Farming and Rural Community Well-Being

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Farming and Rural Community Well-Being

- **The relationship between farming and rural community well-being is a hotly contested issue.**
- **Many believe that a healthy farm economy translates into a healthy rural economy.**
- **Others argue that the need for off-farm income to maintain the farm family has reversed the relationship.**

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- **The discussion of this relationship within academia is often cast in the framework of the Goldschmidt Hypothesis.**
- **Consolidation of farming into large "corporate farms" will drive "family farmers" off the land and absentee owners will drain rural communities of profits and income.**
- **While the "theoretical" literature is rich, the empirical evidence is mixed at best.**

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- **We want to revisit this basic question.**

- **We do this in two steps:**
  - **(1) a set of simple economic growth models looking at farm dependency in 2002 (2002 Census of Agriculture data) helps predict growth from 2000 to 2012;**

  - **(2) how farm characteristics are associated with a range of community well-being metrics.**

  - **Using US nonmetropolitan county level data we employ simple regression and correlation analysis.**

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The growth models are in the spirit of the classic Carlino-Mills partial adjustment models:

$$P^* = f(E^*, I^* \mid \Omega^P) \quad (1)$$

$$E^* = g(P^*, I^* \mid \Omega^E) \quad (2)$$

$$I^* = g(P^*, E^* \mid \Omega^I) \quad (3)$$

Employment
Per Capita Income
Population
Earnings Per Capita
Average Weekly Wages
Number of Firms

Farm Share of Total Employment
Farm Share of Proprietor Employment
Number of Farms
Median Farm Size by Acres
Average Farm Size by Sales

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Table 1: Base Growth Models Nonmetro Counties 2000-2012

	Employment	Per Capita Income	Population	Earnings Per Capita	Average Weekly Wages	Number of Firms
Intercept	-0.120570	0.167200	0.047530	-0.530560	0.490440 **	-0.376020 **
	(0.5509)	(0.5400)	(0.5489)	(0.2340)	(0.0222)	(0.0104)
Employment	-0.000007 **	-0.000001	-0.000001	0.000003	-0.000001	0.000000
	(0.0042)	(0.8133)	(0.1341)	(0.5766)	(0.6896)	(0.8547)
Per Capit Income	0.000004 **	-0.000002	-0.000001 **	0.000004	0.000009 ***	0.000002 *
	(0.0114)	(0.3124)	(0.0426)	(0.3417)	(0.0001)	(0.0849)
Population	0.000001 *	-0.000002 *	0.000001 *	-0.000005 **	-0.000001	0.000002 **
	(0.0831)	(0.0645)	(0.0760)	(0.0052)	(0.2987)	(0.0011)
Number of Businesses	0.000040	0.000064	0.000003	0.000107	0.000045	-0.000083 **
	(0.1923)	(0.1214)	(0.8265)	(0.1171)	(0.1718)	(0.0002)
Population Density	-0.000411 *	-0.001430 ***	0.000203 **	-0.001820 **	-0.000732 **	-0.000431 **
	(0.0656)	(0.0001)	(0.0204)	(0.0002)	(0.0020)	(0.0078)
Percent of the Population over Age 65	-0.010050 ***	0.006050 *	-0.004490 ***	0.014360 **	-0.002750	-0.001500
	(0.0001)	(0.0666)	(0.0001)	(0.0078)	(0.2880)	(0.3974)
Percent of the Population Age 20 to 24	-0.015230 **	-0.014220 *	-0.005070 **	-0.008940	-0.004380	-0.013760 **
	(0.0077)	(0.0650)	(0.0236)	(0.4774)	(0.4695)	(0.0009)
Percent of the Population under Age 18	0.001380	0.009250 **	0.001170	0.021170 ***	0.000431	0.007340 ***
	(0.5731)	(0.0052)	(0.2220)	(0.0001)	(0.8682)	(0.0001)
Percent of the Population Non-Caucasian	-0.001240 **	-0.000227	-0.000371 **	-0.001910 *	-0.000714	-0.001380 ***
	(0.0075)	(0.7161)	(0.0410)	(0.0622)	(0.1461)	(0.0001)
Percent of the Population Speaks a Language other than English at Home	0.004070 ***	0.005430 ***	0.000026	0.007840 ***	0.004220 ***	-0.000625
	(0.0001)	(0.0001)	(0.9128)	(0.0001)	(0.0001)	(0.1587)
Percent of the Population in the Same House 1995-2000	-0.000158	0.009180 ***	-0.004730 ***	0.016610 ***	0.002670 **	-0.003250 ***
	(0.8846)	(0.0001)	(0.0001)	(0.0001)	(0.0211)	(0.0001)
Median Rent	-0.000305 **	-0.000745 ***	0.000314 ***	-0.001330 ***	-0.000620 ***	0.000277 **
	(0.0093)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0012)
Share of Employment in Construction	0.006400 **	-0.011270 ***	0.008140 ***	-0.020150 ***	0.004650 **	0.003340 **
	(0.0022)	(0.0001)	(0.0001)	(0.0001)	(0.0354)	(0.0273)
Thiel Measure of Employment Diversity	0.284400 **	0.226600	0.099500 **	0.253310	-0.137340	0.292430 **
	(0.0226)	(0.1780)	(0.0419)	(0.3567)	(0.2987)	(0.0012)
Youth Poverty Rate	0.004090 **	0.008500 **	-0.002300 **	0.011240 **	0.010700 ***	0.002500 *
	(0.0282)	(0.0007)	(0.0017)	(0.0063)	(0.0001)	(0.0647)
Elderly Poverty Rate	-0.005130 **	-0.010130 ***	0.002570 ***	-0.015720 ***	-0.009230 ***	-0.000577
	(0.0027)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.6415)
Percent Age over 25 with Some College	0.003460 **	0.003910 **	0.001650 **	0.004830 *	-0.000134	0.003290 **
	(0.0086)	(0.0279)	(0.0014)	(0.0960)	(0.9236)	(0.0006)
Percent Age over 25 with Less than High School Education	-0.002890 *	-0.003920 *	0.000298	-0.007970 **	-0.001400	0.000849
	(0.0705)	(0.0697)	(0.6348)	(0.0239)	(0.4101)	(0.4645)
F test	12.95 ***	40.62 ***	71.75 ***	40.18 ***	18.83 ***	10.56 ***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
AdjR^2	0.0981	0.2650	0.3917	0.2628	0.1396	0.0800

Marginal significance or p-value in parentheses.
***: Significant at the 99.9% level.
**: Significant at the 95.0% level.
*: Significant at the 90.0% level.

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Table 2: Farm Augmented Growth Models Nonmetro Counties 2000-2012

	Employment	Per Capita Income	Population	Earnings Per Capita	Average Weekly Wages	Number of Firms
Farm Share of Total Employment	0.673310 ***	1.102670 ***	0.046660	1.957610 ***	0.673470 ***	0.400790 ***
	(0.0001)	(0.0001)	(0.1496)	(0.0001)	(0.0001)	(0.0001)
Farm Share of Proprietor Employment	0.268150 ***	0.289140 ***	0.036720 **	0.543020 ***	0.286750 ***	0.148650 ***
	(0.0001)	(0.0001)	(0.0439)	(0.0001)	(0.0001)	(0.0001)
Number of Farms	0.000023	-0.000036 *	0.000024 ***	-0.000044	0.000006	0.000005
	(0.1081)	(0.0597)	(0.0001)	(0.1629)	(0.7006)	(0.6223)
Median Farm Size by Acres	0.000042 ***	0.000075 ***	0.000002	0.000135 ***	0.000045 ***	0.000025 ***
	(0.0001)	(0.0001)	(0.5803)	(0.0001)	(0.0001)	(0.0001)
Average Farm Size by Sales	4.37E-08	6.93E-09	-3.70E-08 **	9.69E-08	-3.82E-08	2.06E-08
	(0.2912)	(0.9014)	(0.0228)	(0.2885)	(0.3846)	(0.4929)

Marginal significance or p-value in parentheses.

***: Significant at the 99.9% level.

**: Significant at the 95.0% level.

*: Significant at the 90.0% level.

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First, of the 30 separate modeling results 19 are statistically significant suggesting that the relative size of the farm economy can help understand rural economic growth.

Second, of the 19 statistically significant results 17 suggest a positive relationship between farm dependency and economic growth.

Third, contrary to the Goldschmidt Hypothesis it appears that rural counties with larger farms, at least measured by median acreage, experience higher rates of economic growth. We cannot draw the same conclusion using farm sales.

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Taken together, these results suggest that farming is linked to rural economic growth.

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- **Economic growth is but one small element of community well-being.**

- **To further explore we use data for 2012 and estimate a series of correlations or scatterplots across a range of community well-being metrics.**

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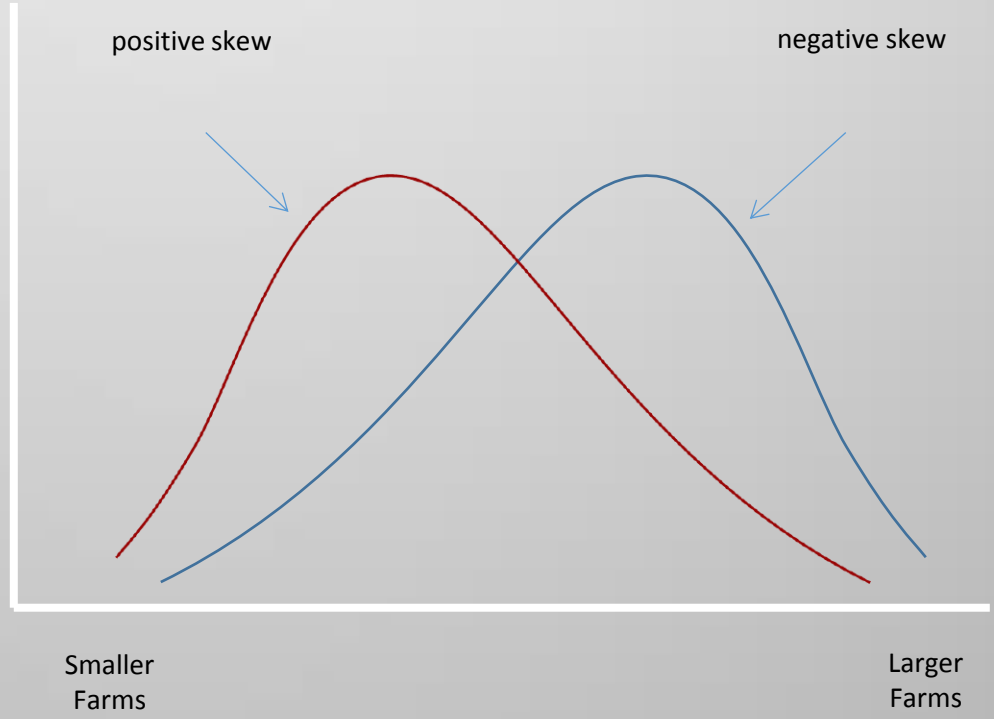
Index of Farm Dependency (2012)	
	Weighting
Average Farm Sales	0.1410
Median Farm Acreage	0.1561
Number of Farms per 1,000 Population	0.5614
Farm Share of Proprietorship Employment	0.5338
Farm Share of Total Employment	0.5964



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Economic Well-Being	Standard of Living Well-Being
Per Capita Income	Percent of Population over Age 25 with Some College
Percent Eligible for Free Lunch	Percent of Families with Single Parent
Child Poverty Rate	Violent Crime Rate
GINI Index of Income Inequality	Air Quality Daily PM25
Unemployment Rate	Percent of Persons with Pottable Water Below Standards
Percent of Population Eligible for SNAP	Percent of Population with Limited Access to Healthy Foods
	Percent of Houses Lacking Complete Plumbing
Public Health Well-Being	Percent of Household with High Housing Costs
Percent of Adults with Diabetes	
Percent of Population with No Access to a Doctor	
Percent of Population with Poor or Fair Health	
Rate of Low Birth Weight	
Adult Obesity Rate	

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Table 3: Farming and Community Well-Being: Farm Dependency Index

Farm Dependency Index	Pearson	Spearman	Kendall Tau b
Per Capita Income	0.30297	0.19889	0.12853
	(0.0001)	(0.0001)	(0.0001)
Percent Eligible for Free Lunch	-0.18296	-0.15311	-0.10278
	(0.0001)	(0.0001)	(0.0001)
Child Poverty Rate	-0.16471	-0.15423	-0.10335
	(0.0001)	(0.0001)	(0.0001)
GINI Index of Income Inequality	-0.12213	-0.14772	-0.09924
	(0.0001)	(0.0001)	(0.0001)
Unemployment Rate	-0.46581	-0.45364	-0.31008
	(0.0001)	(0.0001)	(0.0001)
Percent of Population Eligible for SNAP	-0.30241	-0.31157	-0.21243
	(0.0001)	(0.0001)	(0.0001)
Percent of Adults with Diabetes	-0.09912	-0.09268	-0.06701
	(0.0001)	(0.0001)	(0.0001)
Percent of Population with No Access to a Doctor	-0.35237	-0.3344	-0.22792
	(0.0001)	(0.0001)	(0.0001)
Percent of Population with Poor or Fair Health	-0.25658	-0.21521	-0.14406
	(0.0001)	(0.0001)	(0.0001)
Rate of Low Birth Weight	-0.19997	-0.18668	-0.12664
	(0.0001)	(0.0001)	(0.0001)
Adult Obesity Rate	-0.02115	-0.03351	-0.02497
	(0.3559)	(0.1435)	(0.1152)
Percent of Population over Age 25 with Some College	0.17972	0.11698	0.07641
	(0.0001)	(0.0001)	(0.0001)
Percent of Families with Single Parent	-0.35716	-0.34576	-0.23926
	(0.0001)	(0.0001)	(0.0001)
Violent Crime Rate	-0.30588	-0.36377	-0.24717
	(0.0001)	(0.0001)	(0.0001)
Air Quality Daily PM25	-0.3578	-0.32034	-0.22144
	(0.0001)	(0.0001)	(0.0001)
Percent of Persons with Potable Water Below Standards	0.09373	0.02176	0.0158
	(0.0001)	(0.3431)	(0.3462)
Percent of Population with Limited Access to Healthy Foods	0.40293	0.28578	0.19648
	(0.0001)	(0.0001)	(0.0001)
Percent of Houses Lacking Complete Plumbing	0.01607	-0.02263	-0.01533
	(0.4831)	(0.3234)	(0.3174)
Percent of Household with High Housing Costs	-0.5457	-0.55422	-0.4016
	(0.0001)	(0.0001)	(0.0001)

Marginal significance or p-value in parentheses.

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First, higher levels of dependency on farming for economic activity is associated with higher levels of economic well-being (e.g., higher income levels and lower measures associated with poverty).

Second, higher dependency on farming is associated with higher levels of public health. Clearly, there is a well-documented relation between poverty and public health so some care must be taken drawing a direct relationship between farming and public health.

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Third, the relationship between farming dependency and a more peculiar set of community well-being is more mixed than the income and health related measures. For example, higher farm dependency is associated with higher levels of education, lower levels of single parent households, lower violent crime rates, better access to affordable housing and air quality but poor drinking water accessibility and limited access to healthy foods.

Fourth, contrary to the Goldschmidt Hypothesis it appears that rural counties with larger farms tend to have higher levels of community well-being.

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The bottom line to the analysis is that rural counties that are more dependent on farming, particularly larger farms, tend to have higher levels of community well-being.

One possible explanation for these results is that agriculture was a source of stability during the Great Recession hence creating a unique period in history that is reflective in the data.

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