Appendix I
1997 Census of Agriculture Longitudinal File

Most data used in this report are from the 1997 Census of Agriculture Longitudinal File. Data from five censuses (1978, 1982, 1987, 1992, and 1997) were merged for individual farms. As a result, individual farms can be followed over a 20-year period. The file contains 4.5 million observations—any farm in business during any of the five censuses.

Following Farm Businesses, Not Operators

The longitudinal file attempts to follow individual farm businesses associated with farmland rather than operators. The longitudinal file operationally follows "CFNs" or census file numbers. The CFN identifies a farm operation for a particular census and may follow a farm operation through subsequent censuses (up to five on the longitudinal file). If the farm continues from one census to the next and the farm operator responds to the census using the same CFN, the information reported by that farm for that census period is appended to the longitudinal file using the same CFN.

A farm is defined as going out of business when there is no response to the census questionnaire or the questionnaire is returned with a statement that the establishment is no longer operating as a farm. The disappearance of a farm in a given census year is indicated by zeros for all variables. A farm is considered to be out of business (an exit) when a zero appears in the CFN variable field for a given year, indicating that the farm has been discontinued. Likewise, a farm operation with a CFN that is not matched or linked to a previous longitudinal record would be considered a new business (an entry) and added to the longitudinal file as a new record. A farm with a CFN for both a beginning and an ending intercensus period in its record is considered to be a survivor.

Because the file follows farm businesses rather than operators, an operation that changes hands does not necessarily mean that the original farm went out of business and a new farm appeared on the longitudinal file. A change in operator among relatives due to life-cycle events—such as a widow or an adult child assuming operation of a farm upon the death of an operator—would not necessarily trigger a change in the CFN. Similarly, if the farm is sold to an unrelated operator, who continues the business as a separate entity, a new CFN might be issued. In this case, the data collection agency, currently the National Agricultural Statistics Service (NASS), links the old and new CFNs by matching farm operations. Linking allows data for the new CFN to be added to longitudinal data from the previous census under the old CFN, extending the longitudinal record of the farm.

Cases such as these make life-cycle analyses more difficult because they mean that an elderly farmer may quit farming but that the farm itself may continue. The operator and farm do not necessarily exit together. Nevertheless, life-cycle changes can trigger exits. In a common pattern, farm operators become elderly, stop farming, and rent or sell their land to other farmers who incorporate it into their operations. In other words, the original farm businesses no longer exist.

Other examples of events that could terminate a farm business on the file include the disappearance of the farm business through sale of the land for nonfarm purposes and the division of the farm into separate farming businesses. For a list of some possible transactions and whether they would trigger a change in CFN, see appendix table 1. The table gives examples of transactions, with their likely effects on the CFN. Terminating a CFN indicates a farm exit, and issuing a new CFN indicates a farm entry. This list does not cover all possible transactions.

The longitudinal file is not truly longitudinal, like the Census Bureau's Survey of Income and Program Participation (SIPP) or the University of Michigan's Panel Study of Income Dynamics (PSID), which were designed to follow households over time. Rather than identifying farms and following them as time progresses, the longitudinal file links data collected in the past for another purpose (the agricultural census). Thus, one cannot claim with

Appendix table 1
Likely effects of various transactions on Census File Numbers (CFNs)

Transaction	No change in old CFN	Old CFN terminated	New CFN issued
	Likely effect on CFNs		
Farm continues with original acreage owned by the operation:			
Under current operator	X		
Operator retires, farm continues under a junior operator	X		
Farm is sold to—			
Relative	X		
Someone else		X (Old and new CFNs are linked)	X
Entire farm is sold to another operation		X	(Purchasing farm has its own CFN)
Original farm is divided into two or more smaller farming operations:			
A portion of the original acreage continues under the original operator	X		X
All of the farms have new operators		X	X
Operator no longer farms but rents out farmland:			
Renter operates farm as a separate unit	X		
Renter operates the rented land as part of an an existing farm		X	(Renting farm has its own CFN)
Part of original farm is sold for nonfarm use; part continues as a farm	X		
Entire farm is sold for nonfarm use		X	

Note: Land rented by the original farm is not considered, to simplify the table. "Operator" means the the primary operator, in the case of legal or informal partnerships. This table is drawn up for family farms, which includes proprietorships, partnerships, and family corporations but a similar table could be created for nonfamily farms.

certainty that every instance of the transactions listed in appendix table 1 will affect CFNs as indicated, which explains the use of the phrase "likely effects on CFNs" as a column heading in the table.

Weighting

During each agricultural census, some operators do not respond, despite numerous attempts to contact them (USDA, NASS, 1999, pp. C-2 and C-3). This "whole farm nonresponse" ranges from 9 to 14 percent of all farms during the census years examined here. Census personnel use a weighting procedure to correct for whole farm nonresponse. Most census observations have a nonresponse weight of 1, meaning they represent only themselves. Some farms, however, have a nonresponse weight of 2 and represent themselves, plus another farm, the operator of which failed to provide a response. If the nonresponding farm is large or unique, census personnel conduct an intensive telephone or personal followup to obtain a response. If the followup fails, data are imputed for the farm. As a result, all the nonresponse weights are 1 for large farms. Weighted data are used in this report, when possible, to discuss characteristics of farming in a particular year and to calculate exit rates. Nonresponse weights for 1978, unfortunately, are not available on the longitudinal file or anywhere else.

Nonresponse can also cause problems when estimating exits and entries. Some farms classified as exits may actually have been continuing operations that failed to respond to the census questionnaire. Similarly, some farms classified as entries may be continuing operations that did not respond to the previous census.[10] The exit rates for farms calculated from the longitudinal file, however, are comparable to exit rates for Canadian farms, as discussed earlier, despite a Canadian nonresponse rate of less than 1 percent (Gale and Pursey, 1995, p. 68), suggesting that nonresponse may not be a large source of bias.

Farm Definition Change

The official census definition of a farm is "any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold during the census year" (USDA, NASS, 1999, p. VII). Although the basic definition has not changed since 1974, minor changes occur from time to time. Three new groups of farms were counted for the first time in the 1997 Census of Agriculture: farms with all their cropland in the Conservation Reserve or Wetlands Reserve Programs (CRP or WRP), Christmas tree farms, and operations specializing in forest products (Hoppe and Korb, 2002, p. 26).

Farms that became CRP/WRP farms or switched their production solely to forest products or Christmas trees between 1992 and 1997 would be classified as surviving farms during the 1992-97 intercensus period. In previous intercensus periods, such farms would have been classified as exits because they would not have met the farm definition existing at that time. Exit rates and exit probabilities, therefore, are understated somewhat—particularly for farms with sales of less than $10,000—between 1992 and 1997, relative to earlier periods. Similarly, entrance rates are overstated somewhat. Including these farms in the 1997 Census reduced the decline in the number of farms between the 1992 and 1997 Censuses from 4.6 percent to 0.7 percent.

[10]Peterson and Gale (1991) devised a procedure to correct for nonresponse that leads some continuing farms to be mistakenly classified as exits or entries. It is a fairly simple algorithm, applied in a spreadsheet that uses nonresponse rates to apportion nonrespondents across the survivor, exit, and entry categories. However, it is based on four major assumptions, three of which the authors state are not completely true. The Peterson-Gale adjustment procedure is not used in this report to adjust exit rates. Their procedure simply adjusts cells in a spreadsheet, not individual observations. Using unadjusted exit rates in this report maintains comparability between the exit rates and results from the model, which uses data from individual observations.

Note that some places qualify as farms, even if they have less than $1,000 in sales. If a place does not have $1,000 in sales, a "point system" assigns values for acres of various crops and head of various livestock species to estimate a normal level of sales. Point farms have less than $1,000 in sales but points worth at least $1,000. These point farms tend to be very small. Some, however, normally may have large sales but have low sales in a particular year due to bad weather, crop or livestock disease, or other factors.