because the current Census does not consolidate this information. It does, however, show it on a crop-by-crop basis.[53] For example, for cash-grain corn, in the top group (highest sales/farm), 37% of the acres are irrigated, vs. 14% for all groups. It goes on like that for all crops (except rice, all of which is irrigated). This finding is unaffected by ranking bias, pro or con.[54]

Those and other data on irrigated acres are quite overpowering.[55] *They establish that quantity and quality of cropland are mates more than alternates. The larger farms get more water per acre.*[56]

To be sure, those data apply just to cropland; they do not bear directly on pasturage and woodland. They do, however, point to a strong, consistent link between acres/farm and land quality. This link, hitherto neglected in the literature, presumably has general financial-economic (rather than technological) causes, and therefore applies as well to different qualities of

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[52]1950 Census of Ag, p.??****

[53]T. 52, p.120)

[54]There is no ranking bias because neither acres nor irrigated acres is the ranking variable. Sales is the ranking variable, and then we compare gross acres with irrigated acres.

[55]A good general source for California is Department of Water Resources, Bulletins 23.

[56]Water <u>is</u> economic land, meaning all natural resources.

pastureland (including irrigated pasture). This makes it likely that farmland is more concentrated by value than by area.

As to pasturage and woodland, cropland is only 21% of the land in farms of 2,000 acres and over, vs. 46% for all farms. That fact alone is what keeps PAVLOVSDOG < 1.00, and makes it plausible that GR-by-acres > GR-by-value. For the rest of the ranking, however, cropland/[all-land] rises steadily from .503 (farms under 10 acres) to a max of .735 (farms 500-999 acres). It drops only negligibly to the next bracket (.666), and only really dives in the top bracket, as noted. Looking solely at the top bracket it seems that larger farms have a lower share of cropland, but looking at all other brackets it works the other way. Gini Ratios are based on all brackets, not just the top.

It is easy to presume that in a state of extremes, like California, high GRs result simply from consolidating intensive irrigated horticulture with vast arid ranches, "the cattle on a thousand hills." Several of the older "Wright Act" Irrigation Districts are strikingly egalitarian, it is true.[57] These are, however, small and exceptional. An intensive study of the huge Westlands Water District, 100% irrigated with subsidized Federal water, shows GR = .77.[58] Villarejo and Redmond consolidated data from 10 Districts receiving among them 48% of all CVP water, for GR = .69.[59] These high GR values come from 100% irrigated lands.[60]

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[57]Series of Factual Reports on specific Irrigation Districts, U.S. Bureau of Reclamation, Sacramento Office, ca. 1947. These give data for calculating the following GRs: Lindsay-Strathmore I.D., .31; Ivanhoe I.D., .46; Madera I.D., .45. These data are from 1947, before they began getting political rent from CVP (Federally subsidized) water. They are less egalitarian today.

[58]Calculated from data in Don Villarejo, 1987, Missed Opportunities, Squandered Resources, (Davis: California Institute for Rural Studies), p.45.

[59]Calculated from Don Villarejo and Judith Redmond, 1986, How Much is Enough? (Davis: CIRS), p.28.

[60]These are also subject to a "160-acre limitation" that supposedly accompanies Federal water. Enforcement is obviously very weak, but is not entirely without effect. Other huge districts, not in these data, get State-subsidized water free of

Ultimately to test the case we must not just measure farms by land value, we must also rank them by land value. This has not been done. The Census can do it, I am told, for added cost of about $5,000. I urge it to. Failing that, others can order a special run at cost. For reasons given, I am confident GR-by-L > GR-by-acres.

The Census also ranks farms by sales/farm. This yields higher GR values: .80 in 1987, compared with .76 by acres. Sales are a measure of dollar values. This suggests, without proving, that GR-by-L > GR-by-acres.

Some discount this finding by stressing the high ratio of sales/earnings in the downstream farms with highest sales. This is another Regression Fallacy. It omits the countervailing fact that upstream cow-calf ranches and cash-grain farms with broad acres have lower turnover, and are downsized by using the sales measure. You cannot belittle a high Gini Ratio by using some new measure of size just to downsize the top bracket: you must rerank every farm by the new measure, creating a new top bracket containing a new set of farms. That should be elementary, but is often flouted.[61]

The same rule holds if we seek to discount this high GR on grounds that farms with fewer sales have more non-cash amenities. The only way to settle that is to rank by the sum of amenity-plus-net sales. This would an accounting nightmare, but there is a market solution: those elements are captured together in market-determined land prices. That brings us back to square one: we must rank farms by land value, L.

The Census now also ranks farms by value of L+B. Ranking thus, GR = .63 in 1987,[62] *lower than GR by acres. This shows that farms are less concentrated by real estate value than by land area, but it does not show they are less concentrated by land value. Acres are a measure of land alone; L+B is a measure*

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any limitation. Their GRs run higher.

[61]For an example see K.L. Bachman, 1952, "Changes in Scale in Commercial Farming," JFE 34:157-72, at p.163.

[62]Calculated from 1987 Census of Ag T.11, p.18

of value, which we want, but the idea is to compare the two ways of measuring land alone. L+B is not an index to L alone, because L/[L+B] (our LSRE) rises sharply with acres/farm, and even more sharply with [L+B]/farm.

AELOS gives two 1988 series that test the point: one for owner-operators, and one for "landlords with debt." For the owner-operators, ranked by acres/farm, LSRE was .37 for farms under 10 acres; .71 for all farms; and .88 for farms 2,000 acres and over.[63] Otherwise put, building values are much less concentrated among these farms than land values. Lumping L+B together lowers the GR hugely.[64]

For "Landlords with Debt"[65] the LSREs are higher overall (.89) than for owner-operators (.71), but our immediate interest is in how the shares rise with size of holding. Ranking by acres/farm, LSRE is .89 overall, rising gently to .93 in the top bracket. These data, however, are also ranked in five other ways.[66] The relevant ranking is by L+B. Ranking thus, LSRE is still, of course, .89 overall, but -- here is the shocker -- LSRE rises to an astonishing .99 (!) in the top bracket.[67]

A share of .99 is breathtaking in any such scatter, but moreso here because the ranking variable includes B. When a scatter of points is loose, the choice of ranking variable - i.e.

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[63]AELOS T. 70, p.229. 1940 was the last year before 1988 when the Census reported separate values for land and buildings. The 1940 breakdown is for all farms. In 1940 LSRE rose from .31 in the lowest acreage bracket, to .69 overall, to .88 in the highest bracket (1940 Census of Ag, 3:80).

[64]Combining this error with regression fallacy, the two Great Plains studies cited supra doubly understate the concentration of land by value. They refer interchangeably to real estate and land, never making it clear which they are measuring. The impression is they used data on real estate (L+B), but called it "land."

[65]AELOS, T.64, p.219.

[66]This lets us see how the choice of ranking variable dominates the trend of LSRE.

[67]Otherwise put, as L+B/farm rises, B/farm falls. B actually approaches 0, which is astounding.

the definition of "size" - biases the findings to show the share of the ranking variable rising with size. *Ignoring this bias is "Regression Fallacy." Thus if we ranked farms by L, a rising LSRE with size could show nothing more than ranking bias.* However the present data are ranked by L+B, which is neutral between L and B. LSRE = .99 in the top bracket is free of ranking bias, and thus quite persuasive. Unless the basic data are false, or unrepresentative, we are onto an extraordinarily strong relationship. It is also momentous that the biggest landlord holdings, in dollar value, are pure land bare of buildings.

Another indicator is control of water by large farmers. Farms of 2,000 acres and over have 34% of all irrigated land, with only 24% of L+B.[68] That indicates higher land quality coupled with lesser improvement.

Doubts remain about the data. We had to work from fragments, a large one on owner-operators and a small one on "landlords with debt." I hope Census leaders will deliver at least three more complete runs: one ranked by L+B, one by L, and one by B. (We already have one ranked by L+B, but without showing LSREs.) There should be two sets of three: one for operators and one for owners. Without question the ones ranked by B will have a low GR.

I predict the ones ranked by L will have a GR near or above .76, indicating the acreage measure does not overstate real concentration of land value. There is precedent for thinking the acreage measure may even be understating it. The 1900 Census reported on the ownership of rented farms by size of holding, measuring size both by acres and by L. By acres, GR = .53; by L, GR = .62.[69] *There is also precedent from Denmark. The 1953 Danish census ranked all Danish farms both ways, with these*

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[68]1987 Census of Ag, T.8, p.16; T.51, p.84.

[69]Calculated from 1900 Census of Ag 1:xcii, xc. The force of ranking bias may be seen here by noting that GR-by-L > GR-by-acres even though PAVLOVSDOG = .33 in 1900 (1900 Census, p.314).

These data refer to ownership, not operation. It may be that ownership goes one way, and operation the other. The answer lies in the stored AELOS data.

results: by acres, GR = .47; by L, GR = .53.[70] *These data from long ago and far away want replicating now and here.*

The land share rises with size of farm: comparing states

We have seen LSRE rises with acres/farm, using 1988 and 1940 data. We have seen LSRE rises faster with [L+B]/farm, even up to .99 in the top bracket. We had to work, however, with skimpy data.[71] *Acres/farm is not 100% correlated with value/farm. In addition, acres are a measure of land alone, (even if not of land values), creating a ranking bias of unknown force. Another problem is that our data showing LSRE as a function of L+B apply only to a subset, the holdings (not the operations) of "landlords with debt." We have to go back 48 years for earlier data separating land from building values, and they are not ranked by value at all.*

Providentially, AELOS provides a third set of separate land and building values to fuel our lamp. These are aggregates for each state.[72] Grouping data by area units, as Margaret Reid did in her study of housing and income, is one way to overcome Regression Fallacy.[73] The idea is to group data on some basis other than the variables being studied, then compare the results.

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[70]Calculated from Danmarks Statistik Arbog 1953, p.50. Both Denmark and rented farms contain lands of less diverse quality and rainfall than the whole U.S., so these precedents by no means settle the case. Nothing will except to do the job itself, using data already at hand.

[71]Some older data are assembled in M. Gaffney, 1956, "Land Speculation," op cit, pp. 209-17.

[72]AELOS T. 71, p.230. These data are just for owner-operators. More coverage would be better, and is stored, but this is all that is released in AELOS.

[73]Margaret Reid, 1962. Housing and Income. Chicago: University of Chicago Press. Discussion is in Richard Muth, ca. 1971, "Permanent Income, Instrumental Variables, and the Income-elasticity of Housing Demand," (unpublished MS, pp. 1-40). Reid's studies were in conjunction with developing the "permanent income hypothesis," which was an extended exercise in offsetting regression fallacy. See also the discussion in M. Gaffney, 1971, "The Property Tax is a Progressive Tax," Proceedings, NTA, 64th Annual Conference, Kansas City, pp. 408-26, at pp. 421-24.

States serve the purpose, just as neighborhoods served Reid in her housing studies.

The method is to compare the dispersion of L with the dispersion of B. The result is unbiased because the two variables are treated the same: neither ranking is given priority over the other. The egg-shaped envelope of scatter points is standing on its end if the y-variable is more dispersed, and leaning on its side if the x-variable is more dispersed. Any standardized measure of dispersion is acceptable.[74] I use two. One is the mean deviation, dividing each by its respective mean to standardize it for comparison with others. I also calculated coefficients of variation (CV), which are standard deviations divided by the respective means. The calculations were done by hand from the published data, and may be hand-checked by anyone.

The results support the hypothesis that farm land values are much more concentrated than farm building values. The CVs are .44 for L (land value), and .24 for B (building value). See Table 1 for details.

(TABLE 1 HERE)

These data, to reprise, give us a statistically neutral comparison of the concentration of L and B. L is much more concentrated. The rise of LSRE with size of farm is not an artifact of the choice of ranking variable; it is a neutral fact.

Data by states also give us new insights into interstate and interregional differences. I divide states into three groups: 9 small urban states, 7 arid ranching states, and 34 rural and rural-urban states (Table 1). For the small urban states the CV values for L and B are .42 and .16; for the arid ranching states, .32 and .29; for the 34 rural states, .67 and .32.[75] Thus L is

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[74]Allen Wallis and Harry Roberts, 1956, Statistics. Glencoe: The Free Press, p.263 and preceding. I find rare minor discrepancies between the results from different measures of dispersion - a point too fine to detain us here.

[75]To sharpen these differentials, I have experimented with dividing states synthetically into regions. Thus it is reasonable to impute the characteristics of Iowa to the northern third of Missouri and the southern third of Minnesota, leaving the

more concentrated than B among the states within each of the three groups, but the difference is most among the small urban states. This, of course, is where farm values are most affected by urban speculation. This suggests that the effect of urban land speculation is toward higher concentration of landholdings, a point made earlier by L.C. Gray, by E.A. Goldenweiser and Leon Truesdell,[76] and observable today around growing cities.[77]

The overall findings are displayed in Figure 1, a scatter plotting LSRE against L/farm, by whole states. L/farm ranges from $71,000 (WV) to $630,000 (AZ). Arizona and other big-farm states have higher LSREs than West Virginia and other small-farm states. Overall, the scatter displays a strong positive relationship between L/farm and LSRE, state to state.[78] This

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residuals to the other two-thirds of each state. The result is a steep jump in the mean deviation of L/farm, with a small rise in that of acres/farm and buildings/farm. Given time, county-by-county data processed in this way would make the points even sharper. Several prior researchers have used county data to good effect.

[76]L.C. Gray, 1931. "Land Speculation." In E.R.A. Seligman (ed.), Encyclopedia of the Social Sciences, New York: The Macmillan Company. E.A. Goldenweiser and Leon Truesdell, 1924. Farm Tenancy in the United States. U.S. Bureau of the Census, Census Monograph #4. Washington: U.S.G.P.O.

[77]Florida, treated below as a "bellwether" state, is not a "small" urban state, but still ranks high in the sprawl of its cities that spreads urban price influence over farm land. 7.4% of Florida is "urban and built-up," compared to less in other states of comparable area and population: 5.1% in Illinois, 5.2% in Michigan, and 5.8% in New York (Statistical Abstract, 1988, p.187). Florida ranks low in per capita income, but #2 among states in domestic travel spending. The Florida Land Boom of 1926 is history, but the dispersed settlement pattern that fostered it still stamps Florida, and helps explain its high LSRE.

Philip Raup points out that recreation-retirement uses, along with tax shelters, even dominate ranchland values in some arid states. (Statement, 1972, before Subcommittee on Monopoly, Senate Small Business Committee, Role of Giant Corporations, Part 3, p.3969.)

[78]Using L to rank the states would reintroduce an element of ranking bias were we not using grouped data. Lumping data causes extreme understatement of the relationship displayed, so no net exaggeration is perpetrated by Figure 1.

supports the basic finding which is, otherwise put, that land is much more concentrated than buildings among farms.[79]

(FIGURE 1 HERE)

Having LSRE, it is useful to use it for ranking. Florida is top at .85 and Wisconsin bottom at .53. Pursuing the contrast, we find Florida above Wisconsin in a number of cognate indicators: L/farm (5.5/1), acres/farm (3/2), L/acre (4/1), GR by acres (2/1), and [L+B]/all assets (11/8). Wisconsin leads Florida in sales/L (3/1), M&E/livestock (7/3), and PTR (property tax rate) (4/1) (Table 2). These contrasts are not marginal: these are two different kinds of polity and society.

(TABLE 2 HERE)

Florida and Wisconsin are not exceptions or outliers, but bellwethers. Extending the data to 8 more states below Florida, and 8 above Wisconsin, the differences persist and accumulate consistently. The "Florida 9" are Florida, Arizona, New Mexico, Hawaii, Montana, North Dakota, Wyoming, California and Texas. The "Wisconsin 9" are Wisconsin, Delaware, Maine, Pennsylvania, New York, New Hampshire, North Carolina, Oklahoma and Ohio. There are clearly two contrasting Gestalts along the lines shown. One more contrast obtains in these other sixteen states: the Florida 9 have higher shares of land under lease than the Wisconsin 9 (although Florida itself does not).

There are two sports among the 18: Delaware does not fit the Wisconsin mold, and North Dakota does not fit the Florida mold. Two sports out of 18 complex cases is not many: a state "personality" is shaped by many factors. It is remarkable to find one factor (LSRE) that identifies 16 states with so much by way of common contrasts. The Gestalts are generally quite identifiable and distinctive. The two sports call for individual analysis.[80]

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[79]If that is not clear, think of it in extreme terms. It is as though buildings were all of equal value, from farm to farm, and farms differed only in their lands.

[80]North Dakota was earlier shaped by its unusual Non-Partisan League movement, and its exemption of farm buildings from the property tax. Today its farms are notably high in

The two Gestalts go beyond farmland data. Several indicators support the notion of a relationship between unequal distribution and social alienation.[81] *(FIND AND CITE POPPER ARTICLE. *** *******) Many factors contribute to such contrasts. I am not trained to weigh them: that looks like a rewarding challenge for a rural sociologist or social anthropologist. Florida compares better by some other indicators. However, these data suggest on a state-by-state scale the kind of contrast Walter Goldschmidt documented locally between the towns of Arvin and Dinuba, California, and Dean MacCannell studied at the county level.*[82]

An added benefit of grouping by states is to relate farmland use and distribution to public policies that vary by states. The

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receipt of government payments per capita. Perhaps it is a state in transition between extremes. Delaware is peculiarly dominated by one family and corporation, and its farm sales by poultry. A book is needed to do each case justice.

[81]Florida leads the nation in violent crimes per 100,000 population, and leads Wisconsin 5/1 (FBI Uniform Crime Rates, 1991 World Almanac, p.848). That is the more significant considering its age distribution, which is short on the violence-prone youthful cohorts. Florida ranks #44 in voter turnout, to #4 for Wisconsin, even though Florida ranks #1 in share of population over age 65, the high-voting ages. Florida also leads Wisconsin in Infant Mortality Rate, 12.8/9.5; divorce rate, 6.7/3.6; and prisoners per 100,000 people, 243/102. In a cultural factor like patents issued per million people, Wisconsin leads Florida 185/113. (Data from 1990 Statistical Abstract, pp. xii-xxi, 535; State and Metropolitan Area Data Book, 1986; Annual Reports, USDC, Commissioner of Patents and Trademarks; America Votes 19, Washington: Congressional Quarterly, 1991.)

[82]Walter Goldschmidt, 1946. As You Sow. Glencoe: The Free Press, rpt. 1978, Montclair: Allenheld, Osmun & Co. Dean MacCannell, 1986, "Report on Social Conditions in the Rural Communities of the Most Agricultural Areas of the Sun Belt," Background Papers, U.S. Congress, Office of Technology Assessment, Technology, Public Policy, and the Changing Structure of American Agriculture, OTA F-285, Washington D.C. The Goldschmidt study has been criticized by Alan Olmstead and Michael Hayes, 19**, *************, and defended by Trudy Wischemann, 1990. "The Role of Land Tenure in Regional Development: Arvin and Dinuba Revisited." California Geographical Society XXX, pp. 101-27.

Wisconsin 9 have higher PTRs (Property Tax Rates), overall, than the Florida 9. To the extent that the PTR is a cause of the effects with which it is associated, its effect is not so much to abort farm capital, as expected. It is associated with low LSRE (low LSRE means a high BSRE, or Building Share in Real Estate). The more visible effect of a high PTR is rather to abet subdivision of farmland, and abort its agglomeration into large units. We find high PTR with low GR, with small farms (low L/farm, low L/acre), with high ratios of M&E to livestock and to real estate, with low shares of leased land, and with fuller land usage as measured by sales/L.

The inverse relationship between PTR and GR is particularly consistent and noteworthy. In this respect our non-conforming states, North Dakota and Delaware, are not sports at all: they fall right into line. Delaware has a low PTR and a high GR; North Dakota the opposite. The egalitarian effects of a high PTR seem stronger than its negative incentive effects, even though buildings are part of the tax base. These egalitarian effects would be stronger if the tax base were limited to naked land value - we have seen how LSRE rises steeply with size of farm. Untaxing buildings would, of course, also eliminate negative incentive effects.

The high LSRE on big farms raises the possibility we may have in the "Florida 9" some tendency toward a 3d-world Gestalt: a pattern of large, underutilized landholdings that preempt the best land and force median farmers onto small farms on low-grade land. To test this we need data on labor input related to farm size. There is none in AELOS, nor in the 1987 Census of Agriculture, except for hired and contract labor. There is no current measure of owner labor, the traditional main source of labor on small and medium farms. We are forced back to earlier Censi: they counted and measured labor of farm proprietors and their families.[83]

In 1950 the Census reported on farms ranked by sales/farm. Class I farms (the largest) had 22% of the land in farms, with 7% of the farm labor. Class VI farms (the smallest) had 5% of the

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[83]I urge the Census to do so again: it is misleading to report only on hired and contract labor, omitting farm family labor.

land in farms, with 11% of the farm labor.[84] This contrast would of course be much greater if farms were ranked by acres or L+B, because sales reflect the presence of labor inputs. Those contrasts were brought out in many studies in those years.[85]

Most farm buildings are operator dwellings; their function is to house operator labor near the job site. Lacking data on family labor, we may assume operator labor inputs are roughly in proportion to operator housing. In 1988 operators' dwellings were 16.4% of farm real estate assets for all farms, falling steadily from 48% in the lowest bracket to to 4.4% on farms over 2,000 acres.[86] For "family-held" corporate farms (of all sizes) the share is 6.3%; for other corporate farms, 3.2%. These data support the common impression that smaller farms are better supplied with operator family labor.[87]

We conclude that large farm units are less improved and less peopled[88] than small and medium farms. There are two possible interpretations. One is they are more efficient, getting more from less. The other is that Veblen was right, many of them are

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[84]1950 Census of Ag 5 (Part 6):51, cited in M. Gaffney, "Land Speculation," p.207.

[85]See Gaffney, op. cit, pp. 203-09. Cited there are supporting data from studies by Carter Goodrich, J.A. Baker, Lowry Nelson, Conrad Hammar and J.H. Muntzell, W.J. Cash, A.O. Craven, Arthur Raper, T.J. Woofter et al., J.V. Rogers, D.G. Miley, Herbert Weaver, W.W. Wilcox and W.E. Hendrix, Stanley Hamilton and Darryl Parker, David Weeks, Henry L. Roberts, Leslie Gay, Jr., Erich Jacoby, and Robert Hardie.

[86]AELOS, T.70, p.229.

[87]This also implies that land in smaller farms is more productive in terms of supplying the necessity of shelter, plus the amenities of rural life, to families. We have seen elsewhere it is also more productive in purely commercial terms of sales/L. The two kinds of productivity are additive.

[88]"Peopled," as opposed to the traditional "manned," is unaffectedly non-sexist and non-ageist. It presumes the importance of female and family labor on small farms. Members of NOW would serve their cause to insist the Census show more respect for hard-working farm wives by counting their labor as an input. Now it just counts hired and contract labor, as though owner-farms yielded their products untouched by human hand.

oversized "stores of value," held first to park slack money, and only secondly to produce food and fiber, and complement the owner's "instinct of workmanship."

We cannot settle that issue in a few words, but the implications for tax policy are the same either way. If large units are more efficient they can bear heavier taxes. If they are less efficient, heavier PTRs will induce them to release surplus land for others, tending at the margins to equalize factor proportions, moving more states from the Florida toward the Wisconsin model.

TO BE CONCLUDED

(Figure 1, last page, is hand-done and perhaps hard to read. Its ordinate is LSRE; its abscissa is L. Every point is a state, labelled individually by the two-letter convention.)

Table 1. Dispersion of Farm Sizes, U.S. and States by Type

GroupLSRE	L/Ac	Ac/Fm	L\Fm	B\Fm	[L+B]/Fm
			$	Acres	$k	$k	$k
50 States	.71	537	299	161	64.7	225
Mean Deviation	-	-	177	70.9	15.7	-
MD/Mean	-	-	.59	.44	.24	-
Std. Devn.	-	-	319	102	23.2	-
CV	-	-	1.07	.63	.36	-
34 Rural-urban States	.70	708	213	151	64.4	215
Mean Deviation	-	-	67.5	66.9	13.9	-
MD\Mean	-	-	.32	.44	.22	-
Std. Devn.	-	-	97.1	101	20.8	-
CV	-	-	.46	.67	.32	-
7 Small Urban States	.70	3,186	106	337	143	480
Mean Deviation	-	-	13.5	128	18.5	-
MD/Mean	-	-	.127	.38	.129	-
Std. Devn.	-	-	15.1	140	22.7	-
CV	-	-	.143	.415	.159	-
9 Arid Ranching States	.78	201	879	201	56.3	258
Mean Deviation	-	-	423	57.0	13.2	-
MD/Mean	-	-	.48	.283	.234	-
Std. Devn.	-	-	567	64.4	16.6	-
CV	-	-	.645	.320	.295	-

The 9 arid ranching states are ND, SD, NE, KS, MT, WY, NV, CO, and NM. (Arizona is surprisingly missing, because of its high L/acre.)

The 7 small urban states are MA, RI, CT, NJ, DE, MD and NH. (New Hampshire is surprisingly included, because of its small area and high L/acre. Ideally, northern New Hampshire would be treated separately as rural, but then many other states should be split as well.)

The 34 "regular" states are all the others.

Table 2. States Ranked by LSRE: Top and Bottom Nine

State	LSRE	L/Fm	L/a	GR	PTR	L+B / AFA	M&E / LS	Acs / Fm	L / AFA	Leased share	Sales / L
FL	.85	452	1686	.847	.54	.88	.75	306	.75	.26	.23
AZ	.84	630	542	.870	.44	.86	.55	4752	.72	.77	.31
NM	.84	329	137	.782	.37	.84	.52	3230	.71	.48	.32
HI	.83	366	1726	.962	.35	.85	4.57	353	.71	.51	.25
MT	.80	304	180	.617	.85	.79	1.59	2451	.63	.32	.18
ND	.80	229	279	.467	.96	.73	4.02	818	.58	.51	.23
WY	.78	274	118	.682	.81	.77	.70	2314	.60	.42	.24
CA	.78	476	2318	.875	.55	.86	1.11	368	.67	.58	.31
TX	.78	215	570	.782	.56	.84	1.19	376	.66	.51	.22
				**********							
OH	.59	91	702	.556	.95	.78	2.56	130	.46	.42	.33
OK	.59	92	361	.649	.60	.79	.97	255	.47	.46	.43
NC	.59	89	943	.621	.47	.81	2.94	95	.48	.49	.59
NH	.58	183	1370	.547	.97	.86	1.85	134	.50	.14	.15
NY	.58	126	704	.506	1.58	.75	1.52	223	.43	.22	.40
PA	.57	118	945	.490	.80	.76	1.41	153	.43	.33	.40
ME	.56	106	520	.528	1.17	.74	2.27	214	.41	.15	.70
DE	.54	126	1299	.679*	.44	.82	3.75	205	.44	.57	.85
WI	.53	84	444	.436	2.13	.64	1.32	221	.34	.28	.72

LSRE = Land Share of Real Estate, i.e. L/[L+B]
L/Fm = Land Value per Farm
L/a = Land Value per acre
GR = Gini Ratio, intrastate, by acres
PTR = Property tax rate on real estate, de facto
L+B/AFA = Land + Buildings as share of All Farm Assets
M&E/LS = Machinery and Equipment divided by Livestock, dollar values
Acs/Fm = Acres per Farm
L/AFA = Land Value as share of All Farm Assets
Leased Share = Fraction of acres in state under lease
Sales/L = Sales (of farm output) per dollar of Land Value (est.)

* 1982 data used, for want of 1987 data for DE.
Separate Land and Building Values from AELOS T.70, p.229.
Other Asset Values from AELOS T.28, p.61.
Gini Ratios calculated from data in AELOS T.5, p.179.

Tax rates from AELOS T.51, p.181.
Leased land from AELOS T.2, p.5.
Sales from AELOS T.8, p.20; L+B from T.28, p.61. L+B was converted to L using the LSRE factor in Column 1. This is an estimate because the LSRE factor applies to owner-occupied farms, while the sales and L+B data are for all farms. This approximation is forced on us by lack of fully coordinated published data.

(THIS PARA. FOR LATER USE) A second purpose of dividing the three groups is to show that L/farm is more concentrated than acres/farm in two of the three groups: the urban states and the rural-urban states. In the arid ranching states it is otherwise, and combining these with the others in the national data makes it otherwise for the nation. This explains the anomaly of finding that L/acre is an increasing function of acres/farm within the humid states, while at the national level L/acre falls with acres/farm. This is why I feel unable to predict whether the GR of farms ranked by value will turn out higher or lower than the GR of farms ranked by acres, nationwide. I am confident the GR of farms ranked by value is the higher one <u>within</u> most of the humid states.

DRAFT, 26 November 91

Large Farms: More Land with Less Usage

Mason Gaffney

"AELOS"[1] is the first U.S. Census output since 1940 to report farm land values separate from building values. AELOS reports tantalizingly few of the survey results, but enough to shine light in several dark corners. My purpose here is to infer what one can from the data released, and suggest more runs to brighten more dark corners. AELOS also is the first farmland survey in decades to report on ownership separate from operations. The leaders of this project have done a great service, as I hope to show by using the data.

My prime findings are these: 1, farmland is the major farm asset; 2, concentration has continued to rise, faster than usually perceived; 3, concentration is as high when measured by value as by acreage; 4, the land share in farm assets rises with size of farm; 5, land in larger farms is less fully utilized; 6, landownership is more concentrated than land management.[2]

#1 and #2 may seem humdrum to some, but are disputed by others, and worth updating. #3, #5 and #6 controvert cherished inferences drawn by other analysts from these same data. #4 is a new topic opened up by having the relevant data; it bears on progressive tax policy.

An easily-understood highlight of this study, epitomizing its findings in lay terms, is the interstate comparison. I ranked 50 states by the ratio of land value to land-plus-building value (henceforth LSRE, for Land Share of Real Estate). Florida is tops, at .85; Wisconsin lowest at .53. It turns out there is an entire socio-economic Gestalt distinguishing the two states (Table 2). Florida is also higher than Wisconsin in land-

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[1]AELOS is a 1988 supplement to the 1987 Census of Agriculture 3(2), Agricultural Economics and Land Ownership Survey.

[2]These findings support many of the deceptively casual pronouncements of Thorstein Veblen, 1923, Absentee Ownership, New York: B.W. Huebsch, Inc., pp.129-41. One suspects the scholarly Veblen slily consulted the three excellent Censi of Ag, 1900-1920, before caricaturing their subject in his sardonic style.

value/farm; acres/farm; land-value/acre; Gini Ratio[3] by acres and by sales; real estate/all assets; and livestock/machinery. Wisconsin leads Florida 3/1 in output per dollar of land value. Wisconsin's property tax rate (PTR) exceeds Florida's 4/1 - possible grist for those who see property taxation as a constructive instrument of public policy.

It is not just Florida vs. Wisconsin. Ranking by LSRE, the top 8 with Florida are Arizona, New Mexico, Hawaii, Montana, North Dakota, Wyoming, California and Texas. The lowest 8 with Wisconsin are Delaware, Maine, Pennsylvania, New York, New Hampshire, North Carolina, Oklahoma and Ohio. The top group generally fit the Florida pattern, and the bottom group the Wisconsin pattern.

Farm Land is the Major Farm Asset

Land and Building values (henceforth L+B) were 79% of U.S. farm assets in 1988. Machinery and Equipment (M&E) were 9.8%; livestock was 6.1%; stored crops and miscellany were the rest.[4] Separate land values (L) and building values (B) are harder to find, even in AELOS. AELOS reports these separately for two subgroups, "owner-operators,"[5] and "landlords with debt."[6] I summarize these data by calculating L/[L+B], the Land Share of Real Estate, (LSRE for short - this is your last reminder). For owner-operators, LSRE = .71; for "landlords with debt,"[7] LSRE =

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[3]The Gini Ratio is a measure of concentration used for frequency distributions that are extremely skewed, like income and wealth. It can range from .00 (complete equality) to 1.00 (complete inequality). Its essence is explained in Gene Wunderlich, 1963, "Satisfying the Economic Demands for Natural Resources: Some Policy Issues for the United States," in Howard Ottoson (ed.), Land Use Policy and Problems in the U.S. Lincoln: University of Nebraska Press, p.424. It is in many texts, e.g. Needham, 19.., ... A fuller discussion is in Mary Jean Bowman, 1945, "A Graphical Analysis of Personal Income Distribution in the U.S.," AER 35:607-28. A difficult exposition is in The New Palgrave under "Gini Ratio." Cf. n.27, infra.

[4]AELOS T.27, p.55

[5]AELOS T.70, p.229.

[6]AELOS T.64, p.219.

[7]It is not clear how landlords without debt have offended, but they were purged from this part of AELOS.

.89. Owner-operators have about 55% of the land, so the overall LSRE is between .71 and .89, somewhere near .79.[8]

Is it just humdrum to say land is the major farm asset? Not to everyone: Theodore Schultz, now a Nobel Laureate, won professional applause for writing "The Declining Economic Importance of Agricultural Land."[9] Probably most writing on farm size routinely overlooks land cost by perceiving and treating economies of scale mainly in terms of spreading fixed costs of machinery over more acres: a 9.8% tail wagging a 79% dog?[10] At the other extreme, some tax analysts portray the real estate tax, especially its land portion, as a peculiar burden on farming. We need facts and numbers to judge such inconsistent declarations.

I do not imply LSRE is higher on farm than city land: it may not be. The point here is rather that LSRE varies widely among farms: intra-farming differences exceed farm-city differences. LSRE differs among locations, soils, crops, states, counties, tenures, and sizes of farm. It would vary more if we measured strictly economic land value naked of fixed capital improvements.[11]

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[8]Those LSRE numbers actually overstate the true land share because they lump raw land value with all immovable capital other than buildings: with fences, farm roads and bridges, terraces, trees, vines, gates, bunkers, ditches, tiles, pipes, leveling, alfalfa beds, vine supports, loading ramps, etc. Citrus or avocado trees may add $6,000 to an acre worth only $1,000 bare, and all be reported as "land." An ideal Census would correct for this and measure raw land value (L) in strict economic terms, using soil and climate maps and expertise. Meantime I am glad to get buildings separately reported, and will work with that.

[9]Theodore Schultz, 1953, The Economic Organization of Agriculture. New York: McGraw-Hill, Chapter 8. As with all influential writing, it both reflected and molded its times.

[10]Actually, M+E as a function of acres/farm is U-shaped, while the traditional view of M+E scale dominating scale economies probably implies an arc-shape.

[11]The ratio of land price/gross sales is higher in most farming than most commerce and industry because most farming is an upstream or primary industry with lower turnover. Gross sales should not be confused with net income, however. Even within farming, downstream feeders show much higher turnover than upstream grain and cow-calf operations.

I do not imply LSRE is stable over time. It was .79 in the 1900 Census; rose to .83 in 1920; and fell to a low of .69 in 1940. After that the Census of Ag stopped reporting it.[12] 1972-81 saw a five-fold rise in farmland values in Minnesota and Iowa,[13] and sympathetic movements elsewhere,[14] which of course raised LSRE.[15] 1982-87 saw a slump of 50-60%, lowering it again. LSRE was probably about .79 in 1988, piecing together fragments of data.[16] Had AELOS data come from a 1981 survey, instead of 1988, LSRE would have been higher. In 1940 it was lower. AELOS is a still shot of a moving target. One hopes for regular future reports; meantime AELOS can improve us.

I do not equate farmland with "farmers." 45% of all farmed acres were under lease in 1988[17] (up from 35.4% in 1950[18]). Some landlords also farm, but this does not make them farmers of land they rent out.[19] This leased land is of at least average value/acre, but is far below average in improvement: its LSRE is

You seem to do exactly that from p 5 on

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[12]USDA estimates (non-Census) had it back up to .77 by 1959, and .80 by 1963. These values seem too high; I doubt that they are precisely commensurable with Census values. (Reported in The Economic Almanac 1960, p.32; and 1964, pp. 203-04.)

[13]Philip Raup, 1989. "Some Lessons from Land Price Booms and Busts." Staff Paper P89-52, Department of Agricultural and Applied Economics, University of Minnesota, pp. 1-4.

[14]Not everywhere: New England was unsympathetic.

[15]Building values are more stable because buildings are reproducible. Therefore, LSRE rises in land booms and falls in slumps.

[16]Basis of estimate is in Paragraph One of this Section, above.

[17]AELOS T.1, pp. 1-2.

[18]1950 Census of Agriculture 5(5):13.

[19]It is misleading, and almost tribal, to discount land leasing because some landlords are also active or retired farmers, or heirs of farmers, and "farm folks are good folks." One could make a case that nearby landlords are better stewards than distant ones, but no one has tried on a national scale for 91 years, since the 1900 Census special study on ownership of rented farms (which was a good job).

89%, compared to 71% for owner-operated land.[20] Past researchers have demonstrated firmly that leased land is generally the best land, as a worldwide rule.[21]

I do not imply that all farm land value derives from strictly farm income. Some other sources of value are mineral rights, urban potential, water licenses (including possibilities of separate sale of surplus water to cities), timber, recreation and retirement, and tax shelter. These factors generate capricious aberrations in L.

Growing Concentration

The mean acres/farm remained fairly constant for 65 years, 1870-1935, at around 155 acres. After that it took off, and tripled to 462 acres by 1987. At the same time, the national average of farm property tax rates dropped from 1.32% in 1930 to 0.77% in 1945, stabilizing around that level - they were 0.85% in 1987.[22] Several kinds of farming became income-tax-shelters, in effect enjoying negative taxation. Government payments, many of them for retiring land, became "entitlements."[23] Urban tax and ratepayers subsidized farm public works and utilities. Farmland became a fount of political rent, attractive as a "store of value," i.e. a place to park slack money.

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[20]AELOS, T. 64, p.219, and T. 71, p.230. The landlord data are strictly just for "landlords with debt." AELOS does not report land separately for other landlords. It is not clear why not: all landlords reported. The data having been reaped one would think they should be delivered, not bonded like surplus crops.

[21]The older evidence is marshaled in M. Gaffney, 1956, "Land Speculation," Ph.D. dissertation, U.C. Berkeley, (available University Microfilms), pp. 122-33. Outstanding work was done for the U.S. Census in the 1920s by E.A. Goldenweiser and Leon Truesdell. The rule also extends back in history, at least as far as Boeothia, classical region of rich land and dulled people.

[22]1930 and 1945 rates from USDA, cit. The Economic Almanac, 1960, p.33. 1988 rate from AELOS, T.50 p.179. Earlier information is fuzzy, but before 1930 there were no state sales taxes and few state income taxes: both local and state governments relied primarily on property taxes.

[23]AELOS reports government payments as being considerably more than all "other farm income." This seems shocking, but wants interpreting before one cries outrage: another whole study is called for.

As farm numbers fell, population rose. In 1900 there was one farm per 11 Americans; in 1987 only one per 113. Real wage rates have not risen as fast as land prices since 1955, and not at all since about 1975,[24] raising the labor-price of land. Coupling this with rising acres/farm, the labor-price of a farm roughly tripled from about 6 years' wages (before payroll deductions) in 1954 to about 17 years' in 1987.[25]

P/e ratios, another barrier to entry when high, have moved up and down. They are now higher than in 1945-50, when food prices outpaced farmland prices for a few years, and a window of entry-opportunity opened. A Census special study on P/e ratios would be useful, although difficult. A surrogate for P/e might be [L+B]/sales, which was very low in 1945 when the market looked for a postwar depression. It rose to 4.0 in 1954, rose more to 5.9 in 1982, and fell again to 4.35 in 1987.[26] High P/e values block entry into farm ownership, even for the well-funded.

1. Gini Ratios: farms ranked by acres/farm[27]

In 1900 the Census began publishing farm data ranked and grouped by "Size of Farm" - meaning acres/farm. Calculating the Gini Ratio (GR) for each Census year, it was .58 in 1900, rising only slowly to .63 in 1930. After that it shot up to .70 by 1950,

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[24] In constant dollars, average hourly earnings of non-supervisory production labor in U.S. manufacturing peaked in 1975, dropping about 7% to 1988. (BLS, 1991, Handbook of Labor Statistics, Bulletin 2340, T.80, p.312.)

[25]Average hourly earnings before tax of non-supervisory production workers were $1.71 in 1955, and 8.57 in 1985. L+B/farm was $20,400 in 1954, and $289,000 in 1987. Figuring 2,000 working hours/year, we get the labor-cost of a farm in year-wages. ******NEEDED: DATA FOR EXACT YEARS********

I have understated both the the rise and the years by using "earnings" instead of disposable pay after payroll taxes, which have risen sharply. Also, I've allowed nothing for layoffs, sickness, injury, unemployment, etc.

[26]1987 Census of Ag, T.1, p.7, for 1954-87 data.

[27]For the meaning of Gini Ratio, see n.3. GR is a pure index that sums up and standardizes long columns of disparate data in one number. A rise in GR means the big got bigger and/or the small smaller. This is useful, but so highly abstracted as not to translate itself in terms of the original data. GR = .76 for example, is the index to a series in which the top 3.2% of the farms have 48% of the acres (U.S. farms, 1987). GR = .25 when the top 10% have 21% (renters, 1988).

plateaued there for 15 years, then rose again to .76 by 1987.[28] (By comparison, GRs for personal income run lower, around .40, and are much more stable over decades.) The fast rise, 1930-date, coincided with the rise of mean acres/farm, and the fall of property tax rates. The combined impact of higher GR values, fewer farms, higher acre values, and higher share of land under lease is to blockade entry into farming, except for those with surplus funds to store and non-farm income to shelter.

GR as a measure deals only with concentration among a given number of farms: industrial economists fault it for not reflecting the loss of farms, or the fate of the former farm families. One may modify it, however, to combine both effects: add the ghosts of departed farms to the lowest bracket, as farms with zero acres. 4.5 million farms were lost, 1935-88. Adding them to the bracket of farms with less than ten acres raises GR for 1988 from .76 to .92. That is unconventional, but responds to the critics. It also makes a point. Doing it this way we get a better feel for how concentration shot up after 1930-35. In The Great Depression small farms were refuges for the jobless and homeless; today this refuge is closed.

For your own working purposes, please note in the mss.

Some additional factors amplify this rise of concentration. [L+B]/acre in the top bracket (farms of 1,000 acres and up) has risen relative to ~~[L+B]/acre for~~ all farms. For easy recall, label this ratio "PAVLOVSDOG" (Per-acre Value of Land on Vast Spreads, Divided ~~by Ordinary~~ Grade). PAVLOVSDOG for L+B was .26 in 1900; .30 in 1940; and .61 in 1987.[29] This indicates the concentration of L+B <u>value</u> is growing faster than that of farm acres. The rate of rise after 1940 is much faster than before.

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[28]Calculated from Censi of Agriculture. The full set of numbers is: 1900 = .58; 1910 = .57; 1920 = .60; 1925 = .62; 1930 = .63; 1935 = .65; 1940 = .67; 1945 = .70; 1950 = .70; 1959 = .71; 1969 = .71; 1982 = .75; 1987 = .76. Cf. a reproduction of a graph labeled NEG. ERS 1245-62(7) in Gene Wunderlich, 1963, "Satisfying the Economic Demands for Natural Resources: Some Policy Issues for the United States," in Howard Ottoson (ed.), <u>Land Use Policy and Problems in the U.S.</u> Lincoln: University of Nebraska Press, p.427. The GR values reported there follow the same broad time-path as mine, but show 1910 at GR = .53, vs. my .57. This difference exaggerates the rise before 1930, thus obscuring the acceleration after 1930. I have double-checked my source (1910 Census of Ag V:257) and calculations, and vouch for them.

[29]1987 Census of Ag T. 51, p.93. 1940 Census of Ag 3:78-79, 82; and 1950 Census of Ag 2:776. In 1940 and 1950 the "top bracket" was 1,000 acres and up; in 1987 it was 2,000 acres and up. I adjusted for this by combining the top two brackets in 1987.

In addition, LSRE in the top bracket (1,000 acres and up) has risen faster than overall. As a result, PAVLOVSDOG for L alone rose faster than for L+B. PAVLOVSDOG for L rose from .31 in 1900 to .38 in 1940 (the last year the Census published separate data on land values). In 1940 there were at least 9 states within which PAVLOVSDOG > 1.[30]. There is cause to put the 1988 U.S. nationwide PAVLOVSDOG somewhere near .75.[31] That is a steep climb from the 1900 starting point of .31. PAVLOVSDOG (for Land alone, without Buildings) seems headed up towards 1.00 or more, meaning no more drop-off of acre values with size.

A cognate indicator is the share of harvested cropland, by size of farm. This share in the top bracket has risen relative to the share for all farms. This ratio in 1925 was 8.5%/37.3%, or .23. It rose to .37 in 1950, and .69 by 1987.[32]

Another amplifying factor is the rising concentration of irrigated land. When irrigation was young here, 1890-1914, it was the recourse of small farmers struggling against bonanza wheat farmers and ranchers, familiar grist of horse operas. Then, big spreads were subdivided to create small irrigation farms. There was drastic subdivision and intensification, 1900-30.[33] Land in farms of 1,000 acres and over actually dropped by 15%, 1900-1910, the only such drop on record. Now, however, 34% of all irrigated

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[30]PAVLOVSDOG values by states, 1940: MA = 1.04; NY = 1.42; NJ = 1.28; PA = 2.04; OH = 1.57; DE = 2.33; MD = 1.35; KY = 1.42; MS = 1.17; AR = 1.37. (Calculated from 1940 Census of Ag III, T.14, p.82 ff. Calculation is unusually laborious; I may have left some on the table.)

[31]For 1988 AELOS gives data on pure L for owner-occupied farms (not for all farms as in 1940). For them, PAVLOVSDOG of L is up to .60. That undoubtedly means it is well above .60 for all farms, because the PAVLOVSDOG that we do have (for L+B) is much higher for rented acres (PAVLOVSDOG = .65) than for owned acres (PAVLOVSDOG = .52). Reasoning from that comparison, PAVLOVSDOG for pure L in 1988 would be about .75. To reprise, that would mean the value/acre of land in farm operations of over 1,000 acres is 3/4 as high as the value/acre for all farms.

[32]1925-50 data from 1950 Census of Ag II:780-82. 1987 from 1987 Census of Ag T.51, pp. 90-91. To maintain comparability it is necessary to consolidate the top two brackets in 1987.

[33]Benjamin F. Rhodes, 19.., "The Thirsty Land." Ph.D. dissertation, U.C. Berkeley, 19..

land is in the top bracket, farms of 2,000 acres and over.[34] Control of irrigated land means control over water. Control of water gives control over arid lands roundabout. Ownership and control based on water has become highly concentrated. For farms with irrigated land, GR = .82.[35]

2. Gini Ratios: farms ranked by L+B.

FIND OR STRIKE.**********

These GR values have risen from .*** in **** to .63 in 1987. These values are not comparable with acreage values, because they include B (Building Value), which is not a measure of land, and is much less concentrated than L. However, these GR values are comparable with each other over time: their rise confirms that concentration climbs on.

3. Gini Ratios: farms ranked by sales

GR values run higher when we measure and rank farm size by gross sales. These GRs have risen from .50 in 1900 to .67 in 1950 to .80 in 1987.[36] These values are not directly comparable with acreage or L+B values. They are, however, comparable with each other over time. Their trend confirms that concentration climbs on.

4. Rising P/CF ratios (CF = cash flow)

LSRE almost certainly rose from 1940, when land prices were depressed, to 1987. I estimate it rose from .69 to over .80. The

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[34]1987 Census of Ag, T.8 p.16; T.51, p.84. The movement in California is documented in some detail in independent studies by Fellmeth, Robert, 1973, Politics of Land, NY: Grossman Publishers; Goodall, Merrill, 1991, "Property and Water Institutions in California," draft, pp. 1-18, Claremont Graduate School; Roberts, Polly, 1971, "Power and Land in California," a summary of the Nader Report chaired by Robert Fellmeth, 1971; Taylor, Paul S., 1979, Essays on Land, Water and the Law in California, NY: Arno Press; Villarejo, Don, and Judith Redmond, 1988, Missed Opportunities --Squandered Resources, Davis: California Institute for Rural Studies; Zonlight, Margaret A. Cooper, 1979, Land, Water and Settlement in Kern County, California, 1850-1890, New York: Arno Press.

[35]Calculated from 1987 Census of Ag T.8, p.16. Because of the peculiar arrangement of data, this figure needs cautious interpretation. For other confirmation, however, see infra.

[36]Calculated from 1950 Census of Ag V, Part 6:51-55. 1987 Census of Ag T. 52, p.104; 1900 Census of Ag, p.230.

boggling process of splicing together comparable data is explained in the note.[37]

Higher LSRE bears on concentration because it means a higher P/CF (Price to Cash Flow) ratio. This is because CF from buildings and other capital includes capital consumption allowances (CCA). These CCA are part of CF, but not part of earnings; price is capitalized only from earnings (CF-CCA). Thus, the price of capital is capitalized from less than its CF. The price of land, in sharpest contrast, is capitalized from more than its CF: it is from CF plus the current increment to land price.[38] In addition, land price captures expectations of cash and service flows from various non-farm elements, many of which are deferred and speculative.

Thus, a higher LSRE implies a higher P/CF ratio, which is a barrier to entry. The ordinary story is that high M&E requirements of modern farm technology are the barrier to farm entry. That doesn't wash.[39] M&E is much smaller than L+B, and also it is much smaller relative to its CF. Loans invested in M&E are normally self-liquidating from CF; loans used to buy land often mean negative CF for a few years.

Higher mean acreages tell us there are fewer farms overall. Higher labor-prices per farm tell us aspiring new farmers lacking prior wealth can no longer buy in. Higher Gini Ratios tell us land is less equally shared among a given number of farms. Higher

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[37]In 1940, the last previous Census report separating L and B, LSRE was .69 overall, with no separate report on owner-operators. In AELOS, 1988, we have the owner-operators but not the overall figure. How compare 1940 with 1988? It is fair to assume owner-operators' LSRE was well below the average then, as now. From that I will "ballpark" it at .60 for 1940. In 1988 owner-occupiers' LSRE was measured, and was up to .79, a big jump. This implies a big jump in overall LSRE, too.

[38]The standard cap formula (omitting the property tax rate) is P=CF/[i-g], where P is land price, CF is current cash flow, i is interest rate, and g is annual growth rate of CF. Rearranging terms, P=[CF+Pg]/i. Pg is the current annual increment to land price. The formula is simplified, but in the market brokers have been capitalizing and selling Pg for ages, using this basic theme and variations.

[39]Historians would not expect it to: latifundia did in Italiam millenia before modern technology. Veblen, supposedly a technocrat, didn't buy the farm technology story either. A farm boy and and an historian, he saw farm machinery rather conforming to the Procrustean bed of speculative landholdings. (Veblen, loc. cit.)

P/CF ratios tell us it is harder for a newcomer to acquire any farm acres. The combination means the agricultural ladder has been pulled up. Entry is nearly impossible for most; exit and latifundiazation proceed apace.

Efforts to Downstate Concentration

Many analysts, even the best, sporadically downplay concentration and absentee ownership of land. The 1987 Census highlights a "tenancy rate" of 11%, while burying the leased-land rate, 45%.[40] Several analysts stress the lower values/acre in farms with larger acreages. Some intimate that broader farms go with larger families. Census tables make out that most corporate owners are really family farmers, their numbers few and their weight light. Foreign ownership is not a real concern, but only exercises "hysterical alarmists." Farms expand only to achieve economies of scale for the general welfare, releasing surplus labor to higher uses. Perhaps it is just human nature to rationalize, but it may violate some facts.

As to family size, many studies of people/land ratios have found an inverse relationship between family size and farm size. For brevity, I submit that as "common knowledge."[41] ~~Poverty is~~ prolific.

Some writers discount the GR for farms measured by acres, because the acre values of the largest farms are below the average for all farms.[42] (We noted earlier that PAVLOVSDOG has

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[40]The "tenancy rate" is in T.16, p.20, where it stands out like a neon flasher. The rest of T.16 is cryptographic, so the data-weary eye alights on the only message in plain view: the low "tenancy rate." It is impossible to decode the amount of leased land from T.16 or any other page in the 1987 Census, until AELOS, 1988, T.1, pp.1-2.

[41]An early study making this point is Carter Goodrich, et al., 1936, Migration and Economic Opportunity. (Philadelphia: University of Pennsylvania Press,) p.72. Using 1930 Census data, he shows that small farms in the Appalachians had fewer acres/farm, but more people/farm, than Iowa farms. (He also shows they produced more per dollar of L+B.)

It is only symbolic, but mnemonic, that the owner of excess land receiving subsidized irrigation water, whose name endures in the leading case of Ivanhoe I.D. v. McCracken, 357 U.S. 275, 1958, was a single person.

[42]"USDA/ERS/RDED/ERS-197, 1964, Owner Characteristics and Distribution of Land Ownership in the Eastern Great Plains, Washington, pp. 4-7. USDA, ARS, ARS 43-93, 1959, Land Ownership in the Great Plains. Washington, p.23-24. In addition, they

risen since 1900, but it is still less than one.) They infer from this that "the value of land was more evenly distributed than acreage, ..."[43] The error there ("Regression Fallacy") is that not all the farms in the top 1% by acres are in the top 1% by value. They are displaced by another set, from lower acreage groups.[44] The entering set may contain a higher share of L than the exiting set contains of acres.

In this case, the possibility is highly probable, from several clues. One is that land in farms in what is now the 2nd highest bracket, 1,000 - 1,999 acres, is worth more per acre than the mean for all farms ($521/acre vs. $447/acre, estimated).[45] In the brackets from 260 acres to 1999 acres there are more farms worth $1 million or more than there are in the top bracket, 2,000 acres and up. Half the farms in the top bracket are worth less than $1 million @.[46] ranches

Another clue is that yields/acre of most crops stay level or rise with harvested acres/farm.[47] The most likely reason for that is that quality of land rises with quantity. There is a trade-off between quality and quantity, which many writers stress exclusively. However, there is also a bond: whoso can afford more

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doubly understate concentration by using L+B in lieu of L, as discussed later.

[43]ERS-197, op. cit., p.5.

[44]Allen Wallis and Harry Roberts, 1956, Statistics. Glencoe: The Free Press, preceding p. 263. Lawrence Klein, 1962, Introduction to Econometrics. Englewood Cliffs: Prentice-Hall. George Stigler, 1946, "Labor Productivity and Size of Farm: a Statistical Pitfall," JFE 28:821-25. A.E. Waugh, 1943, Elements of Statistical Method, New York: McGraw-Hill, pp. 387-89. There is a clear little piece by Harold Hotelling making this point in response to a writer who said industrial concentration was falling because several firms in the top group in one year were not there a few years later. The fallacy never dies, however: now we have a school of urbanists telling us cities are becoming more alike because the largest ones of past years are regressing towards the mean.

[45]L+B values from 1987 Census of Ag., T.51, p.84 ff. L estimated by applying LSRE factor derived from AELOS T.20, p.229. This is very rough because the AELOS series applies just to owner-occupied farms.

[46]56,355 farms vs. 35,484 farms over 2,000 acres. 1987 Census of Ag T.51, p.93.

[47]1987 Census of Ag T.44, p.36.

can afford better. Which effect is stronger? That is the question.

The question can be resolved by data, if available. The Census does supply one non-monetary surrogate for land quality: land irrigated. Irrigated land is generally flatter, lower and warmer, but in addition the water supply itself is an easement over more land (the watershed) whose acreage is not counted with acres/farm). The Census ranks farms by acres harvested, crop by crop. The share irrigated rises steeply with acres/farm, for almost all crops.[48]

Taking alfalfa, 67% of acres in the top class are irrigated, compared with 23% for all farms producing alfalfa. The ratio of those percentages forms an index, SOLIVARAF (Share of Land Irrigated on Vast Acreages, Relative to All Farms).[49] For example, for alfalfa SOLIVARAF = .67/.23 = 2.9. Other crops are given in the end note.[50]

This finding is very strong because it runs against the ranking bias. These farms are ranked by all acres harvested; that bias alone tends to make SOLIVARAF < 1. If the Census ranked these same data by acres irrigated, the trend shown would be much stronger.

Comparing different crops, high values of GR go with crops that are mostly irrigated. Here is a comparison of tomatoes and silage corn. 85% of tomato acres are irrigated; 14% of silage corn acres. For tomatoes, GR = .91; for silage corn, GR = .52. Those GR index numbers come from raw data like the following. For tomatoes, the top bracket contains 1.1% of the farms, 45% of the harvested acres, and 52% of the irrigated acres in tomatoes. For silage corn, the top bracket contains 1.0% of the farms, 11.3% of the harvested acres, and 26% of the irrigated acres in silage corn.

Those and other data on irrigated acres are quite overpowering. They establish that quantity and quality of

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[48]1987 Census of Ag T.44, p.36.

[49]This is the counterpart of PAVLOVSDOG, used supra under "Growing Concentration."

[50]SOLIVARAF values by crops, calculated from 1987 Census of Ag, T.44, p.36. Cash corn = 2.1; silage corn = 3.3; sorghum = 0.8; wheat = 1.0; barley = 1.3; oats = 3.2; cotton = 1.4; tobacco = 1.8; soybeans = 2.0; dry edible beans = 1.5; potatoes = 1.1; sugar beets = 1.5; peanuts = 1.8; alfalfa hay etc. = 3.3; other hay = 7.5; seeds = 1.4; vegetables = 1.3; tomatoes = 1.2; sweet corn = 1.6; berries = 0.9; orchards = 1.2; rice = 1.0.

cropland are mates more than alternates. The larger farms get more water per acre.[51]

To be sure, those data apply just to cropland; they do not bear directly on pasturage and woodland. They do, however, point to a strong, consistent link between acres/farm and land quality. This link, hitherto neglected in the literature, presumably has general financial-economic (rather than technological) causes, and therefore applies as well to different qualities of pastureland (including irrigated pasture). This makes it likely that farmland is more concentrated by value than by area.

As to pasturage and woodland, cropland is only 21% of the land in farms of 2,000 acres and over, vs. 46% for all farms. That fact alone is what keeps PAVLOVSDOG < 1.00, and makes it plausible that GR-by-acres > GR-by-value. For the rest of the ranking, however, cropland/all land rises steadily from .503 (farms under 10 acres) to a max of .735 (farms 500-999 acres). It drops only negligibly to the next bracket (.666), and only really dives in the top bracket, as noted. Looking solely at the top bracket it seems that larger farms have a lower share of cropland, but looking at all other brackets it works the other way. Gini Ratios are based on all brackets, not just the top.

Ultimately to test the case we must not just measure farms by land value, we must also rank them by land value. This has not been done. The Census can do it, I am told, for added cost of about $5,000. I urge it to. Failing that, others can order a special run at cost. For reasons given, I am confident GR-by-L > GR-by-acres.

The Census also ranks farms by sales/farm. This yields higher GR values: .80 in 1987, compared with .76 by acres. Sales are a measure of dollar values. This suggests, without proving, that GR-by-L > GR-by-acres.

Some discount this finding by stressing the high ratio of sales/earnings in the downstream farms with highest sales. This is another Regression Fallacy. It omits the countervailing fact that upstream cow-calf ranches and cash-grain farms with broad acres have lower turnover, and are downsized by using the sales measure. You cannot belittle a high Gini Ratio by using some new measure of size just to downsize the top bracket: you must rerank every farm by the new measure, creating a new top bracket containing a new set of farms. That should be elementary, but is often flouted.

The same rule holds if we seek to discount this high GR on grounds that farms with fewer sales have more non-cash amenities.

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[51]Water is economic land, meaning all natural resources.

The only way to settle that is to rank by the sum of amenity-plus-net sales. This would an accounting nightmare, but there is a market solution: those elements are captured together in market-determined land prices. That brings us back to square one: we must rank farms by land value, L.

The Census now also ranks farms by value of L+B. Ranking thus, GR = .63 in 1987,[52] lower than GR by acres. This shows that farms are less concentrated by real estate value than by land area, but it does not show they are less concentrated by land value. Acres are a measure of land alone; L+B is a measure of value, which we want, but the idea is to compare the two ways of measuring land alone. L+B is not an index to L alone, because L/[L+B] (our LSRE) rises sharply with acres/farm, and even more sharply with [L+B]/farm.

AELOS gives two 1988 series that test the point: one for owner-operators, and one for "landlords with debt." For the owner-operators, ranked by acres/farm, LSRE was .37 for farms under 10 acres; .71 for all farms; and .88 for farms 2,000 acres and over.[53] Otherwise put, building values are much less concentrated among these farms than land values. Lumping L+B together lowers the GR hugely.[54]

For "Landlords with Debt"[55] the LSREs are higher overall (.89) than for owner-operators (.71), but our immediate interest is in how the shares rise with size of holding. Ranking by acres/farm, LSRE is .89 overall, rising gently to .93 in the top bracket. These data, however, are also ranked in five other ways.[56] The relevant ranking is by L+B. Ranking thus, LSRE is

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[52]Calculated from 1987 Census of Ag T.11, p.18

[53]AELOS T. 70, p.229. 1940 was the last year before 1988 when the Census reported separate values for land and buildings. The 1940 breakdown is for all farms. In 1940 LSRE rose from .31 in the lowest acreage bracket, to .69 overall, to .88 in the highest bracket (1940 Census of Ag, 3:80).

[54]Combining this error with regression fallacy, the two Great Plains studies cited supra doubly understate the concentration of land by value. They refer interchangeably to real estate and land, never making it clear which they are measuring. The impression is they used data on real estate (L+B), but called it "land."

[55]AELOS, T.64, p.219.

[56]This lets us see how the choice of ranking variable dominates the trend of LSRE.

still, of course, .89 overall, but -- here is the shocker -- LSRE rises to an astonishing .99 (!) in the top bracket.[57]

A share of .99 is breathtaking in any such scatter, but moreso here because the ranking variable includes B. When a scatter of points is loose, the choice of ranking variable - i.e. the definition of "size" - biases the findings to show the share of the ranking variable rising with size. Ignoring this bias is "Regression Fallacy." Thus if we ranked farms by L, a rising LSRE with size could show nothing more than ranking bias. However the present data are ranked by L+B, which is neutral between L and B. LSRE = .99 in the top bracket is free of ranking bias, and thus quite persuasive. Unless the basic data are false, or unrepresentative, we are onto an extraordinarily strong relationship. It is also momentous that the biggest landlord holdings, in dollar value, are pure land bare of buildings.

Forget it for this chapter anyway.

Doubts remain about the data. We had to work from fragments, a large one on owner-operators and a small one on "landlords with debt." I hope Census leaders will deliver at least three more complete runs: one ranked by L+B, one by L, and one by B. (We already have one ranked by L+B, but without showing LSREs.) There should be two sets of three: one for operators and one for owners. Without question the ones ranked by B will have a low GR.

I predict the ones ranked by L will have a GR near or above .76, indicating the acreage measure does not overstate real concentration of land value. There is precedent for thinking the acreage measure may even be understating it. The 1900 Census reported on the ownership of rented farms by size of holding, measuring size both by acres and by L. By acres, GR = .53; by L, GR = .62.[58] There is also precedent from Denmark. The 1953 Danish census ranked all Danish farms both ways, with these results: by acres, GR = .47; by L, GR = .53.[59] These data from long ago and far away want replicating now and here.

The land share rises with size of farm: comparing states

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[57]Otherwise put, as L+B/farm rises, B/farm falls. B actually approaches 0, which is astounding.

[58]Calculated from 1900 Census of Ag 1:xcii, xc. These data refer to ownership, not operation. It may be that ownership goes one way, and operation the other. The answer lies in the stored AELOS data.

[59]Calculated from Danmarks Statistik Arbog 1953, p.50. Both Denmark and rented farms contain lands of less diverse quality and rainfall than the whole U.S., so these precedents by no means settle the case. Nothing will except to do the job itself, using data already at hand.

We have seen LSRE rises with acres/farm, using 1988 and 1940 data. We have seen LSRE rises faster with [L+B]/farm, even up to .99 in the top bracket. We had to work, however, with skimpy data.[60] Acres/farm is not 100% correlated with value/farm. In addition, acres are a measure of land alone, (even if not of land values), creating a ranking bias of unknown force. Another problem is that our data relating LSRE to L+B apply only to a subset, the holdings (not the operations) of "landlords with debt." We have to go back 48 years for earlier data separating land from building values, and they are not ranked by value at all.

Providentially, AELOS provides a third set of separate land and building values to fuel our lamp. These are aggregates for each state.[61] Grouping data by area units, as Margaret Reid did in her study of housing and income, is one way to overcome Regression Fallacy.[62] The idea is to group data on some basis other than the variables being studied, then compare the results. States serve the purpose, just as neighborhoods served Reid in her housing studies.

The method is to compare the dispersion of L with the dispersion of B. The result is unbiased because the two variables are treated the same: neither ranking is given priority over the other. The egg-shaped envelope of scatter points is standing on its end if the y-variable is more dispersed, and leaning on its side if the x-variable is more dispersed. Any standardized measure of dispersion is acceptable.[63] I use two. One is the mean

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[60]Some older data are assembled in M. Gaffney, 1956, "Land Speculation," op cit, pp. 209-17.

[61]AELOS T. 71, p.230. These data are just for owner-operators. More coverage would be better, and is stored, but this is all that is released in AELOS.

[62]Margaret Reid, 1962. Housing and Income. Chicago: University of Chicago Press. Discussion is in Richard Muth, ca. 1971, "Permanent Income, Instrumental Variables, and the Income-elasticity of Housing Demand," (unpublished MS, pp. 1-40). Reid's studies were in conjunction with developing the "permanent income hypothesis," which was an extended exercise in offsetting regression fallacy. See also the discussion in M. Gaffney, 1971, "The Property Tax is a Progressive Tax," Proceedings, NTA, 64th Annual Conference, Kansas City, pp. 408-26, at pp. 421-24.

[63]Allen Wallis and Harry Roberts, 1956, Statistics. Glencoe: The Free Press, p.263 and preceding. I find rare minor discrepancies between the results from different measures of dispersion - a point too fine to detain us here.

well Boomer. One needs one set of buildings per farm. Some ranches are bigger than many small farms..

deviation, dividing each by its respective mean to standardize it for comparison with others. I also calculated coefficients of variation (CV), which are standard deviations divided by the respective means. The calculations were done by hand from the published data, and may be hand-checked by anyone.

The results support the hypothesis that farm land values are much more concentrated than farm building values. The CVs are .44 for L (land value), and .24 for B (building value). See Table 1 for details.

(TABLE 1 HERE)

These data, to reprise, give us a statistically neutral comparison of the concentration of L and B. L is much more concentrated. The rise of LSRE with size of farm is not an artifact of the choice of ranking variable; it is a neutral fact.

Data by states also give us new insights into interstate and interregional differences. I divide states into three groups: 9 small urban states, 7 arid ranching states, and 34 rural and rural-urban states (Table 1). For the small urban states the CV values for L and B are .42 and .16; for the arid ranching states, .32 and .29; for the 34 rural states, .67 and .32. Thus L is more concentrated than B among the states within each of the three groups, but the difference is most among the small urban states. This, of course, is where farm values are most affected by urban speculation. This suggests that the effect of urban land speculation is toward higher concentration of landholdings, a point made earlier by L.C. Gray, by E.A. Goldenweiser and Leon Truesdell,[64] and observable today around growing cities.[65]

The overall findings are displayed in Figure 1, a scatter plotting LSRE against L/farm, by whole states. L/farm ranges from

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[64]L.C. Gray, 1931. "Land Speculation." In E.R.A. Seligman (ed.), Encyclopedia of the Social Sciences, New York: The Macmillan Company. E.A. Goldenweiser and Leon Truesdell, 1924. Farm Tenancy in the United States. U.S. Bureau of the Census, Census Monograph #4. Washington: U.S.G.P.O.

[65]Florida, treated below as a "bellwether" state, is not a "small" urban state, but still ranks high in the sprawl of its cities that spreads urban price influence over farm land. 7.4% of Florida is "urban and built-up," compared to less in other states of comparable area and population: 5.1% in Illinois, 5.2% in Michigan, and 5.8% in New York (Statistical Abstract, 1988, p.187). Florida ranks low in per capita income, but #2 among states in domestic travel spending. The Florida Land Boom of 1926 is history, but the dispersed settlement pattern that fostered it still stamps Florida, and helps explain its high LSRE.

$71,000 (WV) to $630,000 (AZ). Arizona and other big-farm states have higher LSREs than West Virginia and other small-farm states. Overall, the scatter displays a strong positive relationship between L/farm and LSRE, state to state.[66] This supports the basic finding which is, otherwise put, that land is much more concentrated than buildings among farms.[67]

(FIGURE 1 HERE)

Having LSRE, it is useful to use it for ranking. Florida is top at .85 and Wisconsin bottom at .53. Pursuing the contrast, we find Florida above Wisconsin in a number of cognate indicators: L/farm (5.5/1), acres/farm (3/2), L/acre (4/1), GR by acres (2/1), and [L+B]/all assets (11/8). Wisconsin leads Florida in sales/L (3/1), M&E/livestock (7/3), and PTR (property tax rate) (4/1) (Table 2). These contrasts are not marginal: these are two different kinds of polity and society.

(TABLE 2 HERE)

Florida and Wisconsin are not exceptions or outliers, but bellwethers. Extending the data to 8 more states below Florida, and 8 above Wisconsin, the differences persist and accumulate consistently. The "Florida 9" are Florida, Arizona, New Mexico, Hawaii, Montana, North Dakota, Wyoming, California and Texas. The "Wisconsin 9" are Wisconsin, Delaware, Maine, Pennsylvania, New York, New Hampshire, North Carolina, Oklahoma and Ohio. There are clearly two contrasting Gestalts along the lines shown. One more contrast obtains in these other sixteen states: the Florida 9 have higher shares of land under lease than the Wisconsin 9 (although Florida itself does not).

There are two sports among the 18: Delaware does not fit the Wisconsin mold, and North Dakota does not fit the Florida mold. Two sports out of 18 complex cases is not many: a state "personality" is shaped by many factors. It is remarkable to find one factor (LSRE) that identifies 16 states with so much by way of common contrasts. The Gestalts are generally quite

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[66]Using L to rank the states would reintroduce an element of ranking bias were we not using grouped data. Lumping data causes extreme understatement of the relationship displayed, so no net exaggeration is perpetrated by Figure 1.

[67]If that is not clear, think of it in extreme terms. It is as though buildings were all of equal value, from farm to farm, and farms differed only in their lands.

identifiable and distinctive. The two sports call for individual analysis.[68]

[68]North Dakota was earlier shaped by its unusual Non-Partisan League movement, and its exemption of farm buildings from the property tax. Today its farms are notably high in receipt of government payments per capita. Perhaps it is a state in transition between extremes. Delaware is peculiarly dominated by one family and corporation, and its farm sales by poultry. A book is needed to do each case justice.

Table 2. States Ranked by LSRE: Top and Bottom Nine

State	LSRE	L/Fm	L/a	GR	PTR	L+B AFA	M&E LS	Acs Fm	L AFA	Leased share	Sales L
FL	.85	452	1686	.847	.54	.88	.75	306	.75	.26	.23
AZ	.84	630	542	.870	.44	.86	.55	4752	.72	.77	.31
NM	.84	329	137	.782	.37	.84	.52	3230	.71	.48	.32
HI	.83	366	1726	.962	.35	.85	4.57	353	.71	.51	.25
MT	.80	304	180	.617	.85	.79	1.59	2451	.63	.32	.18
ND	.80	229	279	.467	.96	.73	4.02	818	.58	.51	.23
WY	.78	274	118	.682	.81	.77	.70	2314	.60	.42	.24
CA	.78	476	2318	.875	.55	.86	1.11	368	.67	.58	.31
TX	.78	215	570	.782	.56	.84	1.19	376	.66	.51	.22
**********											
OH	.59	91	702	.556	.95	.78	2.56	130	.46	.42	.33
OK	.59	92	361	.649	.60	.79	.97	255	.47	.46	.43
NC	.59	89	943	.621	.47	.81	2.94	95	.48	.49	.59
NH	.58	183	1370	.547	.97	.86	1.85	134	.50	.14	.15
NY	.58	126	704	.506	1.58	.75	1.52	223	.43	.22	.40
PA	.57	118	945	.490	.80	.76	1.41	153	.43	.33	.40
ME	.56	106	520	.528	1.17	.74	2.27	214	.41	.15	.70
DE	.54	126	1299	.679*	.44	.82	3.75	205	.44	.57	.85
WI	.53	84	444	.436	2.13	.64	1.32	221	.34	.28	.72

LSRE = Land Share of Real Estate, i.e. L/[L+B]
L/Fm = Land Value per Farm
L/a = Land Value per acre
GR = Gini Ratio, intrastate, by acres
PTR = Property tax rate on real estate, de facto
L+B/AFA = Land + Buildings as share of All Farm Assets
M&E/LS = Machinery and Equipment divided by Livestock, dollar values
Acs/Fm = Acres per Farm
L/AFA = Land Value as share of All Farm Assets
Leased Share = Fraction of acres in state under lease
Sales/L = Sales (of farm output) per dollar of Land Value (est.)

* 1982 data used, for want of 1987 data for DE.
Separate Land and Building Values from AELOS T.70, p.229.
Other Asset Values from AELOS T.28, p.61.
Gini Ratios calculated from data in AELOS T.5, p.179.
Tax rates from AELOS T.51, p.181.
Leased land from AELOS T.2, p.5.
Sales from AELOS T.8, p.20; L+B from T.28, p.61. L+B was converted to L using the LSRE factor in Column 1. This is an estimate because the LSRE factor applies to owner-occupied farms, while the sales and L+B data are for all farms. This approximation is forced on us by lack of fully coordinated published data.

The two Gestalts go beyond farmland data. Several indicators support the notion of a relationship between unequal distribution and social alienation.[69] Many factors contribute to such contrasts. I am not trained to weigh them: that looks like a rewarding challenge for a rural sociologist or social anthropologist. Florida compares better by some other indicators. However, these data suggest on a state-by-state scale the kind of contrast Walter Goldschmidt documented locally between the towns of Arvin and Dinuba, California.[70]

An added benefit of grouping by states is to relate farmland use and distribution to public policies that vary by states. The Wisconsin 9 have higher PTRs (property tax rates), overall, than the Florida 9. To the extent that the PTR is a cause of the effects with which it is associated, its effect is not so much to abort farm capital, as expected. It is associated with low LSRE (low LSRE means a high BSRE, or Building Share in Real Estate). The more visible effect of a high PTR is rather to abet subdivision of farmland, and abort its agglomeration into large units. We find high PTR with low GR, with small farms (low L/farm, low L/acre), with high ratios of M&E to livestock and to real estate, with low shares of leased land, and with fuller land usage as measured by sales/L.

The inverse relationship between PTR and GR is particularly consistent and noteworthy. In this respect our non-conforming states, North Dakota and Delaware, are not sports at all: they fall right into line. Delaware has a low PTR and a high GR; North Dakota the opposite. The egalitarian effects of a high PTR seem stronger than its negative incentive effects, even though buildings are part of the tax base. These egalitarian effects would be stronger if the tax base were limited to naked land value - we have seen how LSRE rises steeply with size of farm. Untaxing buildings would, of course, also eliminate negative incentive effects.

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[69]Florida leads the nation in violent crimes per 100,000 population, and leads Wisconsin 5/1 (FBI Uniform Crime Rates, 1991 World Almanac, p.848). That is the more significant considering its age distribution, which is short on the violence-prone youthful cohorts. Florida ranks #44 in voter turnout, to #4 for Wisconsin, even though Florida ranks #1 in share of population over age 65, the high-voting ages. Florida also leads Wisconsin in Infant Mortality Rate, 12.8/9.5; divorce rate, 6.7/3.6; and prisoners per 100,000 people, 243/102. In a cultural factor like patents issued per million people, Wisconsin leads Florida 185/113. (Data from 1990 Statistical Abstract, pp. xii-xxi, 535; State and Metropolitan Area Data Book, 1986; Annual Reports, USDC, Commissioner of Patents and Trademarks; America Votes 19, Washington: Congressional Quarterly, 1991.)

[70]Walter Goldschmidt, 1946. As You Sow. Glencoe: The Free Press.

The high LSRE on big farms raises the possibility we may have in the "Florida 9" some tendency toward a 3d-world Gestalt: a pattern of large, underutilized landholdings that preempt the best land and force median farmers onto small farms on low-grade land. To test this we need data on labor input related to farm size. There is none in AELOS, nor in the 1987 Census of Agriculture, except for hired and contract labor. There is no current measure of owner labor, the traditional main source of labor on small and medium farms. We are forced back to earlier Censi: they counted and measured labor of farm proprietors and their families.[71]

In 1950 the Census reported on farms ranked by sales/farm. Class I farms (the largest) had 22% of the land in farms, with 7% of the farm labor. Class VI farms (the smallest) had 5% of the land in farms, with 11% of the farm labor.[72] This contrast would of course be much greater if farms were ranked by acres or L+B, because sales reflect the presence of labor inputs. Those contrasts were brought out in many studies in those years.[73]

Most farm buildings are operator dwellings; their function is to house operator labor near the job site. Lacking data on family labor, we may assume operator labor inputs are roughly in proportion to operator housing. In 1988 operators' dwellings were 57% of farm real estate assets for all farms, falling to 35% on farms over 2,000 acres.[74] Coupling this with the fall of buildings relative to land value, the ratio of operator dwelling values to all farm real estate falls from 16.4% overall to 4.37% over 2,000 acres. For "family-held" corporate farms the ratio is 6.3%; for other corporate farms, 3.2% These data support the common impression that smaller farms are better supplied with operator family labor.

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[71]I urge the Census to do so again: it is misleading to report only on hired and contract labor, omitting farm family labor.

[72]1950 Census of Ag 5 (Part 6):51, cited in M. Gaffney, "Land Speculation," p.207.

[73]See Gaffney, op. cit, pp. 203-09. Cited there are supporting data from studies by Carter Goodrich, J.A. Baker, Lowry Nelson, Conrad Hammar and J.H. Muntzell, W.J. Cash, A.O. Craven, Arthur Raper, T.J. Woofter et al., J.V. Rogers, D.G. Miley, Herbert Weaver, W.W. Wilcox and W.E. Hendrix, Stanley Hamilton and Darryl Parker, David Weeks, Henry L. Roberts, Leslie Gay, Jr., Erich Jacoby, and Robert Hardie.

[74]AELOS, T.70, p.229.

We conclude that large farm units are less improved and less peopled[75] than small and medium farms. There are two possible interpretations. One is they are more efficient, getting more from less. The other is that many of them are oversized "stores of value," held first to park slack money, and only secondly to produce food and fiber, and complement the owner's "instinct of workmanship." Is old Thorstein still mocking us from the grave? We cannot settle that issue in a few words, but the implications for tax policy are the same either way. If large units are more efficient they can bear heavier taxes. If they are less efficient, heavier PTRs will induce them to release surplus land for others, tending at the margins to equalize factor proportions, moving more states from the Florida toward the Wisconsin model.

TO BE CONCLUDED

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[75]"Peopled," as opposed to the traditional "manned," is unaffectedly non-sexist and non-ageist. It presumes the importance of female and family labor on small farms. Members of NOW would serve their cause to insist the Census show more respect for hard-working farm wives by counting their labor as an input. Now it just counts hired and contract labor, as though owner-farms yielded their products untouched by human hand.

(THIS PARA. FOR LATER USE) A second purpose of dividing the three groups is to show that L/farm is more concentrated than acres/farm in two of the three groups: the urban states and the rural-urban states. In the arid ranching states it is otherwise, and combining these with the others in the national data makes it otherwise for the nation. This explains the anomaly of finding that L/acre is an increasing function of acres/farm within the humid states, while at the national level L/acre falls with acres/farm. This is why I feel unable to predict whether the GR of farms ranked by value will turn out higher or lower than the GR of farms ranked by acres, nationwide. I am confident the GR of farms ranked by value is the higher one <u>within</u> most of the humid states.