Amber Waves

contents

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FEATURES

FINDINGS

STATISTICS

Random Inspections Reveal Import Risks


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Between 1998 and 2007, U.S. agricultural imports increased in value by 70 percent, U.S. wildlife imports jumped 108 percent, and foreign passenger arrivals in the U.S. rose 80 percent. While providing many benefits, increased trade and travel raise the risk of imported foods, plants, and wildlife bringing non-native agricultural pests and/or pathogens into the U.S.

Border inspection of passengers and cargo is the frontline in comprehensive risk management. The U.S. Customs and Border Protection branch of the U.S. Department of Homeland Security inspects passengers and most cargoes for invasive species at ports-of-entry. Cargo inspections, however, can slow supply chains and damage perishable goods. Passenger inspections cause inconvenient delays. Therefore, inspectors primarily concentrate on the riskier "pathways" (the commodity origin and passenger origin upon which risk analysis is based). Other, less risky pathways into the U.S. are subject to less scrutiny and fewer inspections. Regular and more rigorous random inspections of selected cargo and passengers can reveal which pathways are riskier.

ERS researchers, using data from USDA's Animal and Plant Health Inspection Service on cargo inspections and a variety of risk and uncertainty scenarios, developed a model to determine the optimal number of random inspections and the most effective allocation of inspection resources at a given port. Model results showed that more frequent random inspections of seemingly low-risk cargoes and passengers may enable inspectors to identify when low-risk pathways might become more high-risk. To reduce uncertainty about which pathways are high risk, ports can devote greater resources to random inspections in cases when the inspection track record is short and therefore uncertain.

The variable nature of import risk points to the benefits of continually updating the underlying knowledge of the riskiness of different pathways and periodic reallocations of inspection effort and resources. Inspecting a portion of all passengers and cargo pathways, including those presumed to be less risky, might reveal underlying risks across pathways that were previously unknown.

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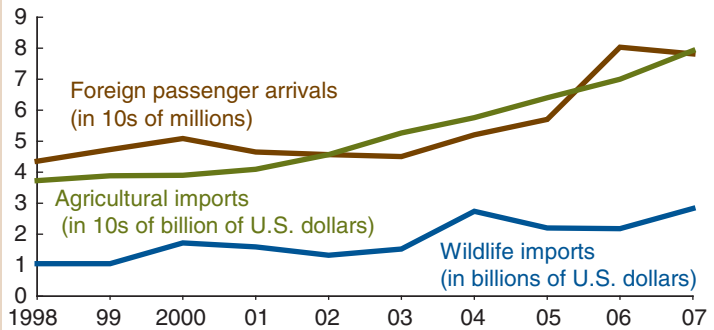
This finding is drawn from . . .

"Illicit Agricultural Trade," by Peyton Ferrier, in *Agricultural and Resource Economics Review*, 37(2): 1-10, 2008.

U.S. agricultural and wildlife imports and number of passengers increased in 1998-2007



Source: USDA, Economic Research Service analysis of data from USDA's Animal and Plant Health Inspection Service, U.S. Census Bureau, and U.S. Fish and Wildlife Service.

Income Source Matters in Farm Household Spending

Many U.S. farm households have several income sources, including farm production, off-farm employment, and government payments. ERS research suggests that farm households may employ "mental accounting" to decide which income sources, including different types of government payments, are most appropriate for household expenses.

Farm household expenditures support the household, rather than the farm business, and include food, nondurable goods such as clothing, durable goods such as appliances and home improvements, and savings and investments, including retirement accounts such as Individual Retirement Accounts. ERS research, using data from USDA's 2003-05 Agricultural Resource Management Survey, found that increases in relatively stable non-farm income have a greater impact on farm household spending than do increases in farm production income, which can vary from year to year because of weather effects, crop failures, animal losses, and/or commodity price fluctuations.

Government payments also include both stable and variable types of income, and as with other income sources, farm households do not consider all government payments to be the same. Increases in variable government payments, such as marketing loan benefits, were found to affect farm household expenditures less than increases in stable government income sources, such as fixed direct payments.

Income variability, however, does not fully explain the effect of different types of government payments on household spending. Countercyclical payments may be available when program crop prices fall below a target level and thus vary from year to year. Their impact on household expenditures, however, is closer to that of stable direct payments. It may be that because countercyclical payments are not tied to current production, but rather to historic (base) acreage like fixed direct payments, farm households consider them in the same mental account as fixed direct payments and therefore available for household uses. By contrast, farm households may consider income from sources associated with current production, like marketing loan benefits, more appropriate for farm business expenditures.

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This finding is drawn from . . .

"Income Stabilization Through Government Payments: How Is Farm Household Consumption Affected?" by James B. Whitaker and Anne Effland, in *Agricultural and Resource Economics Review*, 38(1):1-13, 2009.

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Rising Wheat Prices Outpace Input Costs

Most U.S. wheat producers—90 percent—are expected to cover their production costs in the 2008/09 marketing year. This high percentage results from the fact that, although wheat prices have fallen from their 2007/08 peak, they remain high by historical standards.

The February 2009 USDA forecast of the season average price of wheat for the 2008/09 marketing year ranges from $6.70 to $6.90 per bushel, compared with an average of $3.51 from 1998/99 to 2007/08. A global shortage of wheat resulting from low stocks and adverse weather around the world has led to growing foreign demand for U.S. wheat and higher prices.

ERS researchers indexed cost data from a 2004 USDA survey of U.S. wheat producers (the latest data available) to estimate wheat production expenses in 2008. The 2004 survey captured the wide variation of wheat production costs across the country that result from differences in cropping practices, yields, and costs of land, labor, and capital assets. Production costs include the costs for seed, fertilizer, chemicals, fuel, repairs, hired labor, property taxes, insurance, and the cost of maintaining machinery (depreciation and interest). Longrun costs such as opportunity costs for the farmer's labor and land are not included because farmers do not consider these costs in current production.

According to ERS research, continuation of historically high wheat prices will enable a larger share of wheat producers to cover their production costs in 2008/09 than in 2004. This will occur even though prices paid for production inputs, particularly fuel and fertilizer, have also risen since 2004. Fuel prices increased an estimated 117 percent and fertilizer prices rose 132 percent between 2004 and 2008.

An estimated 25 percent of the wheat producers had costs of $3.20 per bushel or less in 2008/09, and 75 percent of the producers had costs of $5.17 per bushel or less. In 2004, the season average price of $3.40 per bushel covered the per bushel production costs of 82 percent of the farms in the USDA survey. In 2008/09, a price of $5.67 per bushel would be needed to get equivalent coverage.

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This finding is drawn from . . .

Consequences of Higher Input Costs and Wheat Prices for U.S. Wheat Producers, by Mir Ali and Gary Vocke, WHS-09c-01, USDA, Economic Research Service, March 2009, available at: www.ers.usda.gov/publications/whs/mar09/whs09c01/

Ninety percent of wheat farms expected to cover costs in 2008-09

f = 2008 costs are forecasts.
Source: USDA, Economic Research Service analysis of wheat data from ERS and USDA, National Agricultural Statistics Service, Agricultural Resource Management Survey, 2004.

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China's Cotton Use Trimmed by Growing Efficiency and a Slowing Economy

Since the 1980s, as global textile production has shifted from developed to less developed countries, China has become a major exporter of cotton textiles, an importer of cotton fiber, and a significant market for U.S. cotton exports. At the same time, intense global competition in textiles has stimulated cost-cutting measures and new investments that have significantly increased the efficiency of transforming cotton fiber into yarn. Higher efficiency combined with changes in fiber blending has reduced the volume of cotton fiber needed to produce China's textile and clothing exports. These changes have important implications for understanding world cotton markets and the size of the world's largest cotton textile industry.

Although China is the largest market for U.S. cotton, it has proven difficult to accurately estimate China's cotton import needs. Data on China's cotton sector are imprecise and incomplete. But data on China's textile trade is widely available, and widespread monitoring by importing countries improves the accuracy of the data. Converting data on China's textile trade to its equivalent in cotton fiber use by textile mills offers insight into China's actual demand for cotton.

USDA research in the 1980s and earlier found that producing cotton yarn resulted in a 10-percent loss of the initial fiber. Since then, this conversion rate has been applied to data on U.S. textile trade to estimate the amount of cotton that textile mills around the world consume to satisfy U.S. import demand for cotton textiles. Analysts have applied this same "textile-to-cotton" conversion to China's textile trade data, in an effort to resolve longstanding concerns about the size of China's cotton textile industry.

However, yarn is now spun from fiber more efficiently than in the 1980s, and the industry recycles more waste. ERS research shows that about 5 percent of the raw cotton currently consumed by Chinese textile mills is lost. Using this conversion rate, China's textile mills needed 8.7 million tons of cotton to produce textile exports in 2008. With 1.3 billion consumers in China's domestic market, China's mills would have consumed more than 10 million tons to meet combined domestic and export textile demand.

With a slowing world economy in 2009, China's cotton textile exports are likely to decline for the first time since 1996. Smaller domestic needs also are expected, and demand for cotton fiber is projected to shrink considerably in the United States' largest export market.

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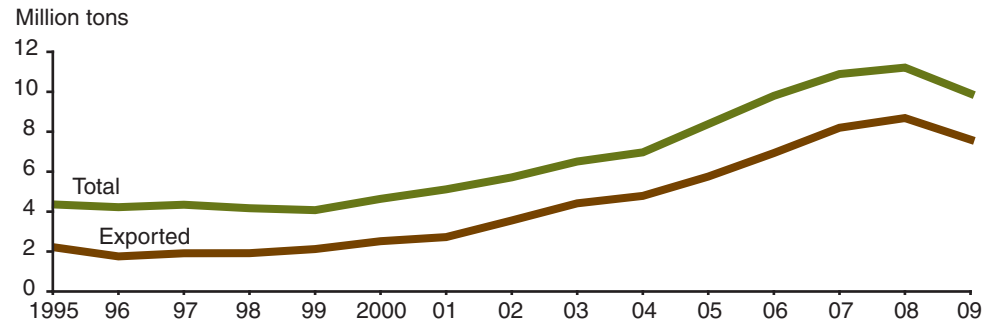
This finding is drawn from . . .

Fiber Use for Textiles and China's Cotton Textile Exports, by Stephen MacDonald and Sarah Whitley, CWS-08i-01, USDA, Economic Research Service, March 2009, available at: www.ers.usda.gov/publications/cws/2009/03mar/cws08i01/

China's cotton use for exports likely to decline in 2009



Sources: USDA, Economic Research Service using data from USDA's *World Agricultural Supply and Demand Estimates* (various issues), China Customs, and Global Insight.

Increased SNAP Benefits Provide Countercyclical Boost

Recessionary conditions led to 33.2 million Americans receiving benefits from the Supplemental Nutrition Assistance Program (SNAP) in March 2009—a record number of participants and 19 percent greater than a year ago. In fiscal year (FY) 2008, SNAP issued $34.6 billion of benefits to an average monthly caseload of 28 million people.

According to ERS estimates, each $1 billion of SNAP benefits generates $1.84 billion of economic activity. Higher unemployment and greater benefit payments per household are expected to increase SNAP benefits by 45 percent in FY 2009 relative to FY 2008. This substantial increase in benefits will increase spending by participants that, in turn, generates more economic activity and jobs.

SNAP, formerly known as the Food Stamp Program, is one of the Federal Government's primary income-based countercyclical assistance programs. Total benefits issued decrease during good economic times and expand during recessionary periods of job losses and stagnant wages.

The Congressional Budget Office estimates that SNAP benefits in FY 2009 will be $15.4 billion higher than in FY 2008. Higher caseloads will account for two-thirds of the increase. This countercyclical boost will be complemented by an increase in maximum benefit levels. As part of the American Recovery and Reinvestment Act of 2009, Congress raised maximum benefit allotments by 13.6 percent beginning in April 2009. For a four-person family, for instance, maximum benefits jumped from $588 to $668 per month. The increase in maximum benefit levels is estimated to raise total SNAP benefits by $4.8 billion in FY 2009.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ERS researchers used an input-output multiplier model to estimate the impacts of the increased purchasing power provided to needy families through higher SNAP benefit allotments and larger numbers of participants. SNAP participants spend their benefits quickly and fully on food. Spending on nonfood goods expands as well, since SNAP benefits free up some income used for food purchases for spending on nonfood items. This spending is "multiplied" through the economy by a succession of effects: the increased spending by recipient households from the additional SNAP benefits stimulates new production activity; higher production boosts demand for workers and/or hours worked, which increases household income; and higher household income triggers additional spending. The estimated $15.4 billion of additional spending by SNAP participants will provide a $28.3 billion infusion into the economy, helping to preserve and create jobs throughout the economy.

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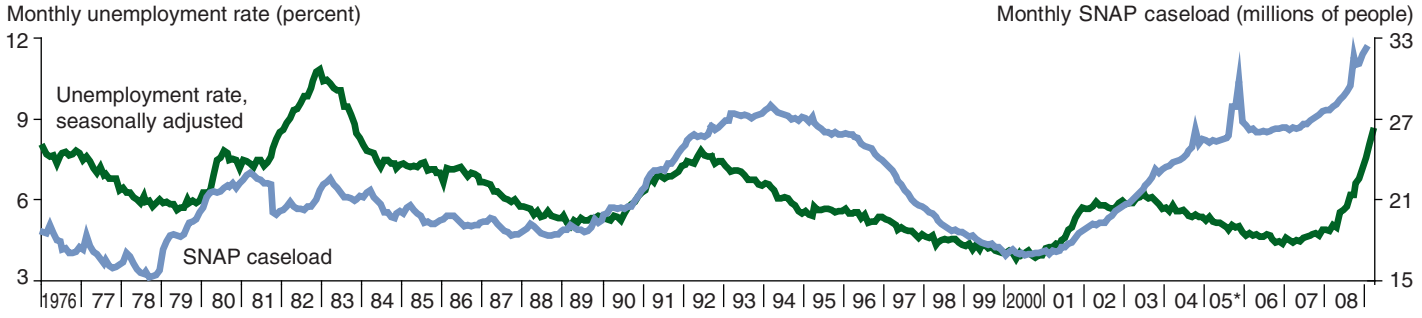
This finding is drawn from . . .

Issues in Food Assistance—Effects of Changes in Food Stamp Expenditures Across the U.S. Economy, by Kenneth Hanson and Elise Golan, FANRR 26-6, USDA, Economic Research Service, August 2002, available at: www.ers.usda.gov/publications/fanrr26/fanrr26-6/

SNAP participation generally decreases during good economic times and expands during recessionary periods



*The 2005 spike in caseloads reflects disaster food assistance for victims of Hurricanes Katrina, Rita, and Wilma.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service and U.S. Bureau of Labor Statisitics.

Price Reductions Have Little Effect on Fruit and Vegetable Consumption by Low-Income Americans

Like other U.S. households, low-income households tend to consume below the recommended amounts of fruit and vegetables. USDA recently implemented several strategies to improve food choices by low-income households, including nutrition education and vouchers for purchasing fresh fruit and vegetables. Some policymakers also are interested in using economic incentives, such as price discounts on fruit and vegetables, to encourage low-income households to eat more nutritious food.

The success of a price-discount program will depend on how much consumers increase purchases in response to lower fruit and vegetable prices, a measure referred to as price elasticity. A 2009 ERS study indicates that reduced prices will not significantly boost fruit and vegetable demand by low-income Americans. Previous research shows that fruit and vegetable demand is not sensitive to price changes; that is, the percentage increase in consumption is lower than the percentage decrease in price. For the same reason, ERS researchers have found that taxing unhealthy snacks would have limited effects on curtailing consumption.

The ERS study examined the effect of three retail price discounts (5, 10, and 20 percent) to predict how low-income consumers might increase their purchases of fruit and vegetables. Using a range of price elasticities and estimates of food consumption by low-income Americans, ERS calculated that with a 10-percent price discount at the retail level, low-income households would increase their consumption of fruit by 2.1 to 5.2 percent (from 0.96 cup to 0.98-1.01 cups per person per day) and vegetables by 2.1 to 4.9 percent (from 1.43 cups to 1.46-1.50 cups). These higher quantities are still below the 2 cups of fruit and 2.5 cups of vegetables per day recommended in the 2005 *Dietary Guidelines for Americans*.

Program costs are an important consideration when contemplating a policy intervention. Subsidizing low-income households' fruit and vegetable purchases by 10 percent would cost the Government $303-$312 million, depending on the price-sensitivity of demand, per year for fruit and $268-$279 million for vegetables. The cost of subsidizing produce purchases would equal about 7 to 8 percent of the $7.6 billion low-income households spend annually on fruit and vegetables.

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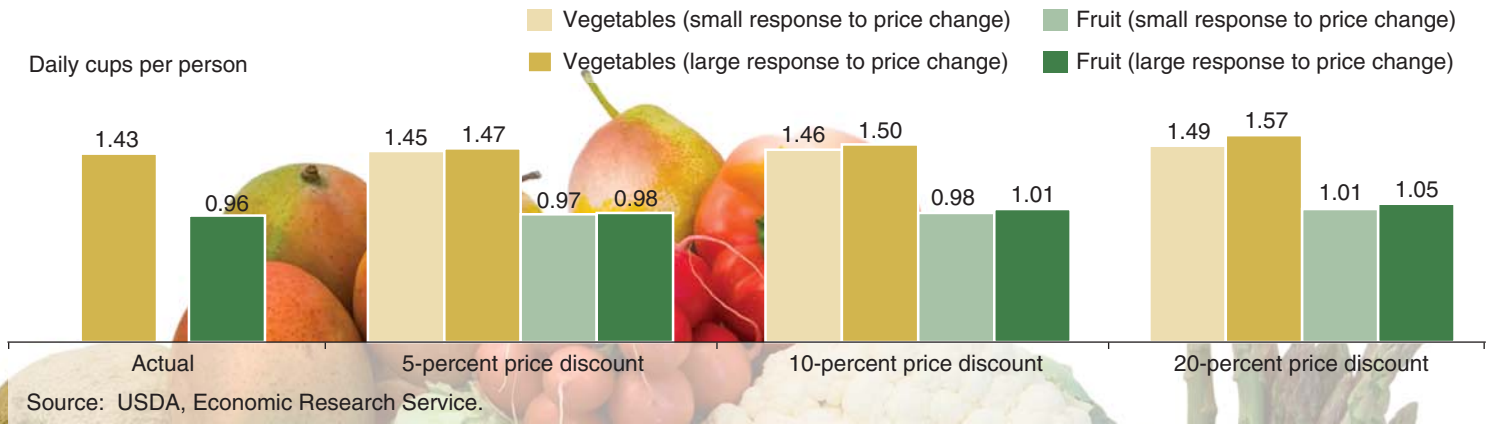
This finding is drawn from . . .

Fruit and Vegetable Consumption by Low-Income Americans: Would a Price Reduction Make a Difference? by Diansheng Dong and Biing-Hwan Lin, ERR-70, USDA, Economic Research Service, January 2009, available at: www.ers.usda.gov/publications/err70/

Lowering produce prices yields only small increase in consumption by low-income households



Source: USDA, Economic Research Service.

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Larger Farms, Environmental Policy Affecting Manure Management

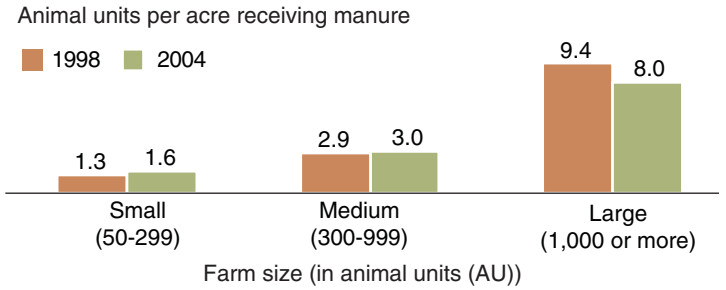
Changes in the structure of livestock farms from smaller to larger increasingly specialized operations have altered manure management practices. Large-scale livestock operations are striving to develop ways to manage the problems associated with concentrating more livestock on confined animal feeding operations, including the problems posed by nutrient (nitrogen and phosphorus) management, and ammonia and methane emissions.

At the same time, changes to the Clean Water Act, State regulations, and local conflicts over odor are requiring livestock producers to more carefully consider their manure management decisions. In the hog industry, changing Federal and State environmental policies encouraged a shift in production from the Southeast to the Midwest during the late 1990s to mid-2000s. The regional shift in hog production was in part a response to State regulations in the Southeast focused on reducing the waste and odor associated with large manure lagoons and an increasing number of Federal and State policies aimed at reducing land applications of manure.

Data from USDA's 1998 and 2004 Agricultural Resource Management Survey of U.S. hog producers indicate how hog farm structure and manure management have been changing. The largest hog operations account for a larger share of total production—up from 34 percent in 1998 to 46 percent in 2004. At the same time, these large operations appear to have altered their manure management practices in anticipation of binding nutrient application constraints proposed under the Clean Water Act.

Between 1998 and 2004, large hog farms removed more manure from their operations, reduced the amount of commercial fertilizer they applied to crops receiving manure, and increased manure application to crops with higher nutrient needs. They also used more feed additives that reduce the phosphorus content of manure, tested more often for manure nutrient value, and increased their use of comprehensive nutrient management plans.

Manure application intensity declined on the largest farms



Note: AU is equivalent to 1,000 pounds of live animal weight.
Source: USDA, Economic Research Service analysis of data from 1998 and 2004 ERS and USDA, National Agricultural Statistics Service, Agricultural Resource Management Survey.

The use of pit/tank manure storage systems increased, and the use of solid manure spreading declined in favor of incorporating liquid manure into the soil, thereby reducing the risk of nutrient runoff, air pollution, and odor. Hog feed efficiency also increased, reducing the amount of manure excreted per animal.

Manure nutrient application intensity generally increases with the size of a livestock operation as animals are concentrated on the farmland. However, the decline in application intensity among the largest hog operations between 1998 and 2004 suggests that environmental policy is contributing to the adoption of conservation-compatible manure management practices.

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This finding is drawn from . . .

Changes in Manure Management in the Hog Sector: 1998-2004, by Nigel Key, William D. McBride, and Marc Ribaudo, EIB-50, USDA, Economic Research Service, March 2009, available at: www.ers.usda.gov/publications/eib50/

Copterviews.com, USDA/ARS

Land Use Can Play Critical Role in Controlling Global Warming

It is generally believed that atmospheric greenhouse gases contribute to global warming. Agriculture emits greenhouse gases (for example, methane from livestock and nitrous oxide from fertilizer) and releases soil carbon through tillage and land use changes. But the agricultural and forestry sectors can also remove carbon dioxide (CO_2) from the atmosphere and store it in soils and plant matter.

The quantity of carbon dioxide emitted to the atmosphere is critical because a portion of CO_2 emissions remains in the atmosphere for more than 1,000 years. Efforts to limit atmospheric CO_2 concentrations have traditionally focused on industries that refine or burn fossil fuels. But recent economic research suggests that limiting CO_2 concentrations to low levels will require strategies that manage carbon emissions/sequestration from land use change as well as from the combustion of fossil fuels.

A recent study by researchers at the Pacific Northwest National Laboratory and ERS analyzed three hypothetical approaches for dealing with CO_2 concentrations through 2095. Option 1 simulates land use if there were no policies limiting CO_2 concentrations. Land use changes over time as population, agricultural productivity, and income change, but not in response to CO_2 limitations. The other two options involve imposing taxes on CO_2 emissions to limit atmospheric concentrations.

Under option 2, only fossil fuel emissions of CO_2 would be taxed, with emissions from land use change ignored. The third option would tax all sources of CO_2, including emissions resulting from changes in land use and land management. The results compare land uses (such as using land to grow crops, livestock, and trees) and the cost of limiting CO_2 concentrations across the three options and for varying CO_2 concentration targets.

Overall, land use change (and costs) are reduced when all sources and sinks of CO_2 are considered, including agricultural soils and forests (option 3). Ignoring the value of carbon in forests and farmland (option 2) leads to pronounced changes in land use as bioenergy is substituted for fossil fuels, and as cultivation expands to less productive soils.

Under all three policy alternatives, future improvements in crop productivity affect land use change and the cost of limiting CO_2 concentrations. Technological advances in growing crops can reduce CO_2 emissions as less cropland is needed to produce the same amount of food and bioenergy. Improved crop productivity has the potential to reduce CO_2 emissions on a scale similar to capturing and storing CO_2 emissions from electricity-generating plants.

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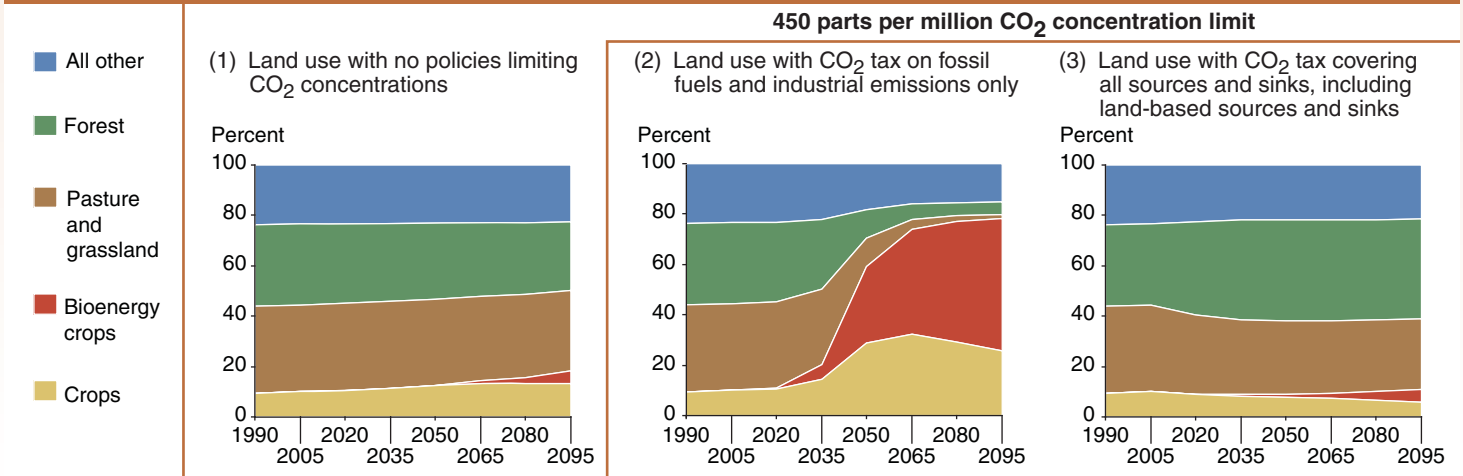
This finding is drawn from . . .

"Implications of Limiting CO_2 Concentrations for Land Use and Energy," by Marshall Wise, Katherine Calvin, Allison Thomson, Leon Clarke, Benjamin Bond-Lamberty, Ronald Sands, Steven J. Smith, Anthony Janetos, and James Edmonds, in *Science*, Vol. 324, May 2009, pp. 1183-1186.

Global land use is sensitive to carbon control policies



Source: USDA, Economic Research Service using MiniCAM model, Pacific Northwest National Laboratory's Joint Global Change Research Institute.

Taking the Pulse of Rural Health Care

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- Rural households have higher rates of mortality, disability, and chronic disease than urban households, even after taking into account the different age distributions of the two populations.
- Rural households have less access than urban households to affordable, nearby, high-quality health care.
- Adoption of new health information technologies, promoted by a $19 billion allocation in the 2009 economic stimulus package, holds promise for improving coordination among geographically dispersed health care providers.

An interview with one of the authors is featured online at: www.ers.usda.gov/amberwaves/

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Reforming the U.S. health care system is high on the national policy agenda. Debate over U.S. health policy has focused on expanding health insurance coverage, improving the quality of health care, and reducing costs. These three goals are interrelated because lack of insurance coverage and poor coordination of services across care providers tend to drive up costs.

Within this broader context, rural households confront special health care challenges due to their lower socioeconomic status, higher average age, and greater geographic dispersal than the U.S. population as a whole. Rural households, on average, have less education and fewer financial resources, both of which are associated with lower health status. Approximately 15 percent of rural residents (compared with 12 percent of urban residents) are age 65 or older, which leads to a greater incidence of chronic disease and disability. Lower population densities in rural areas mean that residents must typically travel longer distances for health services, especially for specialty care.

The Gap Between Rural and Urban Mortality Rates Is Increasing

It has been widely observed that rural populations have higher rates of disability and chronic diseases than their urban counterparts. Research published in the *American Journal of Public Health* found that a gap opened between metro and nonmetro mortality rates about 1990. Mortality rates are a key indicator of health status when they are adjusted for age (since mortality increases with age beyond early childhood). Age-adjusted mortality rates of both metro and nonmetro counties declined about 1.5 percent per year from 1968 through 1989. However, the nonmetro decline in age-adjusted mortality slowed markedly compared with the metro trend beginning in 1990. As a result, the average annual difference in mortality rates between nonmetro and metro areas increased from approximately 6 additional deaths per 100,000 population in nonmetro areas in 1989 to 82 more deaths per 100,000 population in 2005.

Nonmetro counties can be further segmented into micropolitan (micro) counties—larger counties that include urban clusters with between 10,000 and 50,000 people—and the more remote, less densely populated noncore counties—those not part of an urban cluster of at least 10,000 people. Nationally, the mortality rate increases as the level of urbanization declines, with metro counties having the lowest mortality rate and noncore counties having the highest rate. But the level of divergence between metro and nonmetro counties varies within each region. The South had the greatest metro-nonmetro difference in mortality rates in 2005, while there was essentially no difference across metropolitan, micropolitan, and noncore counties in the Midwest. Spatial statistical analysis of high- and low-mortality rates clusters indicates that higher county mortality rates are associated with high persistent-poverty rates, high percent of Black or Appalachian population, and low rates of high school graduation.

Rural Households Have Less Access to Health Care

Insurance coverage and financial affordability, as well as geographical availability, are important components of access to health care. Lack of health insurance creates a range of consequences, including increased illness and death, and greater financial burdens. In addition to protecting households against the financial risks imposed by expensive and unanticipated medical events, health insurance coverage tends to increase timely access to health care, including preventive care, diagnostic tests, and prescriptions, which can help avoid escalation of health problems. As a result, broader health insurance coverage may reduce U.S. health care costs for chronic care, for example, by preventing avoidable hospitalizations for chronic conditions, such as congestive heart failure or uncontrolled diabetes.

About 17 percent of all nonelderly individuals nationwide lack health insurance. Coverage rates are comparable for metro and nonmetro residents. (Because Medicare coverage starts at age 65, only a very small share of the elderly is uninsured.) Nonmetro coverage was lower as recently as the 1990s, and individuals in the more remote (noncore) counties still have lower coverage than urban residents. However, regional location appears to have more impact than rurality, with the

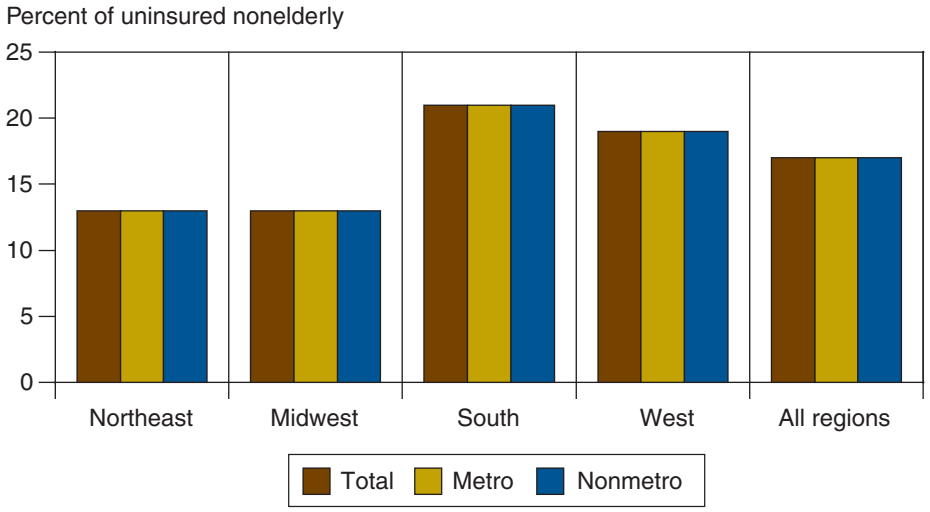
Mortality rates increase as urbanization declines, 2005

U.S. region	Total	Metro	Nonmetro		
			Total	Micro	Noncore
	Number of deaths per 100,000 population				
Northeast	762.7	757.2	809.0	804.5	820.9
Midwest	813.0	813.5	814.1	816.4	812.9
South	845.6	818.7	938.8	922.5	960.6
West	737.4	730.0	796.7	799.5	792.3
Total	798.8	784.2	866.1	857.1	880.0

Among nonmetro counties, micropolitan counties are centered on urban clusters with populations between 10,000 and 50,000, and noncore counties have no nearby urban clusters with a population of 10,000 or more.

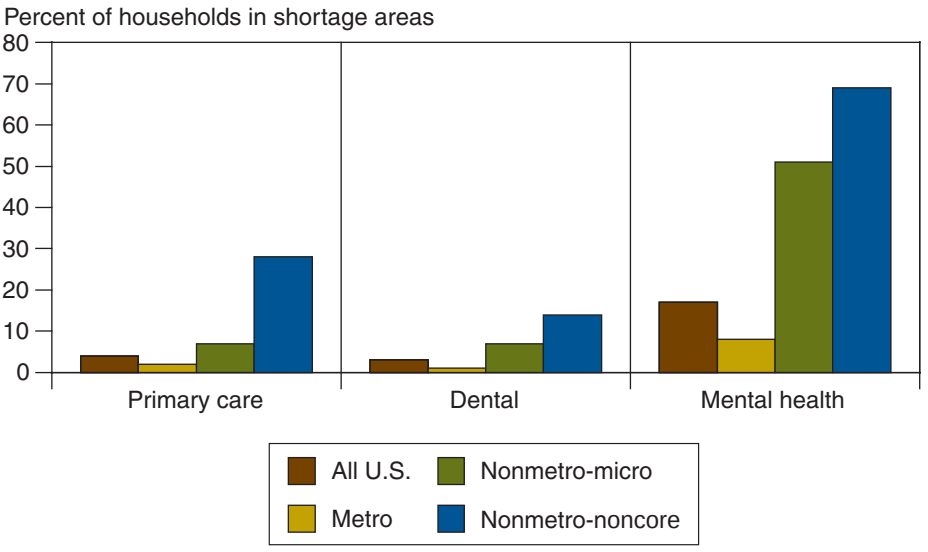
Source: USDA, Economic Research Service using National Center for Health Statistics Compressed Mortality File, 2005.

Shares of U.S. nonelderly without health insurance vary by region but not by metro status, 2007



Source: USDA, Economic Research Service calculations using data from the Current Population Survey, 2008.

Likelihood a household is located in a county with a shortage of health care professionals is greater in more remote counties, 2004



Among nonmetro counties, micropolitan counties are centered on urban clusters with populations between 10,000 and 50,000, and noncore counties have no nearby urban clusters with a population of 10,000 or more.

Source: USDA, Economic Research Service calculations based on the 2004 data from the Area Resource File, National Center for Health Statistics.

Northeast and Midwest having consistently higher rates of health insurance coverage than the South and the West.

Though metro and nonmetro insurance coverage rates may be comparable, nonmetro residents still spend a larger share of household income on out-of-pocket health expenditures (for health care and health insurance premiums) than metro residents. Overall, for those under age 65, household health expenses exceeded 10 percent of after-tax income in 2005 for 24 percent of nonmetro households and 18 percent of metro households. While both metro and nonmetro households of the nonelderly spend on average about $3,300 per year on out-of-pocket health expenses, nonmetro households have lower average incomes.

Most households in both metro and nonmetro areas are covered by employment-based insurance. The rural economy has a disproportionate share of small businesses, which tend to pay lower wages and are less likely to provide health insurance coverage. Due to their different economic circumstances, nonelderly nonmetro households have lower rates of employment-based coverage and higher rates of public health insurance coverage than nonelderly households in metro areas.

Since most proposed or enacted employer-based reforms as of mid-2009 have excluded small businesses, health reform options expanding public insurance may have more impact in rural areas than reform based on expanding employment-based insurance. The nonmetro uninsured are more likely than the metro uninsured to have low income and to have a household member covered by Medicare, Medicaid, or the Children's Health Insurance Program.

For rural populations, geographical access is also a major issue. Due to low population densities and small patient volumes, the rural health care model—particularly in smaller and more remote counties—focuses on providing primary care and emergency care locally. For specialized care, patients are referred to (often distant) regional health care centers. The referral system imposes higher travel costs on rural patients and may result in fragmented care if followup treatment is provided more locally. Alternatively, rural patients may rely more extensively on generalists rather than on specialists for their treatments, or they may forego treatment altogether.

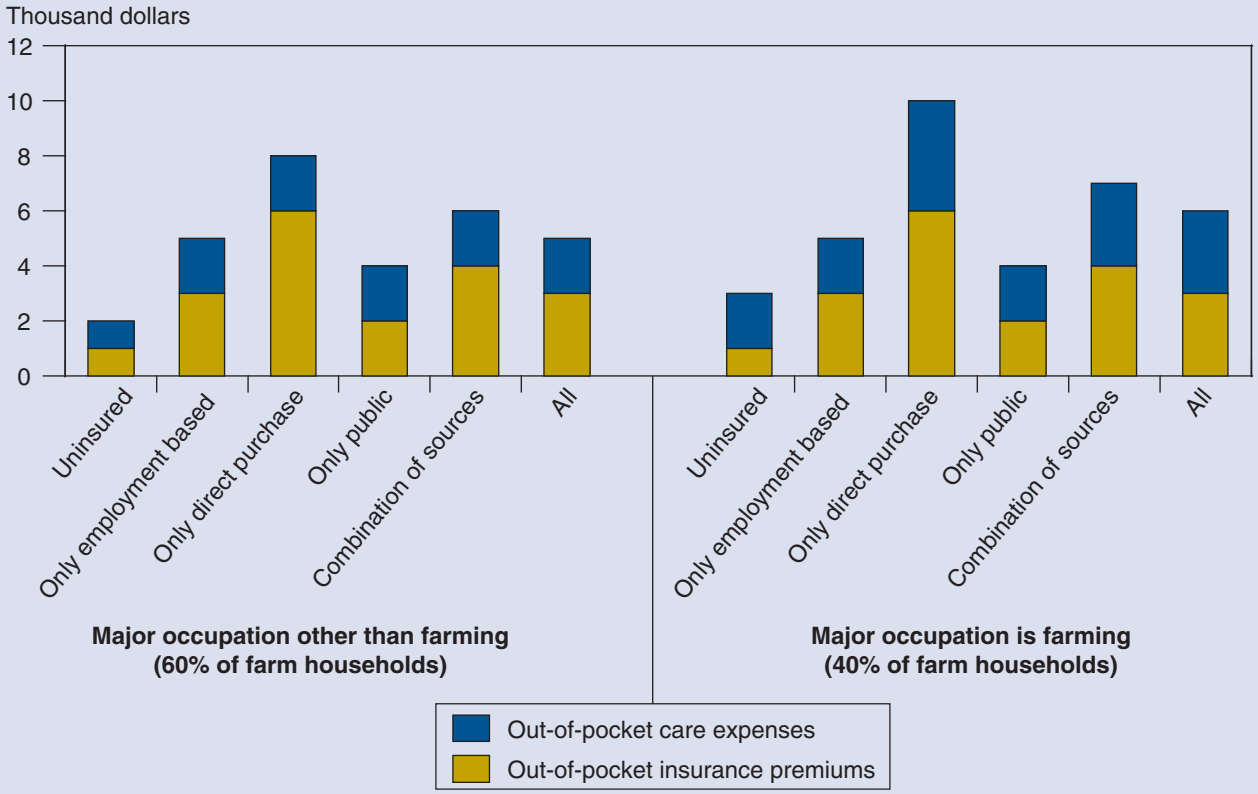
Most Farm Household Members Are Insured But Face Higher Costs Than Members of Other Households

Farmers and their households face unique circumstances regarding health care. About 60 percent of farm-operator households live in nonmetro areas, and, compared with other nonmetro residents, they are more likely to reside in remote areas. Farm households, therefore, are less likely to have access to nearby medical care. In addition, farmers are significantly older than the general U.S. and nonmetro populations, and the elderly generally use more health services.

On the other hand, farm households tend to be better off financially than nonfarmers. In 2007, the average income of farm-operator households was more than one-third higher than that of nonmetro households, and the median wealth of farm households was more than five times that of the nonmetro median. As a result, only 14 percent of all farm household members lacked health insurance during any part of 2007—15 percent of nonelderly and 7 percent of elderly household members.

However, since most farm households are self-employed and 30 percent are not employed off the farm, they have less access to employment-based group insurance and are more likely to rely on costly direct-purchase insurance. More than 10 percent of farm households had only direct-purchase insurance in 2007. These farm households had the highest annual health expenses of all farm households, averaging nearly $10,000 per household and accounting for a fourth of their total household cash expenses in 2007.

Farm households' reliance on direct purchase insurance contributes to higher health expenses, especially if farming is operators' major occupation, 2007



Note: Respondent reported all persons in household were uninsured, but household incurred insurance expenses, perhaps for individuals outside of the household or for Medicare hospital insurance taxes.

Source: USDA, Economic Research Service and USDA, National Agricultural Statistics Service, Agricultural Resource Management Survey, 2007, version 1.

Jupiterimages

Rural counties are more likely to be designated Health Professional Shortage Areas for basic (primary, dental, and mental health) providers. The share of households in counties designated as shortage areas increases sharply as the level of urbanization declines for all three types of care. The shortages are greatest for mental health professionals across the board. As a result of the limited access to mental health professionals, rural primary care physicians often treat mental as well as physical health problems.

Rx—Health Information Technology?

During the past few decades, government policies implemented to redress the uneven geographic distribution of health care resources have had an impact. But access remains an issue, particularly in remote, sparsely populated areas. Adoption of health information and communications technologies—widely promoted to increase patient safety and health, while reducing costs—holds particular promise for remote areas by facilitating coordination of care across geographically dispersed providers.

The key elements of these technologies include individual electronic health records, a network to exchange health information, and the information and communications technology and standards to support both. Telemedicine applications can reduce costs and improve health care by allowing remote health care facilities to consult with primary care physicians and specialists at other hospitals or regional medical centers through the use of high-resolution cameras, digital-imaging equipment, and high-speed connections.

Adoption rates are generally low, however, particularly in nonmetro areas. Though high-speed connection to the Internet is becoming less of a stumbling block for telemedicine (see "Broadband Internet Service Helping Create a Rural Digital Economy" on page 22), nonmetro hospitals report lower adoption rates for electronic medical records than metro hospitals. Adoption rates are comparable for metro and nonmetro private physician practices. Health care organizations may be reluctant to adopt new information systems because of the current lack of technology standards and patient privacy liability concerns.

Other impediments are driven by the intensive investments required to adopt these new technologies, both in financial capital and skilled labor. Under current reimbursement systems, health care organizations that invest in the technology do not receive the related savings. (Patients benefit from better health, and insurers benefit from lower costs; providers, however, face higher costs for implementation and lower revenues after implementation.) Reimbursement for telemedicine services is expanding but is not universal. Medicare pays only for some procedures. State Medicaid programs also have differing policies on telemedicine reimbursement, as do private insurers.

The limited access to capital and infrastructure and the lack of workforce expertise may pose particular challenges to technology adoption in rural areas. Small organizations need financial resources, as well as technical assistance, to successfully implement health information technology and to adjust workflow to achieve the potential efficiencies. The American Recovery and Reinvestment Act of 2009 allocated $19 billion to reduce some of these impediments, including $17 billion in incentive payments through Medicare and Medicaid reimbursements to reward health providers that can show meaningful use of new information technologies. The remaining funds help finance various programs to support adoption, including community-based regional extension services.

This article is drawn from . . .

Health Status and Health Care Access of Farm and Rural Populations, by Carol Adaire Jones, Timothy S. Parker, Mary Ahearn, Ashok K. Mishra, and Jayachandran N. Variyam, EIB-57 USDA, Economic Research Service, August 2009, available at: www.ers.usda.gov/publications/eib57/

"Preliminary Evidence for an Emerging Nonmetropolitan Mortality Penalty in the United States," by Arthur G. Cosby, Tonya T. Neaves, Ronald E. Cossman, Jeralynn S. Cossman, Wesley L. James, Neal Feierabend, David M. Mirvis, Carol A. Jones, and Tracey Farrigan, in *American Journal of Public Health*, August, 2008, 98(8):1470-1472.

Baby Boom Migration Tilts Toward Rural America

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Peter Nelson
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- The size and direction of migration patterns vary considerably by age, and baby boomers are increasingly migrating to rural destinations.
- If baby boomers follow migration patterns similar to those of their predecessors, the rural population age 55-75 will increase by 30 percent between 2010 and 2020.
- Local economic development strategies aimed at attracting more jobs will likely have little effect on the migration decisions of baby boomers searching for a better quality of life.

As Americans age, their likelihood of migrating, their reasons for moving, and their destination choices shift dramatically. Baby boomers—born between 1946 and 1964—are entering a stage when moves to rural locales increase, especially to areas with scenic amenities and lower housing costs.

"Boomers" have already demonstrated an affinity for moving to rural and small-town destinations, compared with older or younger cohorts. They led a short-lived rural "rebound" in the early 1990s despite being at an age when career-oriented motivations strongly influence migration decisions.

Today's 83 million boomers, ranging from age 45 to 63, represent a fourth of the total U.S. population. There has never been such a large share of the workforce approaching retirement. By comparison, 42 million were age 45 to 63 in 1990. Boomers are now poised to significantly increase rural and small-town elderly populations by 2020, with major social and economic implications for their chosen destinations.

John Cromartie, USDA/ERS

Migration Patterns Change With Age

Each individual or family makes unique migration decisions, but commonalities exist at different life stages that affect the number of people moving and their destination choices. Migration rates for children (who mostly accompany parental moves) decline to very low levels during high school, and then rise precipitously. Most migration occurs when people are in their twenties, as they finish college, make initial career decisions, serve in the military, form families, or simply act out of a sense of restlessness. Urban destinations dominate among young singles seeking jobs, social opportunities, and creative cultural environments.

Migration rates decrease steadily and shift geographically through a person's working-age years. Individuals and families settle down as career decisions become more firm. Married couples with children place a higher premium on residential space, better schools, feelings of personal safety, and other qualities associated with suburban settings.

As they age toward retirement, Americans are much less prone to move than in their youth, but those that do are much more likely to move to the countryside. Many "empty nest" couples begin seeking leisure and recreational opportunities, lower housing costs, and a slower pace of life. Quality-of-life considerations begin to replace child-rearing and employment-related factors in decisions about when and where to move. For older Americans, rural migration is highest early in the retirement process and declines sharply as health care needs increase.

Many people develop strong ties to particular places over an extended period, such as while vacationing or visiting family and friends. Thus, retirement-related migration may progress slowly over several years rather than occur as a discrete, one-time event. Couples often purchase a second home or simply visit the same location annually or on weekends with their children, then visit more often and for longer stretches as children leave home. Beginning in the 1990s, the Internet has greatly facilitated work from more remote locations


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and contributed to an increase in permanent moves to second-home destinations. Areas that are popular as recreation and tourist destinations are increasingly favored as permanent residences.

Baby Boomers Have Rural Ties Despite Suburban Upbringing

Baby boomers have followed well-established, age-related migration patterns, but at times have shown more of a preference for rural destinations than older and younger cohorts. Their early childhoods coincided with a massive wave of rural outmigration and suburbanization. Many of their parents had come of age in the countryside during the Depression and maintained rural connections while raising urban and suburban families. These hometown ties have had an enormous influence on the baby boomers' subsequent migration decisions.

As they entered young adulthood, baby boomers faced increased labor and housing market competition, due both to economic trends and the unprecedented size of their cohort. They responded demographically by postponing marriage and delaying childbearing. They responded geographically by migrating from the Northeast and Midwest to the South and West in record numbers and increasing their migration into nonmetropolitan (nonmetro) counties. Overall, they still favored metro destinations as they aged through their twenties, but not as strongly as older or younger cohorts did.

The economic recessions of the 1980s hit rural areas harder than urban areas and contributed to a resurgence in rural outmigration. Urban migration surged for baby boomers in their late twenties and early thirties, especially to large metro centers that were regaining economic momentum lost in the 1970s. In the early 1990s, baby boomers again increased migration to rural areas, stimulating recreation-based economies and boosting population growth in the intermountain West, the southern Appalachians, the Upper Great Lakes, and other scenic locations.

In 1995, baby boomers were age 31-49 and still strongly career oriented. Much of their nonmetro migration was fueling rapid suburban expansion into nonmetro counties adjacent to metro centers. Many of those moving to more remote settings were able to use expanding airline services and the Internet to stay connected to urban-based employers and customers.

More Baby Boomers Heading to Rural Areas

Younger members of the baby boomer generation are still in the middle of child rearing, while those in their fifties are more likely to be empty nesters. Employment considerations still exert a strong influence on their collective migration decisions but will decrease sharply in the next decade. Baby boomers are increasingly drawn to areas with the right combination of scenic amenities (varied topography, relatively large lake or coastal areas, warm and sunny winters, and temperate summers), recreational or cultural opportunities, and reasonable housing costs. The presence of seasonal housing has been a particularly strong indicator of where retirement-related migration is likely to occur.

Net migration increased the number of baby boomers living in nonmetro areas by 1.1 million during 1990-2000. If baby boomers follow the same age-specific geographic patterns of migration as their predecessors (see box, "Projecting Future Net Migration"), their presence in nonmetro locations will increase by 1.2 million in this decade and by 1.1 million during the 2010s, despite declines in their overall propensity to migrate. If they continue the marked preference for nonmetro destinations exhibited during their earlier life stages, nonmetro net migration of baby boomers could reach as high as 1.5 million in this decade and 1.6 million in the next.

Over the next 10 years, baby boomer migration will likely contribute to a significant deconcentration of the population. Assuming a midrange projection between the two outcomes described above, baby boomer net migration to core (predominantly urban) metro counties will switch from a 979,000 gain in the 1990s to a 643,000 loss in the 2010s. Fringe (predominantly rural) metro counties had the highest rates of baby boomer migration in the 1990s (a 17-percent increase, compared with a 9-percent gain for nonmetro counties), but are projected to drop to 8 percent during the 2010s. Fringe counties, along with adjacent nonmetro counties, received the bulk of past suburban

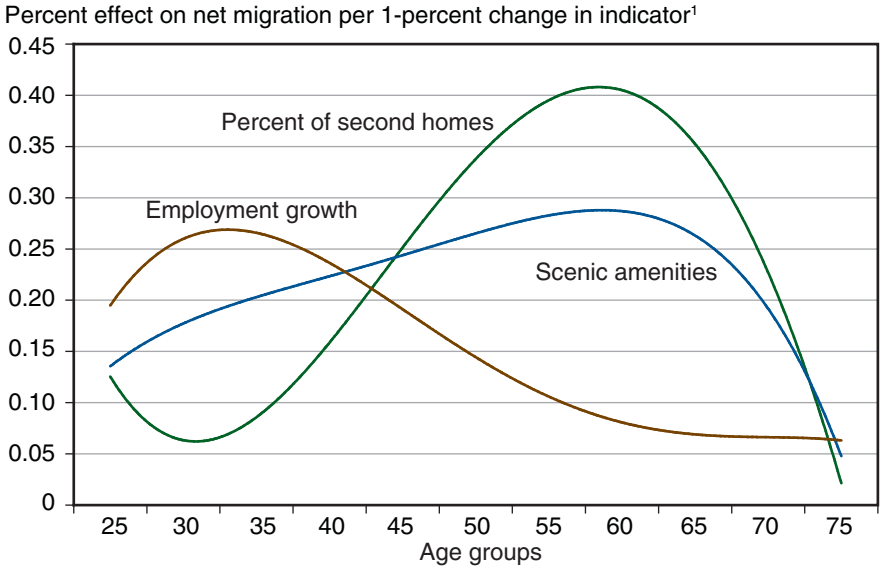
expansion, but movement to these areas is becoming a smaller component of migration among baby boomers.

When measured in terms of relative change, more remote (nonadjacent) nonmetro counties will see the most dramatic changes from baby boomer migration. While nonadjacent counties gained 277,000 residents from net migration among baby boomers during the 1990s, midrange projections indicate that they will increase by nearly 362,000 and 383,000 during this decade and the next.

Whether adjacent to big cities or less accessible, counties with desirable physical attributes—pleasant climates, mountains, beaches, and lakes—are likely to increase their already high share of baby boomer migration. The ERS Natural Amenity Index attempts to measure the attractiveness of an area's natural amenities. Among the 500 nonmetro counties with the lowest scores, net migration is projected to decrease from a 180,000 gain in the 1990s to near zero in the 2010s. At the same time, net migration to the 500 counties with the highest scores will grow from 520,000 to 720,000. However, differences between projected and actual population outcomes are potentially greater for rapidly growing counties, such as those with scenic amenities and booming recreation-based economies. In the past, net migration decreased as such areas "filled up," often in response to higher housing prices. The current mortgage foreclosure crisis, particularly strong in recreation towns that experienced a recent housing boom, creates uncertainty about future demographic trends in these areas.

Regardless of future economic and housing market conditions, baby boomers will increase the size of rural America's retirement-age population. Assuming a midrange projection, the rural population between ages 55 and 75 will increase from 8.6 to 14.2

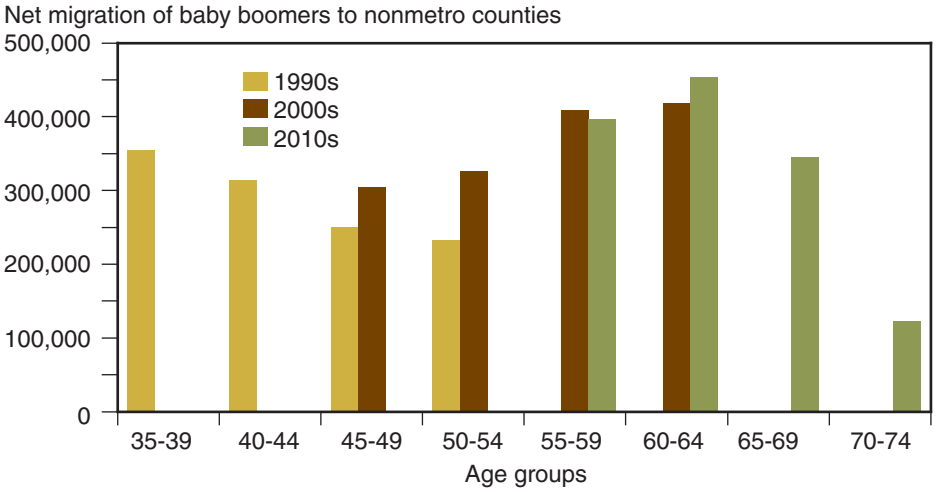
Aging baby boomers drawn more by scenic amenities and second home locations than by employment growth



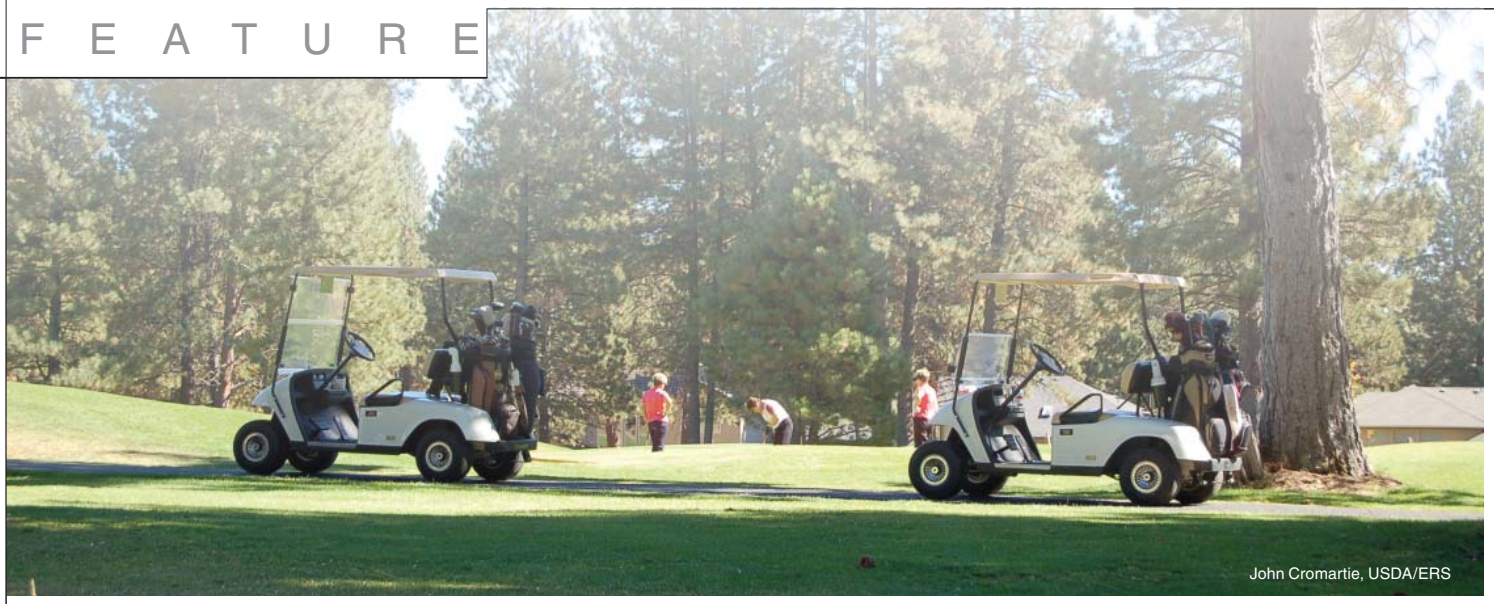
[1]Regression analysis was used to measure the influence of several socioeconomic indicators on county-level net migration rates for 1990-2000, and how those effects shift with age. Values on the vertical axis show increases in net migration rates associated with a 1-percent increase in the socioeconomic indicators.

Source: USDA, Economic Research Service using data from the U.S. Census Bureau, the Bureau of Economic Analysis, and the National Center for Health Statistics.

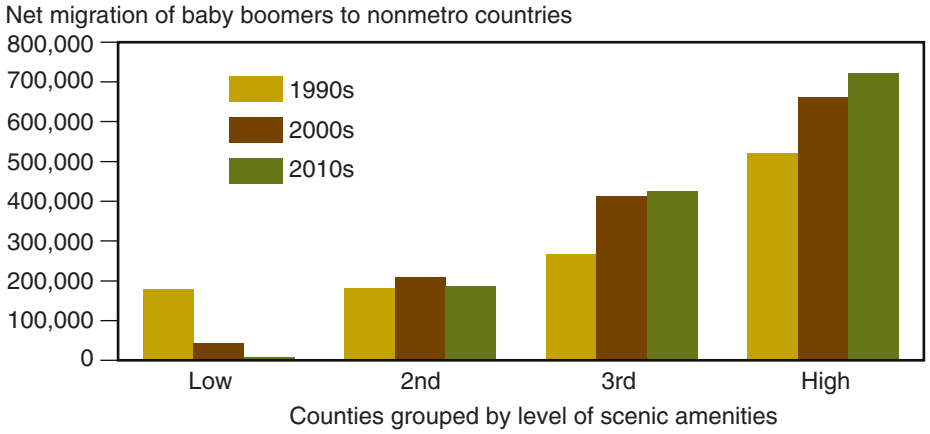
Older baby boomers currently lead nonmetro migration, but younger members will likely dominate after 2010



Source: USDA, Economic Research Service. Net migration estimates for 1990-2000 were tabulated using population data from the U.S. Census Bureau and vital statistics from the National Center for Health Statistics. Projections for 2000-10 and 2010-20 were based on statistical models of age-specific net migration and forward survival methods.


John Cromartie, USDA/ERS

Baby boom migration is directed toward counties with high scenic amenities



Source: USDA, Economic Research Service. Net migration estimates for 1990-2000 were tabulated using population data from the U.S. Census Bureau and vital statistics from the National Center for Health Statistics. Projections for 2000-10 and 2010-20 were based on statistical models of age-specific net migration and forward survival methods. Scenic amenities were measured using the ERS Natural Amenities Index.

Rate of growth has tripled for nonmetro retirement-age populations since the 1990s

U.S. region	Nonmetro population ages 55-75				Growth rate of retirement-aged population		
	1990	2000	2010	2020	1990s	2000s	2010s
	Millions				*Percent*		
Northeast	0.886	0.925	1.276	1.686	4.4	37.9	32.1
Midwest	2.633	2.685	3.235	3.944	2.0	20.5	21.9
South	3.480	3.868	4.972	6.272	11.2	28.5	26.1
West	0.957	1.152	1.708	2.251	20.3	48.2	31.8
Total	7.957	8.631	11.191	14.152	8.5	29.7	26.5

Source: USDA, Economic Research Service, using data from the U.S. Census Bureau and the National Center for Health Statistics. Projections for 2000-10 and 2010-20 were based on statistical models of age-specific net migration and forward survival methods.

million between 2000 and 2020. The overall rate of growth among this age group has likely tripled to 31 percent during the current decade, compared with that in the 1990s, and will remain close to 30 percent in the next decade.

Without baby boomer net migration, the rate of growth for the rural population age 55 to 75 would be 18 percent in this decade and 15 percent during 2010-20. These trends affect not just traditional retirement regions in the South and West, but regions throughout the country. The biggest jump in nonmetro net migration rates is projected in the nonmetro Northeast, which is projected to be growing as fast as the nonmetro West during the 2010s.

Baby Boomers Will Continue To Reshape Rural Communities

Baby boomers are aging toward retirement and moving into high-amenity counties with concentrations of second homes. Migration to nonmetro counties adjacent to metro areas will remain high, but baby boomer migration is likely to become much more dispersed than in the 1990s and not as strongly tied to suburban expansion. New destinations will likely be more isolated, with more empty nest households, and lower housing costs.

Projecting Future Net Migration—Answering "What If" Questions

County-level, post-2000 data on age-specific, net migration—the difference between the number of people moving into and out of a county—will not be available for several years. However, it is possible to project patterns of baby boomer migration into rural and small-town areas, for this decade and the next, using data from the 1990s. Age affects migration in relatively predictable ways that can be statistically measured. The overall size of age cohorts is also easy to project using forward survival methods because age-specific death rates are relatively fixed. Immigration's relatively small impact on older age groups can be measured using the Census Bureau's "best guess" estimates of future, age-specific immigration flows. Thus, researchers can project the size of future baby boom cohorts in different types of metro and nonmetro counties.

Unlike death rates, migration flows between counties are subject to short-term fluctuations. They are affected by employment trends, housing prices, and other factors subject to much uncertainty, especially given current economic conditions and prospects. Also, baby boomers may pioneer new migration paths that differ from those of preceding generations as they age into retirement. Projections are constructed by asking: "What will future migration patterns look like if the most recently measured age-specific migration rates (from the 1990s) stay the same?" They provide useful analytical and planning information but must be seen to fall into a probable range of outcomes.

Migration impacts are unevenly distributed across the landscape. Rural jurisdictions face different demands for local goods and services and different opportunities for economic expansion, depending on population trends. Anticipating the types of areas that will receive large numbers of baby boomers in the near future could help communities plan for rising demand for housing, transportation, health care, and retail infrastructure.

The economic and social impacts of baby boom migration connect to broader age-related issues subject to vigorous debate at Federal, State, and local levels, including Social Security adjustments, pension guarantees, and health care provision. In this case, baby boom migration will bring both additional benefits and costs for rural destinations. New residents are likely to have a positive impact on income and employment. They may also increase infrastructure costs for local governments and require health care and other services not currently available.

Development professionals often emphasize traditional strategies designed to attract manufacturing jobs to their communities. Infrastructure investments geared toward fostering this type of export-based employment growth likely will have minimal influence on the rising number of footloose baby boom migrants who are looking for an improved quality of life. Other development specialists realize that net migration increasingly drives regional economies. Older migrants often bring significant new money into a county's economy, generate new demand for a variety of services, and boost job levels. Increased awareness of key factors attracting baby boomers to rural and small-town America will contribute to more effective, migration-based development strategies.

This article is drawn from . . .

Baby Boom Migration and Its Impact on Rural America, by John Cromartie and Peter Nelson, ERR-79, USDA, Economic Research Service, August 2009, available at: www.ers.usda.gov/publications/err79/

"The Baby Boom and Nonmetropolitan Population Change, 1970-1990," by Peter Nelson, James Nicholson, and E. Hope Stege, in *Growth and Change*, 24 (4) (2004): 526-544.

Challenges From an Aging Population chapter in the ERS Briefing Room on Rural Population and Migration, available at: www.ers.usda.gov/briefing/population/challenges.htm

You may also be interested in . . .

Rural America, Vol. 17, Issue 3 (special issue on the aging of the rural population), USDA, Economic Research Service, December 2002, available at: www.ers.usda.gov/publications/ruralamerica/ra173/

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Broadband Internet Service Helping Create a Rural Digital Economy

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- Broadband—high speed Internet—is less commonly used in rural than urban settings due to higher provision costs and more limited availability in rural areas.
- Rural counties with broadband Internet service in 2000 had greater subsequent employment and income growth than similar rural counties without service.
- Rural citizens, businesses, and communities credit broadband Internet use with providing social and economic benefits.

Photos: Jupiterimages, Corbis, and Eyewire

During the past two decades, the Internet has grown rapidly, joining telephones, televisions, and cars as a common necessity and becoming an integral part of the economy. Rural America has shared in the growth of the Internet economy as more business, government, and personal activities have gone online. In 2007, 71 percent of the rural population used the Internet, and 55 percent of farms reported using the Internet for business purposes.

As the Internet economy has evolved, more online applications require higher data transmission rates. The low transmission capability and speed of dial-up Internet service severely limit access to content-dense applications and websites. As a result, broadband Internet access has become a necessity for those wishing to benefit from the Internet's full economic potential.

An ERS study found that investment in rural broadband Internet access seems to lead to a more competitive rural economy and rural economic growth, helping create a rural digital economy. Comparing the economic growth of counties with broadband access in 2000 with that of otherwise similar counties without broadband suggests that broadband availability helped spur the formation of new businesses and increased the growth of existing firms.

Jupiterimages

Rural Broadband Use Lags Urban Areas

By 2007, most households (82 percent) with in-home Internet access had a broadband connection. A marked difference exists, however, between urban and rural broadband use—only 70 percent of rural households with in-home Internet access had a broadband connection in 2007, compared with 84 percent of urban households. The rural-urban difference in in-home broadband adoption among households with similar income levels reflects the more limited availability of broadband in rural settings.

Areas with low population size, locations that have experienced persistent population loss and an aging population, or places where population is widely dispersed over demanding terrain generally have difficulty attracting broadband service providers. These characteristics can make the fixed cost of providing broadband access too high, or limit potential demand, thus depressing the profitability of providing service. Clusters of lower service exist in sparsely populated areas, such as the Dakotas, eastern Montana, northern Minnesota, and eastern Oregon. Other low-service areas, such as the Missouri-Iowa border and Appalachia, have aging and declining numbers of residents.

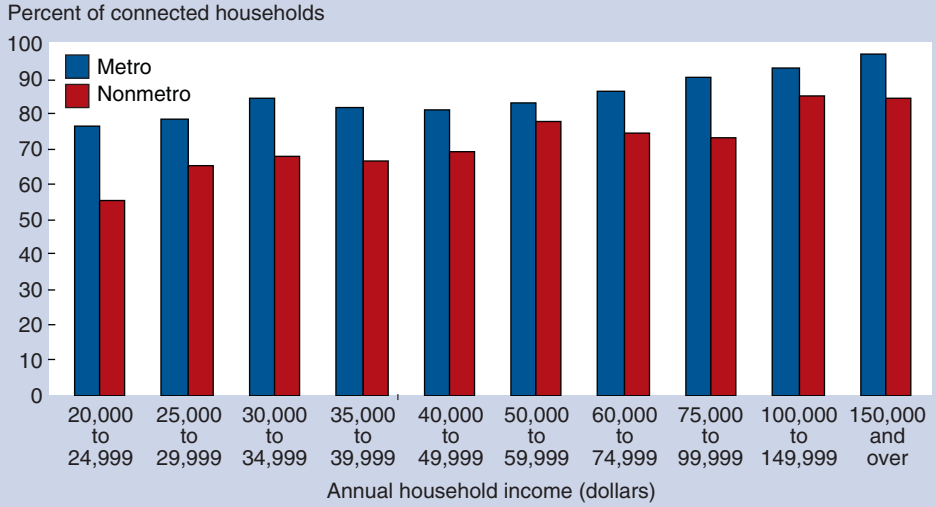
Broadband Availability May Impact Rural Economic Growth

Measuring the economic effects of limited broadband availability on rural areas is challenging. Broadband has not been available for long, and its use has grown rapidly, making it difficult to separate broadband's effect from other causes of economic growth. To examine the effect that broadband availability has had on rural areas, ERS researchers compared a group of rural counties that had broadband by 2000 with a group of otherwise similar rural counties that did not. Rural counties with and without broadband service were paired based on having similar population size and density, industrial composition, employment growth, and income characteristics. In particular, the two county groups exhibited nearly identical average nonfarm employment and private nonfarm earnings growth in the 10 years prior to 2000.

A comparison of post-2000 economic trends in these two sets of rural counties found results that are consistent with the argument that broadband Internet availability had positive effects on the economic vitality of rural areas. The average number of both nonfarm proprietors and nonfarm jobs grew faster in counties that had broadband service available by 2000. The advantage grew early on but decreased as other communities started to gain greater broadband access. Broadband availability may have encouraged the formation of new businesses and contributed to the retention and growth of pre-existing businesses.

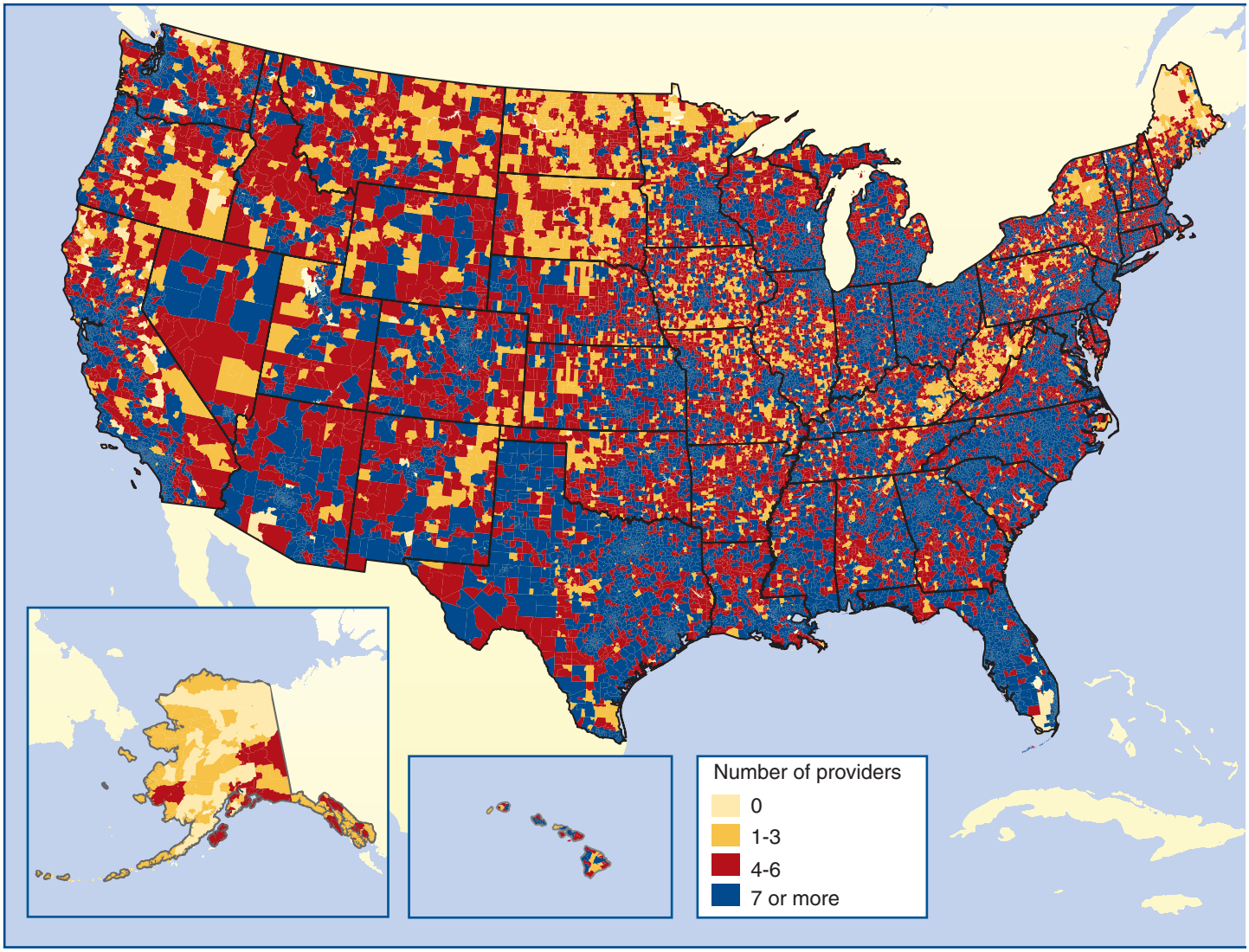
Wage and salary income and nonfarm proprietor's income were also higher in counties that had earlier broadband availability. As time went on, and the other counties gained broadband access, the difference in income growth diminished. The initial larger gains in income relative to employment suggest greater increases in higher paying jobs or in productivity in counties with early broadband availability. These findings may be a sign that early investment in rural broadband Internet led to a more competitive rural economy through increased rural business efficiencies, improved consumer and government services, and expanded economic opportunities.

Broadband less prevalent among nonmetro households with home Internet access, 2007



Source: USDA, Economic Research Service, using data from the 2007 Current Population Survey, Bureau of the Census.

Nonmetro areas typically served by few broadband providers in 2006



Source: USDA, Economic Research Service using data from Form 477, Federal Communications Commission.

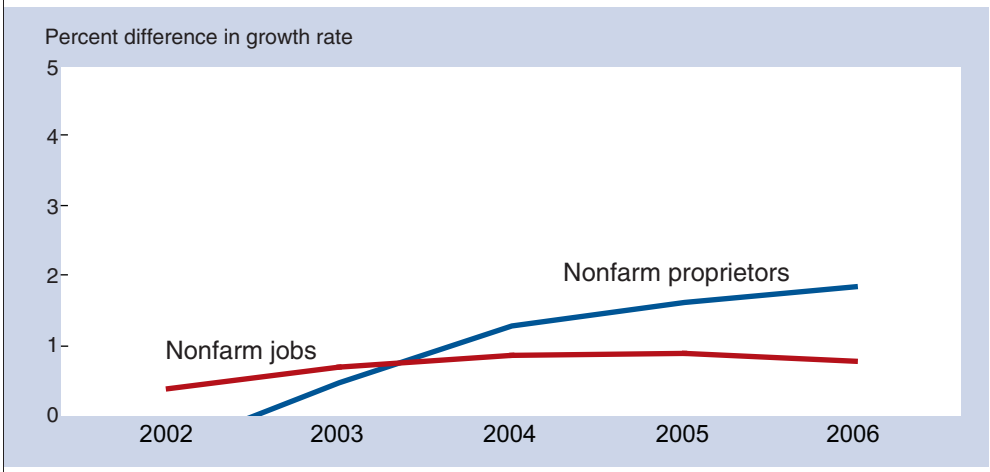
Broadband Expands Options for Rural Residents and Businesses

Previous research sheds light on why broadband Internet access might have wide-ranging economic effects and improve the well-being of rural communities. Evidence suggests that the widespread availability of broadband Internet access can enhance community interaction, improve access to health and educational services, increase household income prospects through telework activities, and provide rural businesses with access to broader markets for their goods.

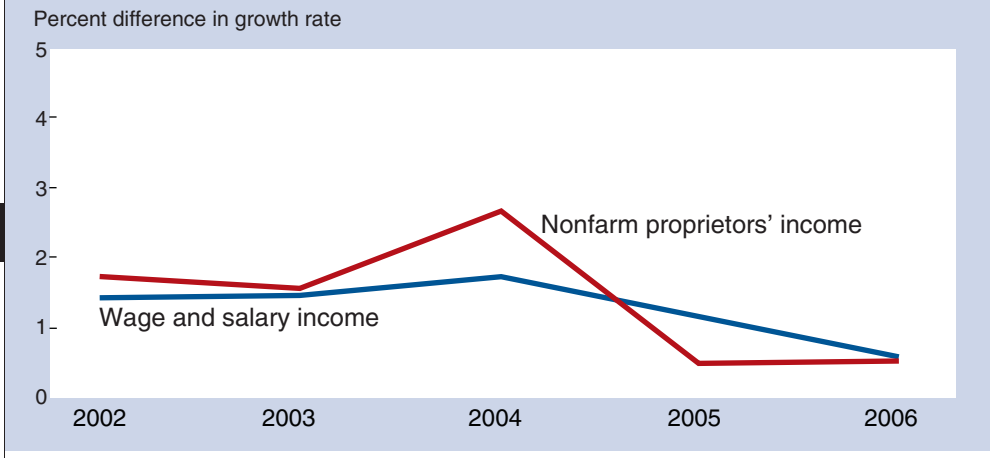
Telemedicine and telehealth practices in rural clinics and hospitals have led to improvements in the well-being of rural individuals and communities. Specialist services are offered in real-time to clinics with no onsite full-time specialist (see "Taking the Pulse of Rural Health Care" on page 10). Patients do not always have to travel long distances or wait days to consult with specialists. It also may not always be necessary to evacuate emergency cases to a larger hospital. Patient savings ranged from $2,000 to $110,000 per year for 24 rural hospitals included in an ERS-sponsored study of Southern Plains States telemedicine practices. Telemedicine may improve the perception of locally provided health care quality, offer a larger menu of medical services than otherwise would be provided, and aid in treating emergencies more effectively.

Telework opportunities can make rural locations, particularly those with broadband service, attractive to those interested in urban-based jobs and a rural lifestyle. Some businesses have expressed interest in locating more of their jobs in rural areas instead of outsourcing them overseas. In a recent study, 37 percent of rural residents surveyed were very interested in working from home to earn additional income, and an additional 39 percent were moderately or somewhat interested.

Employment grew faster in areas with early broadband Internet access . . .



. . . and so did income



Note: Chart shows the average post-2000 advantage enjoyed by rural counties with broadband access in 2000 relative to otherwise similar counties lacking broadband service in 2000.
Source: USDA, Economic Research Service using data from the Bureau of Economic Analysis and other sources.

Business adoption of the Internet has been rapid. Many farm businesses purchase inputs and make sales online, potentially reducing operating costs and increasing profit margins. As Internet adoption expands and online purchasing and marketing become more the norm, the need for high-speed Internet also increases. Rural businesses do not use broadband as much as urban businesses, but those that do argue that broadband use improves their economic vitality. Preliminary research suggests that rural business use of broadband lags, in part, due to higher rural prices and limited availability.

Wholesalers often require rural retailers to use the Internet as they rapidly adopt Internet business-to-business practices that reduce labor, capital, and inventory costs. Rural retail business Internet users also report that broadband access enabled them to increase operational effectiveness by allowing such activities as online reordering. With broadband access, rural businesses also can exploit market niches by creating an online presence. The Internet, however, has also increased the competition rural businesses face. For example, banks may no longer be local in nature as customers increasingly conduct their banking business online.

Recent Policy Developments Could Expand Rural Broadband

The Internet has become much more integrated into the rural economy as consumers, businesses, and government have increased online activities. Broadband Internet access, however, is not as readily available in rural settings.

Government policies that encourage deployment of broadband services have increased their availability in rural America. The Universal Service Program established by the 1996 Telecommunications Act funded broadband Internet access for medical facilities and elementary and secondary schools. The 2008 Farm Act (Food, Conservation, and Energy Act of 2008) reauthorized USDA's telemedicine and distance learning and rural broadband access grant and loan programs. The American Recovery and Reinvestment Act of 2009 provided $2.5 billion to USDA for loans and grants to increase broadband provision in rural areas. If these funds address the needs of unserved and underserved communities, rural broadband availability will continue to spread in the future.

This article is drawn from . . .

Broadband Internet's Value for Rural America, by Peter Stenberg, Mitch Morehart, Stephen Vogel, John Cromartie, Vince Breneman, and Dennis Brown, ERR-78, USDA, Economic Research Service, August 2009, available at: www.ers.usda.gov/publications/err78/

The ERS Briefing Room on the Rural Digital Economy, www.ers.usda.gov/briefing/telecom/

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Rural Broadband At A Glance, 2009 Edition, by Peter Stenberg and Sarah Low, EIB-47, USDA, Economic Research Service, February 2009, available at www.ers.usda.gov/publications/eib47/

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Full Throttle U.S. Ethanol Expansion Faces Challenges Down the Road

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- Constraints to future growth of the ethanol industry will present challenges to meeting the ambitious mandates for expanded biofuel use set forth in the Energy Independence and Security Act of 2007.
- New production technologies and supporting infrastructures will be needed to reach cellulosic biofuel mandates.
- Most U.S. motor vehicles are restricted by manufacturers' warranties to use gasoline containing no more than 10 percent ethanol, which will limit growth in biofuel demand.

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The Energy Independence and Security Act of 2007 specified an ambitious agenda to significantly expand biofuel use in the United States. Even so, the years of full-throttle expansion in the U.S. ethanol industry since 2000 may soon be behind us. The large gains in the scale of the industry over the past decade were achieved by "picking the low-hanging fruit" on both the supply and demand sides of the market. The technology for producing corn-based ethanol was already available, for example, and existing agricultural policy did not hinder the shift to increased corn acreage to support greater ethanol output.

Achieving further large-scale gains will depend on whether the industry can overcome challenges in producing ethanol through cellulosic technologies and on expanding use of ethanol in automobiles.

Expanded Use of Ethanol Was Within Easy Reach

The role of ethanol in the U.S. gasoline supply has grown from just over 1 percent in 2000 to 7 percent in 2008. The increased use of ethanol was fueled by a combination of market conditions and policy factors, including rising oil prices, Federal tax credits, the first Renewable Fuel Standard established under the Energy Policy Act of 2005, and the elimination of methyl tertiary butyl ether (MTBE) as an oxygenating gasoline additive.

Almost all ethanol produced in the U.S. uses corn as the feedstock. The portion of U.S. corn utilization used to produce ethanol rose from 6 percent in 1999/2000 to 24 percent in 2007/08 and is projected to range from 30 to 35 percent over the next decade. And while ethanol's expansion has contributed to higher farm commodity prices, supply and demand adjustments in the agricultural sector have helped mitigate overall impacts (see "U.S. Ethanol Expansion Driving Changes Throughout the Agricultural Sector," in the September 2007 issue of *Amber Waves*).

The existing fleet of motor vehicles in the U.S. also permitted increased use of ethanol in the fuel supply. Moreover, the multistep distribution system linking ethanol production plants to retail gasoline stations was able to accommodate the growth of the industry with minimal adjustments.

New Renewable Fuel Standard Calls for Sharp Expansion in Biofuels

After several years of rapid expansion, the biofuels industry is now working on how to meet the new mandates in the Energy Independence and Security Act of 2007. The law, enacted in December 2007, calls for total renewable fuel "sold or introduced into commerce in the United States" to reach 36 billion gallons by 2022—nearly 5 times the 7.5-billion-gallon renewable fuel mandate for 2012 established in the Energy Policy Act of 2005.

Within the overall 36-billion-gallon mandate, the new Renewable Fuel Standard (RFS-2) sets specific amounts for different categories of biofuels—"cellulosic biofuel," "biomass-based diesel," and "advanced biofuel." The RFS-2 also establishes eligibility criteria based on lifecycle greenhouse gas emissions for determining which biofuels qualify as "renewable fuel" and for the different categories (see box, "Renewable Fuel Standard Under the Energy Independence and Security Act of 2007").

Meeting the mandates for biofuels laid out in the RFS-2 would require significant expansion of biofuel production and use from current U.S. levels. However, major challenges in both supply and demand may limit future growth in the industry.

Cellulosic Production Is a Challenge to Large Ethanol Expansion . . .

On the supply side, ethanol production from so-called "second generation" cellulosic feedstocks—such as corn stover, switchgrass, fast-growth trees, and forest residue—will require development of new technologies to be economically viable on a commercial scale. Even with progress on new cellulosic production technologies, the need to develop supporting infrastructures at every step along the way from the field to the pump will further hinder rapid large-scale growth.

Meeting the mandates for biofuels laid out in the RFS-2 would require significant expansion of biofuel production and use from current U.S. levels.

Production of dedicated energy crops, such as switchgrass, on the scale needed for commercially viable ethanol plants would be new for the agricultural sector. In some regions of the U.S., these new crops will need to generate sufficient profit for farmers to switch acreage from traditional crops. To do that, farmers will require a combination of yields, prices, and production costs to generate favorable net returns. To the extent that some dedicated energy crops take years to become fully productive, long-term contractual arrangements between farmers and ethanol producers likely will be needed to assure market demand and encourage the initial investment.

Crop residues, such as corn stover, provide another source of cellulosic matter for second-generation ethanol production. Prices for these residues will have to be sufficient to compensate farmers for the additional costs of collection and handling. Furthermore, farmers will need to take into account the environmental consequences of removing such residues and the potential impacts on returns for production of the primary crop in subsequent years if soil erosion or changes in production practices alter the productivity of the land.

A further consideration for second-generation ethanol production is that cellulosic feedstocks tend to be bulky. Transportation systems and storage facilities will need to be developed to manage the movement of cellulosic material and assure steady supplies of feedstocks at ethanol plants to maintain year-round operation. The need for such infrastructure developments was less of an issue for the expansion of corn-based ethanol, since the existing grain marketing system already included facilities for storing, handling, and transporting corn.

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. . .and There Are Ethanol Demand Challenges, Too

Future growth in U.S. ethanol demand will be constrained by policies regarding allowable ethanol blends as well as characteristics of current gasoline motor vehicles, factors that are highly related.

Under current U.S. policy, ethanol is permitted to be blended with gasoline in mixtures up to 10 percent ethanol (E10), by volume, or 85 percent ethanol (E85). Midlevel blends with ethanol content above 10 percent but less than 85 percent are generally not permitted, except for use in flexible fuel vehicles.

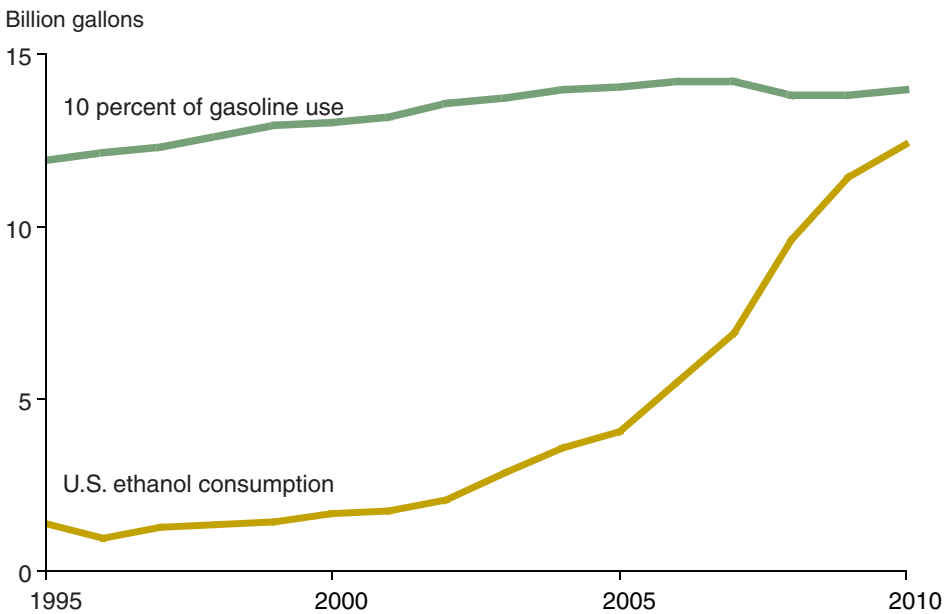
Warranties permit most automobiles and other gasoline vehicles in the United States to use blends that include up to 10 percent ethanol. Automobile manufacturer warranties for these vehicles do not cover use of higher ethanol blends, due in part to potential effects on engines and engine performance that may result from higher corrosiveness and water affinity properties of ethanol.

Flexible-fuel vehicles can use blends up to 85 percent ethanol. The U.S. Department of Energy estimates that there were more than 6 million flexible-fuel vehicles in the United States as of 2008. While increasing in number, these flexible fuel vehicles account for less than 3 percent of the more than 135 million cars and 100 million vans, pickup trucks, and sport utility vehicles in the United States.

Ethanol Demand for E10 Will Hit the "Blend Wall" Soon

Ethanol use of E10 is expected to be near its maximum levels within a few years, hitting the so-called blend wall, as E10 reaches its saturation point in the gasoline market. Annual gasoline use (including ethanol blends) in the United States peaked at about 142 billion gallons in 2007 before falling to just under 138 billion gallons in 2008 due to record-high gasoline prices and the economic slowdown. Future growth in gasoline consumption will be affected by the size of any post-recession rebound in gasoline use, longer term gains in gasoline demand, and improvements in fuel efficiency.

Ethanol expansion in the United States pushes use toward the 10-percent blend wall



Source: USDA, Economic Research Service using data from U.S. Department of Energy, Energy Information Administration and USDA.

U.S. Environmental Protection Agency

E10 ethanol blend wall pushes E85 expansion to the forefront.

Renewable Fuel Standard Under the Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 calls for an ambitious Renewable Fuel Standard (RFS-2) that mandates that 36 billion gallons of biofuels be "sold or introduced into commerce in the United States" in 2022. That volume represents about 3.5 times the amount of ethanol and biodiesel used in the United States in 2008.

The RFS-2 sets specific levels annually for different categories of biofuels. In 2022, the mandate calls for 21 billion gallons of "advanced biofuel," 16 billion of which must be "cellulosic biofuel." At least 1 billion gallons of the remaining "advanced biofuel" in the RFS-2 for 2022 are to be "biomass-based diesel." Definitions of which biofuels qualify for the different categories in the RFS-2 reflect numerous factors related to the feedstock and biofuel production practice used as well as the associated lifecycle greenhouse gas emissions, as determined by the Environmental Protection Agency (see next page for these emission criteria).

Energy Independence and Security Act of 2007 sets ambitious renewable fuel standard

Calendar year	Renewable Fuel Standard, total	Advanced biofuel				"Conventional" and other nonadvanced, maximum (derived)[2]
		Total	Cellulosic biofuel	Biomass-based diesel[1]	Unspecified, maximum (derived)	
			Billion gallons			
2008	9.00	--	--	--	--	9.00
2009	11.10	0.60	--	0.50	--	10.50
2010	12.95	0.95	0.10	0.65	0.20	12.00
2011	13.95	1.35	0.25	0.80	0.30	12.60
2012	15.20	2.00	0.50	1.00	0.50	13.20
2013	16.55	2.75	1.00	1.00	0.75	13.80
2014	18.15	3.75	1.75	1.00	1.00	14.40
2015	20.50	5.50	3.00	1.00	1.50	15.00
2016	22.25	7.25	4.25	1.00	2.00	15.00
2017	24.00	9.00	5.50	1.00	2.50	15.00
2018	26.00	11.00	7.00	1.00	3.00	15.00
2019	28.00	13.00	8.50	1.00	3.50	15.00
2020	30.00	15.00	10.50	1.00	3.50	15.00
2021	33.00	18.00	13.50	1.00	3.50	15.00
2022	36.00	21.00	16.00	1.00	4.00	15.00

[1]Biomass-based diesel RFS specified through 2012; subsequent years "shall not be less than the applicable volume. . .for calendar year 2012."

[2]"Conventional biofuel" is defined in the Energy Independence and Security Act of 2007 as "renewable fuel that is ethanol derived from corn starch."

-- means no amount specified by the Energy Independence and Security Act of 2007.

Source: USDA, Economic Research Service calculations using the Energy Independence and Security Act of 2007.

Some Portions of the RFS-2 Are Implicit

The RFS-2 does not specify mandates for all categories of biofuel. However, implicit maximum levels for other categories can be derived as residual calculations. For example, the unspecified portion of the advanced biofuel level in 2022 could be as much as 4 billion gallons, calculated as the advanced category of 21 billion gallons less the 16 billion for cellulosic biofuel and the 1 billion for biomass-based diesel.

Another residually derived portion of the RFS-2 covers biofuels that do not meet the advanced biofuel criteria. For 2022, such biofuels could total as much as 15 billion gallons, calculated as the residual between the total 36-billion-gallon RFS-2 less the 21 billion for advanced biofuel. The RFS-2 specifically designates ethanol derived from corn starch as not qualifying as advanced biofuel, so it would fall into this residual category if it meets other RFS-2 criteria.

Since amounts in these derived categories are residual calculations, they represent maximum amounts that could fall into those groups as part of meeting the RFS-2. For example, if more than 21 billion gallons of advanced biofuel were used in 2022, the additional volume would count toward the overall 36-billion-gallon mandate. Thus, the difference between these specified mandates, 15 billion gallons, represents a maximum volume of the RFS-2 that can be met by "conventional biofuel" (ethanol derived from corn starch) or other biofuels that do not qualify as "advanced." This does not imply that there could not be more than 15 billion gallons of corn starch-based ethanol used in any given year, but that at most only 15 billion gallons could count toward the RFS-2.

Greenhouse Gas Emissions Criteria Also Established

The RFS-2 also specifies lifecycle greenhouse gas emissions levels that must be met to qualify for the overall RFS-2 and its different categories. To qualify as cellulosic biofuel, life-cycle greenhouse gas emissions must be at least 60 percent less than the lifecycle greenhouse gas emissions for gasoline or diesel in 2005. Advanced biofuel (other than the cellulosic portion) must show at least a 50-percent reduction in lifecycle greenhouse gas emissions. This threshold applies to the biomass-based biodiesel mandate as well as to unspecified advanced biofuel. Other biofuels, to count toward the RFS-2 mandates, must show at least a 20-percent reduction in lifecycle greenhouse gas emissions (unless they are produced at a "grandfathered" facility that is thereby exempt from this requirement). Such biofuels include all those outside of the "advanced" category, such as the 15-billion-gallon maximum residual amount in 2015 through 2022.

As part of the Energy Independence and Security Act of 2007, the "Ten-in-Ten Fuel Economy Act" mandates increases in fuel economy standards. Included in this mandate, the fuel economy average for model year 2020 is set to reach at least 35 miles per gallon for the total fleet of passenger and non-passenger automobiles manufactured for sale in the U.S. for that model year, up from the current standard for passenger automobiles of 27.5 miles per gallon. Further, on May 19, 2009, President Barack Obama announced a plan for accelerated implementation of somewhat stronger fuel economy standards (as well as reductions in greenhouse gas emissions). This proposed rule will go through normal regulatory rulemaking and public comment procedures before becoming finalized.

Ironically, gains in fuel efficiency increase the challenge of meeting the RFS-2. The RFS-2 sets specific volumes for renewable fuel use, rather than stipulating larger shares for biofuels in the overall fuel market. Improved fuel efficiency will mean that the volumes of biofuels set forth in the RFS-2 will account for even greater shares of fuel use, necessitating a larger market penetration by biofuels.

Depending on the assumptions regarding growth in fuel demand and efficiency, gasoline use could range as high as 150 to 160 billion gallons in 2022. This suggests the E10 market will soon hit a maximum, with growth in subsequent years only reflecting increases in total gasoline use. Even if total gasoline use in 2022 reaches the high-end projection of 160 billion gallons, the maximum amount of ethanol that could be used in E10 would be 16 billion gallons--well short of the legislated RFS-2 of 36 billion gallons.

E85 Demand Has a Long Way To Go

With 10-percent ethanol blends expected to be nearing their saturation point, increased use of biofuels will depend on expanding the E85 market. Although E85 is used in corn- and ethanol-producing States such as Iowa, Missouri, and Minnesota, it is not widely available in most of the U.S. In

A number of programs are currently in effect aimed at encouraging expansion of biofuels.

particular, E85 is sold at only a few stations in most major population centers, where gasoline consumption is greatest. Currently, E85 accounts for less than 1 percent of the Nation's total gasoline use.

Growth in the E85 market would require a larger number of flexible fuel motor vehicles, as well as an expanded distribution infrastructure to make E85 more widely available. Greater volumes of ethanol would need to be transported from ethanol plants to population centers, putting more demand on the rail and trucking infrastructure.

Perhaps most important, retail gasoline stations would need storage facilities and pumps that can accommodate E85, requiring significant investment. Many urban stations may lack the space needed to add E85 pumps.

Additionally, Underwriters Laboratories (UL), which conducts scientific tests of products to help ensure they meet national safety standards, would need to evaluate and provide safety certification of E85 dispensers and essential subassemblies. However, as of May 2009, UL had not received submissions from any manufacturers of an external fuel delivery hose, one of the essential subassembly parts needed for the safety certification. UL testing of other components of E85 dispensers has been completed.

Additional possible deterrents to investments in the E85 infrastructure include the uncertainties regarding future biofuel policies and developments of alternative energy technologies for motor vehicles, and their potential effects on the overall size of the E85 market.

Potential Role for Higher Midlevel Blends

If the Environmental Protection Agency (EPA) were to approve higher midlevel ethanol blends than E10, such as E15, it would expand ethanol demand but not entirely eliminate pressure to expand the E85 market. Again, assuming that gasoline use in 2022 totals as much as 150 to 160 billion gallons, a 15-percent ethanol blend would generate demand for 22.5 to 24 billion gallons of ethanol, still short of the overall RFS-2 mandate of 36 billion gallons.

One potential constraint in the delivery infrastructure system for higher midlevel blends was recently relaxed. In February 2009, United Laboratories announced support for permitting the use of existing UL-approved gasoline dispensing systems (intended for use with ethanol blends up to E10) for automobile fuel containing up to 15 percent ethanol. UL indicated that, compared with E10, fuels with a maximum of 15 percent ethanol present "no significant incremental risk of damage" to fuel dispensing systems.

Nonetheless, midlevel blends higher than E10 face other major challenges, including consumer acceptance. Current manufacturer warranties on nonflexible fuel automobiles cover use of ethanol blends up to 10 percent. To modify these warranties for higher ethanol blends, some agreement with the automobile industry would be needed. Such an agreement may be hard to achieve, particularly since the domestic automobile manufacturers are currently encountering their own economic problems. Studies are underway to evaluate the potential long-term effects of higher midlevel blends on automobile engines, with results important for forthcoming EPA decisions.

A further concern regarding higher midlevel blends is the potential effects on small-motor, off-road gasoline engines, such as those used in lawnmowers and power boats.

Small motor off-road engines may be affected by higher midlevel ethanol blends.

Overall implications for the agricultural sector suggest a continuing demand for feedstocks to produce ethanol.

Public Policy Encourages Scientific Research

The many challenges facing future large-scale expansion of U.S. renewable fuels raise issues about the feasibility of meeting the new RFS-2. Public policy can help address these challenges by supporting scientific research to improve the economic viability of new technologies or by providing subsidies to ease a transition to alternative motor vehicle fuels. A number of programs aimed at encouraging expansion of biofuels are currently in effect:

- The U.S. Department of Energy (DOE) has awarded a number of grants for cellulosic research, including work on advanced enzymes for converting cellulose into sugars. Other DOE grants have been awarded to support development of cellulosic ethanol plants.
- USDA's Agricultural Research Service has a program on Bioenergy and Energy Alternatives. Ongoing research priorities include the development of new bioenergy feedstocks, improvement of feedstock yields and production, and work on biorefining technologies.
- Title IX (a specific energy title) of the Food, Conservation, and Energy Act of 2008 (the 2008 Farm Act) provides for support to farmers to establish and produce biomass crops, payments to farmers for the delivery of renewable biomass to a biomass conversion facility (thus assisting with the costs of biomass collection, harvest, storage, and transportation), and assistance for expanding production of advanced biofuels.
- Title VII of the 2008 Farm Act includes authorization for funding for bioenergy research programs and establishes an agricultural bioenergy feedstock and energy efficiency research and extension initiative within USDA.
- Federal tax credits for ethanol blending provide economic incentives to the industry. Current law provides for a $0.45-per-gallon tax credit for ethanol blending, with an additional $0.10 credit for small (60 million gallons capacity or less) ethanol producers for production up to 15 million gallons per year. Additional provisions provide for a total tax credit of as much as $1.01 per gallon for cellulosic-based ethanol.

Balancing Mandates, Environmental Concerns, and Market Constraints

The Energy Independence and Security Act of 2007 allows for waivers and modifications to the RFS-2 if EPA determines there is an inadequate domestic supply to meet the mandate or if the standard would severely harm the economy or environment of a State, a region, or the Nation. Further, the life-cycle greenhouse gas emissions criteria for the different portions of the RFS-2 may each be reduced by as much as 10 percentage points if EPA determines that the initially established criteria are not commercially feasible.

Additional environmental factors may also have a bearing on overall use of different biofuels and the potential for achieving the RFS-2. For example, California's adoption of a low carbon fuel standard in April 2009 puts more stringent environmental criteria on fuel used in that State. The new standard is designed to reduce the carbon intensity of transportation fuels in California by 10 percent in 2020. The phased-in compliance schedule for the standard reduces the feasibility over time of using ethanol from some production pathways, depending on the feedstock, production location, and production process.

The biofuel market, scientific evidence regarding environmental impacts, and policy developments will need to be closely monitored to see how the situation evolves over the next decade and beyond. Overall implications for the agricultural sector suggest a continuing demand for feedstocks to produce ethanol. At a minimum, this demand will increase moderately in accordance with anticipated growth of gasoline usage in the country. Stronger growth will depend on whether the industry can overcome existing challenges to further expansion in ethanol production and use.

For more information . . .

USDA Agricultural Projections to 2018, (ERS contact: Paul Westcott), OCE-2009-1, USDA, Office of the Chief Economist, World Agricultural Outlook Board, February 2009, available at: www.ers.usda.gov/publications/oce091/

ERS 2008 Farm Bill Side-By-Side, Title IX—Energy, available at: www.ers.usda.gov/farmbill/2008/titles/titleixenergy.htm

You may also be interested in . . .

Ethanol Expansion in the United States: How Will the Agricultural Sector Adjust? by Paul C. Westcott, FDS-07D-01, USDA, Economic Research Service, May 2007, available at: www.ers.usda.gov/publications/fds/2007/05may/fds07d01/

Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices, by Ronald Trostle, WRS-0801, USDA, Economic Research Service, July 2008, available at: www.ers.usda.gov/publications/wrs0801/

Trade Data Show Value, Variety, and Sources of U.S. Food Imports

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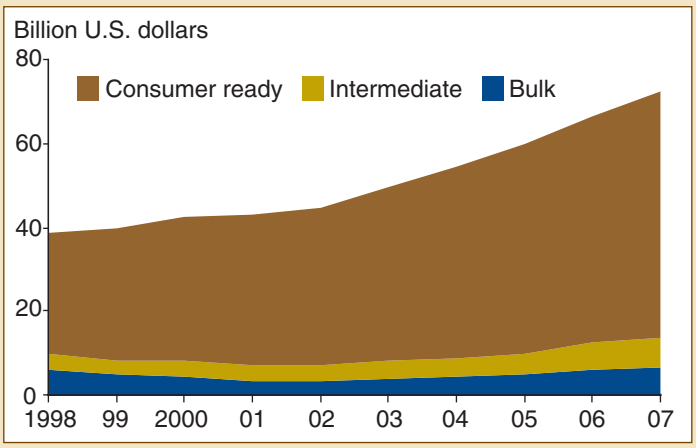
U.S. food and agricultural product imports have been rising for decades. In fact, they increased from $41 billion in 1998 to $78 billion in 2007 in response to the combined effects of trade liberalization, changes in food supply chains, and increased consumer preferences for a wide variety of foods. Imports of fish and shellfish, many fresh fruit and vegetables, fruit juices, tree nuts, and salad and cooking oils account for large shares of domestic consumption. Many agricultural imports with a large share of domestic consumption are products the United States does not produce in large quantities, such as bananas or coffee.

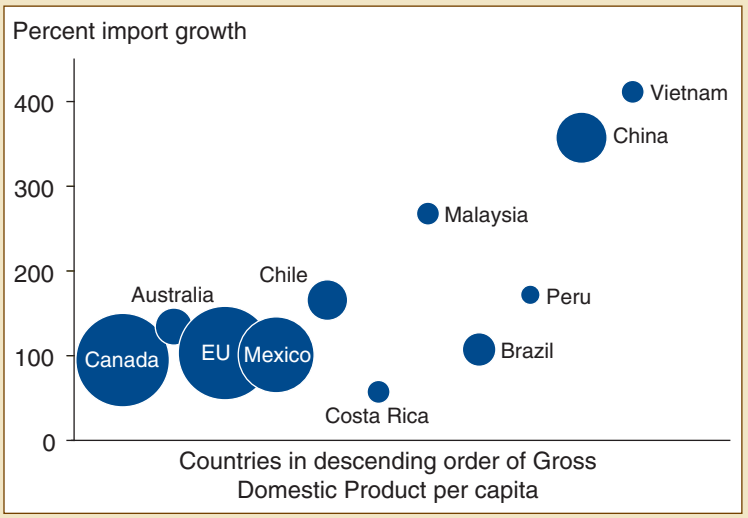
U.S. trade data are collected by the U.S. Department of Homeland Security, U.S. Customs and Border Protection and compiled and distributed monthly by the U.S. Department of Commerce's Census Bureau using the United States' Harmonized Tariff Schedule (HTS) of 10-digit codes. Congress mandated that USDA define which of these codes constitute agriculture and provide the public with statistics on U.S. agricultural trade. To fulfill this responsibility, USDA has maintained the Foreign Agricultural Trade of the United States (FATUS) database since about 1926. FATUS provides data on the volume and value of U.S. agricultural exports and imports, by major countries and commodities. Data are updated online monthly from 1989 to the present.

U.S. food imports climbed rapidly, with consumer-ready products growing fastest



Source: USDA, Economic Research Service classification using data from U.S. Department of Commerce, Census Bureau.

Developing countries increasingly supply U.S. food imports, 1998-2007



Source: USDA, Economic Research Service classification using data from U.S. Department of Commerce, Census Bureau.

Consumer-Ready Product Imports Showed Largest Gain

In the past decade, U.S. imports came primarily from Canada, Mexico, the European Union, Australia, Brazil, and China. The top import sources have changed little since 1990, but the number of countries exporting food and agricultural products to the U.S. has greatly increased, and the import share of developing countries has been rising steadily since 2001.

Rapid U.S. import growth in 2002-07 was driven primarily by increased imports of consumer-ready products, such as fresh fruit, vegetables, meats, seafood, and processed foods. Import growth was relatively stable for raw bulk food commodities, such as grains and oilseeds, and semi-processed intermediate products, such as oils, sweeteners, and cocoa paste. Horticultural products, including fruit, vegetables, nuts, wine, malt beverages, and nursery products, have accounted for nearly half of all U.S. agricultural imports since 2002. Sugar and tropical-product imports have exceeded livestock and livestock product imports since 2005.

Developing Countries Were a Growing Source of U.S. Imports

While developed countries such as Canada and the European Union were among the top sources of U.S. food imports, the greatest growth between 1998 and 2007 was among imports from the developing countries. Seasonal and climatic factors contributed to an influx of fresh fruit and vegetables and other tropical products from many developing countries. U.S. imports of processed food products from these countries also increased in response to globalization of the food industry and in-flow of foreign direct investments that expanded food processing capabilities in many developing countries.

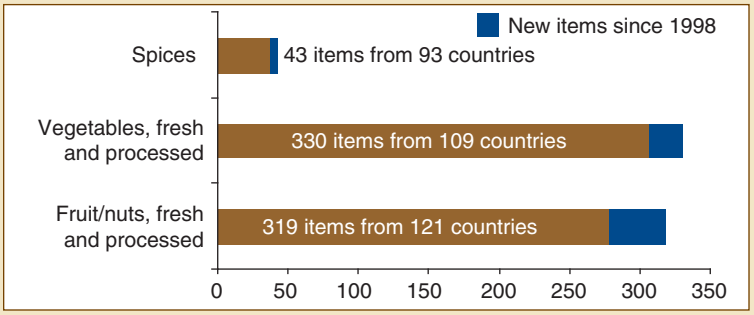
U.S. imports of fresh fruit, vegetables, and other horticultural products from Central and South American countries increased significantly. For example, U.S. imports of fresh fruit and vegetables from Chile grew from about $800 million in 1998 to $2.5 billion in 2007. Similarly, imports of dried, frozen, and processed fruit and vegetables, fish, and spices were increasingly sourced from China, Vietnam, and other Asian countries. Malaysia was a major source of tropical oils and the biggest supplier of cocoa butter and paste.

More Variety, More Countries

As the number of different products imported into the United States grew over the years, so, too, did the number of source countries. In 2007, for example, 319 different fruit products were imported from 121 different countries, including 41 new products and 10 new source countries since 1998.

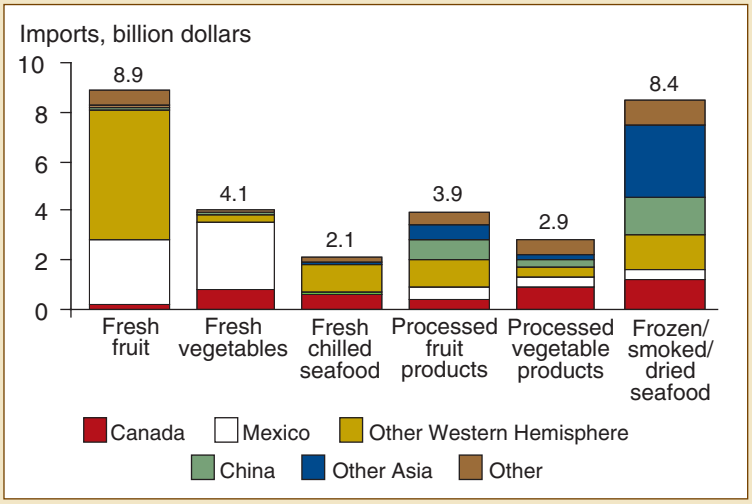
New products imported into the United States included a variety of fresh and processed fruit and vegetables, including such exotic tropical varieties of fruit as durian, lychee, and guava, and a myriad of other fresh and processed fruit, vegetables, and spices.

Wide variety of products and source countries met U.S. import demand, 1998-2007



Note: Each HS-10 digit tariff line is assumed to designate an import item.
Source: USDA, Economic Research Service classification using data from U.S. Department of Commerce, Census Bureau.

U.S. perishable food imports in 2007 mostly came from neighboring countries



Source: USDA, Economic Research Service classification using data from U.S. Department of Commerce, Census Bureau.

The growth in the number of imported products coincided with the number of countries exporting a particular type of food product into the U.S. In 2007, the United States imported artichokes from China and Ecuador, certain types of processed bamboo shoots from Colombia and China, garbanzo beans from Trinidad and India, pepper products from Kyrgyzstan, cinnamon from Ethiopia, and nutmeg from Gabon—none of these countries were listed as sources for such products in 1998.

U.S. Perishable Food Imports Mostly Sourced From Neighboring Countries

Most U.S. fresh produce and seafood imports are sourced from nearby countries in the Western Hemisphere, while processed fruit, vegetables, and seafood may come from more distant countries. Among other factors, seasonal availability, the North American Free Trade Agreement with Mexico and Canada, and consideration of the speed and cost of transportation may have contributed to this import pattern.

This article is drawn from . . .

U.S. Food Import Patterns: 1998-2007, by Nora Brooks, Anita Regmi, and Alberto Jerardo, FAU-125, USDA, Economic Research Service, August 2009, available at: www.ers.usda.gov/publications/fau/2009/08aug/fau125

"Globalization and Evolving Preferences Drive U.S. Food Import Growth," by Nora Brooks, Jean Buzby, and Anita Regmi, in *Journal of Food Distribution Research*, Vol. 40, No. 1, March 2009.

STATISTICS

Data may have been updated since publication. For the most current information, see www.ers.usda.gov/publications/agoutlook/aotables/

Farm, Rural, and Natural Resource Indicators

						Annual percent change			
	2005	2006	2007	2008	2009	2005-06	2006-07	2007-08	2008-09
Cash receipts ($ bil.)	240.9	240.8	284.8p	324.2p	294.6f	0.0	18.3	13.8	-9.1
Crops	116.0	122.6	147.0	181.1p	162.4f	5.7	19.9	23.2	-10.3
Livestock	124.9	118.2	137.9	143.1p	132.2f	-5.4	16.7	3.8	-7.6
Direct government payments ($ bil.)	24.4	15.8	11.9	12.4p	11.4f	-35.2	-24.7	4.2	-8.1
Gross cash income ($ bil.)	281.5	274.1	313.4	354.3p	324.1f	-2.6	14.3	13.1	-8.5
Net cash income ($ bil.)	86.6	68.0	87.4	93.4p	77.3f	-21.5	28.5	6.9	-17.2
Net value added ($ bil.)	123.6	103.1	132.5	137.3p	120.0f	-16.6	28.5	3.6	-12.6
Farm equity ($ bil.)	1,642.2	1,851.0	1,998.4	2,134.5p	2,171.1f	12.7	8.0	6.8	1.7
Farm debt-asset ratio	10.5	9.6	9.6	9.2p	9.1f	-8.6	0.0	-4.2	-1.1
Farm household income ($/farm household)	81,086	81,251	86,223	86,864f	85,140f	0.2	6.1	0.7	-2.0
Farm household income relative to average U.S. household income (%)	128.0	122.1	127.5	na	na	na	na	na	na
Nonmetro-metro difference in poverty rate (% points)[1]	2.3	3.4	5.5	na	na	na	na	na	na
Cropland harvested (million acres)	314	304p	na	na	na	-3.2	na	na	na
USDA conservation program expenditures ($ bil.)[1,2]	4.3	4.3	4.4p	5.0f	na	0.0	2.3	13.6	na

Food and Fiber Sector Indicators

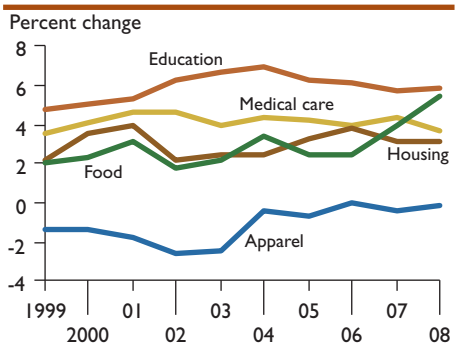
U.S. gross domestic product ($ bil.)	12,422	13,178	13,808	14,265	na	6.1	4.8	3.3	na
Share of agriculture & related industries in GDP (%)[1]	4.5	4.3	4.6	na	na	na	na	na	na
Share of agriculture in GDP (%)[1]	0.8	0.7	1.0	na	na	na	na	na	na
Total agricultural imports ($ bil.)[2]	57.7	64.0	70.1	79.3	81.0f	10.9	9.5	13.1	2.1
Total agricultural exports ($ bil.)[2]	62.5	68.6	82.2	115.5	96.0f	9.8	19.8	40.5	-16.9
Export share of the volume of U.S. agricultural production (%)[1]	21.5	23.0	23.8p	na	na	na	na	na	na
CPI for food (1982-84=100)	190.7	195.3	202.9	214.1	221.3f	2.4	3.9	5.5	3.4
Share of U.S. disposable income spent on food (%)	9.7	9.8	9.7	9.6	na	na	na	na	na
Share of total food expenditures for at-home consumption (%)	51.4	51.5	51.5	51.5	na	na	na	na	na
Farm-to-retail price spread (1982-84=100)	239.2	246.2	248.1	267.0	na	2.9	0.8	7.6	na
Total USDA food and nutrition assistance spending ($ bil.)[2]	50.9	53.1	54.3	60.9	na	4.3	2.3	12.2	na

f = Forecast. p = Preliminary. na = Not available. All dollar amounts are in current dollars.

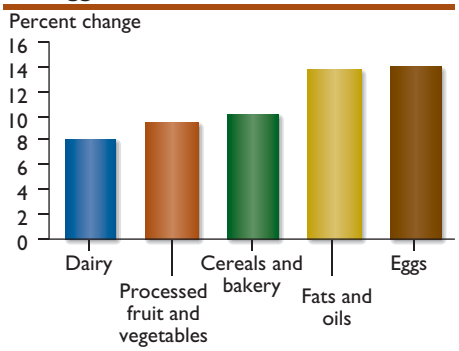
[1] The methodology for computing these measures has changed. These statistics are not comparable to previously published statistics. Sources and computation methodology are available at: www.ers.usda.gov/amberwaves/indicatorsnotes.htm

[2] Based on October-September fiscal years ending with year indicated.

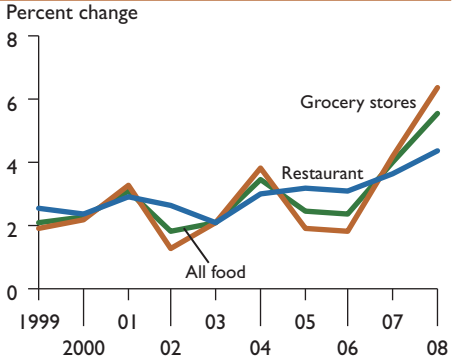
Over the past 10 years, inflation has been higher for education and medical care than for food



In 2008, double-digit price increases for cereals and bakery products, fats and oils, and eggs…



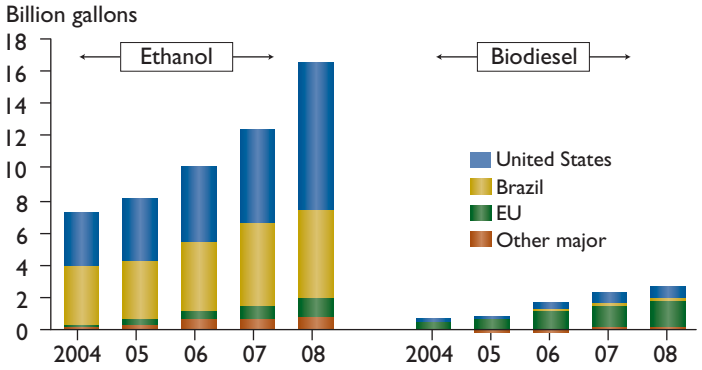
… pushed grocery store price inflation to its highest level in 20 years



For more information, see www.ers.usda.gov/amberwaves

Markets and Trade

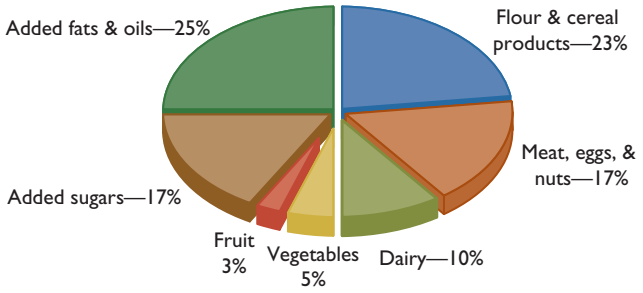
Global biofuel production grew rapidly in 2004-08



Other major = Argentina, Canada, China, Russia, and Ukraine.
Source: *USDA Agricultural Projections to 2016.*

Diet and Health

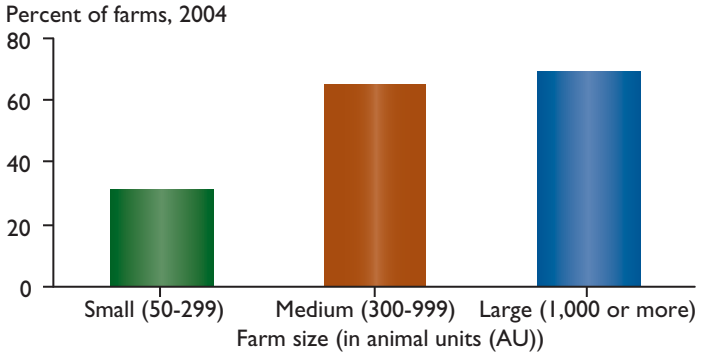
Added sugars and added fats and oils provide 42 percent of the average American's daily calories



Added sugars and added fats and oils are put into foods during processing or preparation. They do not include naturally occurring sugars and fats in food (e.g., sugar in fruit and fats in meat).
Source: USDA, Economic Research Service, Loss-Adjusted Food Availability, 2007 data.

Farms, Firms, and Households

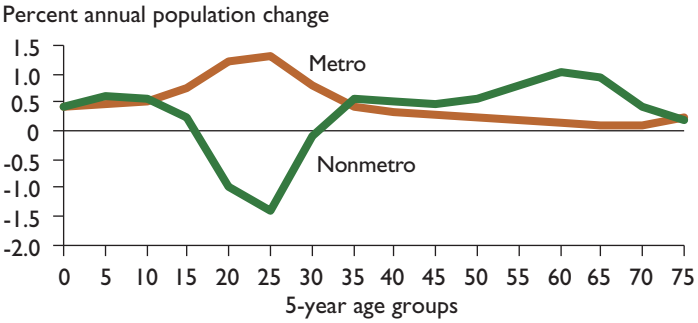
Larger farms more likely to follow a Comprehensive Nutrient Management Plan



Note: An AU (animal unit) is equivalent to 1,000 pounds of live animal weight.
Source: USDA, Economic Research Service and USDA, National Agricultural Statistics Service, 2004 Agricultural Resource Management Survey.

Rural America

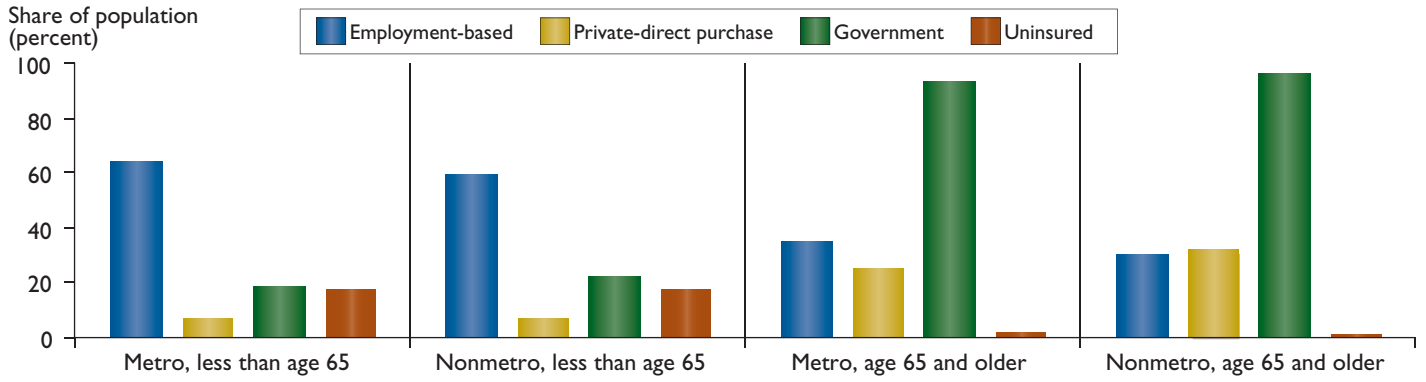
Nonmetro areas lose young adults through net migration, but gain retirees



Note: Net migration is the difference between the number of people moving into an area minus the number moving out. For each age group, the graph shows average annual population change through net migration as a percent of the area's population.
Source: USDA, Economic Research Service, using data from the U.S. Census and USDA-funded cooperative agreements.

Rural America

Patterns of health insurance coverage vary little by age group across metro and nonmetro areas, 2007



Note: Totals may add up to more than 100 percent due to multiple sources per household.
Source: USDA, Economic Research Service using Current Population Survey, ASEC, March 2008.

On the Map

Highest Mortality Rates in the South

Clusters of low-mortality-rate counties are located in the Farm Belt portion of the Midwest and Northern Plains, many rural and urban areas in the Mountain and Pacific regions, along the coasts of California and Florida, and throughout most of the Northeast. These low-mortality-rate clusters include many wealthy areas and counties identified by ERS as farming-dependent. The high-mortality-rate clusters are in the South, including the Black Belt region of the southeastern U.S., the Mississippi River Delta, along the southern coastal plain from Virginia to Texas, and Appalachia. Factors associated with higher mortality counties include low rates of high school graduation, high unemployment/underemployment, persistent-poverty, and large Black, Hispanic, or Native American populations.

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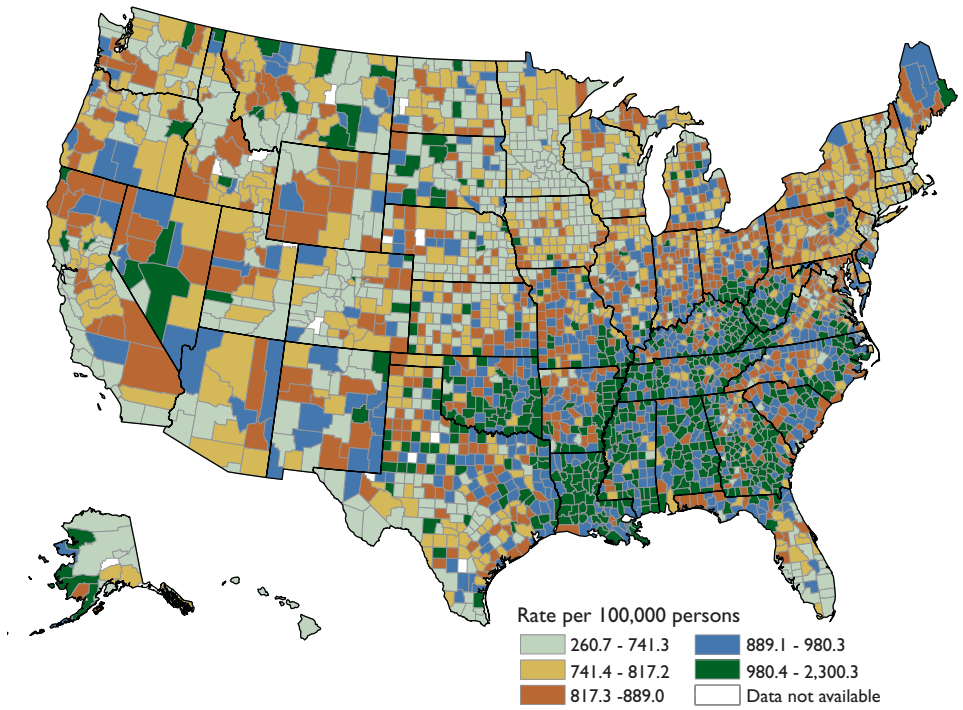
Age adjusted mortality rate, 2005



Source: USDA, Economic Research Service analysis of the National Center for Health Statistics Compressed Mortality File, 1999-2005.

In the Long Run

Growth in Adoption of Genetically Engineered Crops Continues in U.S.

U.S. farmers have rapidly adopted genetically engineered (GE) soybeans, cotton, and corn since their commercial introduction in 1996 because of their economic benefits. Herbicide-tolerant (HT) crops can be treated with selected herbicides to provide effective weed control. HT variety adoption has expanded faster for soybeans than other GE crops. Insect-resistant (Bt) crops contain a gene from the soil bacterium *Bacillus thuringiensis* that produces a protein toxic to specific insects. In 2009, Bt varieties accounted for 65 percent of U.S. cotton acreage and 63 percent of U.S. corn acreage. Adoption of crop varieties with both Bt and HT traits has accelerated and now accounts for 48 percent of cotton acres and 46 percent of corn acres.

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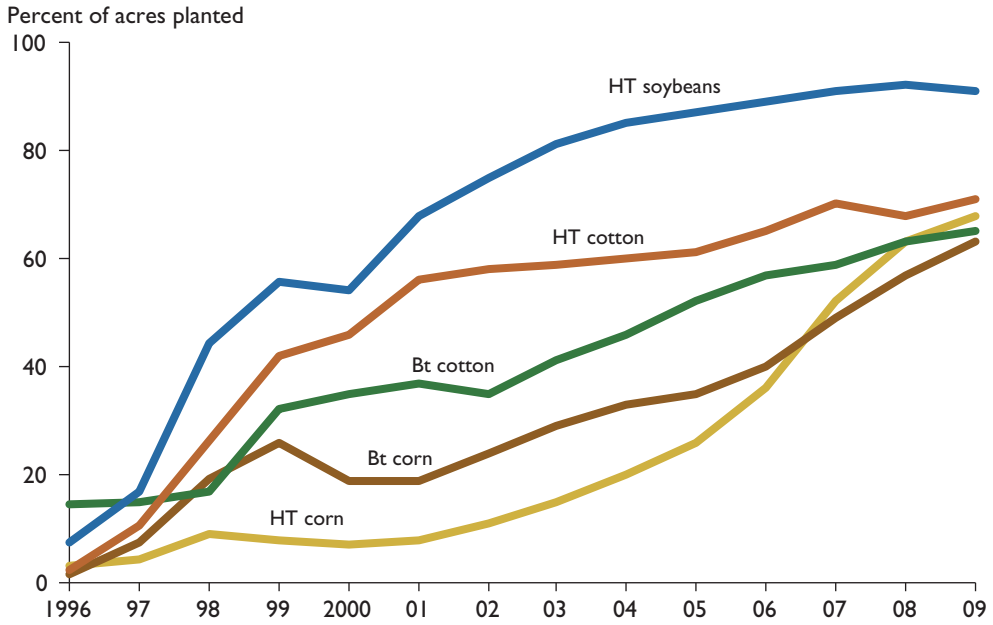
Trends in adoption of genetically engineered crops in the U.S.



Data for each crop category include varieties with both Bt and HT (stacked) traits.
Sources: USDA, Economic Research Service and National Agricultural Statistics Service.