Chapter 2

Determinants of Farm Size and Survival

There has long been interest in the forces driving structural change in agriculture and how agricultural policy can or has influenced this change (USDA, 1981; Shepard and Collins, 1982; Leathers, 1992; Tweeten, 1993; Harrington and Reinsel, 1995; Atwood et al., 1996; Huffman and Evenson, 2001). Cochrane's (1958; 1979) "technology treadmill" model focused on the adoption and diffusion of technology. In this framework, technological innovations reduce production costs, thereby creating incentives for individual operators to adopt the new innovation. Early adopters benefit from a new technology. However, as an innovation diffuses among producers, industry output increases and commodity prices fall. Lower prices force out less efficient producers. According to Cochrane, larger farms are better suited to innovate and adopt new technologies, and the nature of many new technologies requires a minimum farm size to be profitably adopted. Hence, technological change and economies of scale drive farm size growth.

Kislev and Peterson (1982) articulated a simple but influential model that points to labor mobility between farm and nonfarm sectors as the driving force behind structural change. In their framework, the movement of labor out of agriculture has been driven by economywide increases in labor productivity, which caused wages to rise relative to the price of capital. As relative labor costs increased, farms substituted capital for labor in the production process, resulting in larger and more capital-intensive farms.

Neither of these models offers clear implications for how government payments affect farm structure in the absence of transaction costs or market imperfections. For example, in the Kislev and Peterson framework, an increase in commodity program payments might increase returns to farming, but would be capitalized into the price of land. But because payments would not affect costs of labor relative to capital, they would have no effect on farm size.

Transaction costs and market imperfections allow for a variety of mechanisms through which payments could affect farm structure. For example, payments might make it easier or less expensive for larger farms to finance production. Commodity program payments provide cash, some degree of insurance (due to links with commodity prices), and perhaps also a means to leverage greater resources from lending institutions, all of which may lower farmers' capital costs (Evans and Jovanovic, 1989; Holtz-Eakin et al., 1994; Bierlen and Featherstone, 1998; Hubbard and Kashyap, 1992; Barry et al., 2000; Key and Roberts, 2005; Roberts and Key, 2002). Lower capital costs may allow some farms to more quickly adopt new technologies (Cochrane model) or may provide an incentive to operate on a capital-intensive and larger scale (Kislev and Peterson model). In a context of increasing returns to scale, payments might facilitate farms' becoming larger in the short run, but not necessarily the long run (e.g., Morrison Paul and Nehring, 2005; Morrison Paul et al., 2004). Over time, business owners may accumulate sufficient wealth to finance an efficient scale of production, thereby mitigating the influence of payments as a source of liquidity.

If payments are not fully capitalized into land values, then they implicitly increase returns to nonland assets, such as labor. By increasing returns to labor, payments provide an incentive for farmers to work more onfarm and to increase their scale of production. If payments are decoupled from production, as some were after 1996, they could have the opposite effect on scale. In this case, higher income from commodity program payments could induce farmers to work less onfarm, resulting in less total labor (farmer and hired labor) and less production if there are costs associated with hiring labor or finding employment off farm (Lopez, 1984). While land rents are likely associated with payment levels, some evidence suggests that rents do not rise dollar-for-dollar with payments (Goodwin et al., 2003; Roberts et al., 2003). These findings suggest that payments influence labor/leisure decisions and/or facilitate capital acquisition.

Since the effect of payments on structure cannot be predicted from theory, this study addresses whether the level of farm payments is associated with farm size and the survival of farms using an empirical approach.