



China's hog production: From backyard to large-scale☆

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ABSTRACT

China's hog production has undergone significant structural transition, from the traditional backyard production mode to the large-scale production mode. In this study, we illustrate the linkage between economic development and the transition in hog production mode. Using unique and nationally representative survey data, we find that an increase in farmer wealth motivates them to transition away from backyard hog production. However, the relationship between wealth and herd size among large-scale hog producers is positive. With farmer wealth increasing rapidly, the transition of China's hog production toward the large-scale mode is expected to continue; this will have significant implications for not only hog production, but also the feed sector and many other related sectors.

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1. Introduction

As the world's largest hog producer, pork consumer, and pork exporter, China is experiencing an important transition, from backyard, household-based production to large-scale production. According to China's national statistics, during the past decade the share of the country's hogs raised by backyard producers decreased from more than two-thirds to about one-third (National Bureau of Statistics of China, hereafter referred to as NSBC, 2013). Correspondingly, large-scale hog producers have dominated China's hog production since 2007 (Gale, Marti, & Hu, 2012).

This transition has had significant implications for not only China's livestock industries, but also the global meat and feed trade markets. In 2013, even though more than 700 million fattened hogs—about one-half of the world's total production—were slaughtered in China, the country still imported 584,000 tons of pork (National Bureau of Statistics of China, 2014; United States Department of Agriculture, 2015). In the feed market, although China has been able to fulfill most of its own domestic

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hog demand, its protein feed needs have largely been met by the international market. In 2013, China imported 63.4 million tons of soybeans in 2013; this amount constitutes about two-thirds of the soybeans traded in the world market (Taylor & Koo, 2015).

Given the importance of these changes, the lack of rigorous analysis on the determinants of this widely observed transition is surprising. Several factors may have simultaneously affected the transition (Gale et al., 2012). However, to the best of our knowledge, no rigorous empirical research based on nationally representative data has attempted to parse the effect of each of these potential factors on a farmer's decision to switch from backyard production to large-scale production.

The overall goal of this study is to gain a better understanding of China's transition in hog production modes, with particular focus on the major factors that have facilitated this transition. Specifically, this study aims to provide empirical answers to two questions—namely, “What are the general trends in the structure of the hog production industry in China?” and “How do various factors, especially farmer wealth, affect farmer participation in backyard versus large-scale hog production?”.

The rest of this paper is organized as follows. In Section 2, we review the evolution of hog production in China in recent decades. We also present the dynamics of the various types of hog producer (e.g., backyard producers and large-scale hog producers). Section 3 discusses our sampling approach and data collection methods. In Section 4, we econometrically estimate the effect of farmer wealth and other factors on changes to the hog production model and herd size. Section 5 summarizes our findings and discusses policy implications.

2. Transitioning from backyard to large-scale production

Hog producers in China can be classified into one of two types. The first type is the so-called backyard producer. A backyard producer usually raises one or two hogs annually in his or her own backyard (Schneider, 2011). A backyard producer either keeps the hogs in a pen in the backyard or lets the hogs run in the yard or village. For backyard producers, raising hogs is just one of several production activities; they also raise other livestock and poultry and, most importantly, farm crops (Zhang, Li, Liu, & Chen, 2013). As shown in Table 1, as of 1987—after agricultural reforms had been implemented for 10 years—more than 75% of farmers still raised hogs in their own backyards.

The second type of hog producer focuses on hog production as the main, if not sole, source of income. This type of producer can be divided further into specialized hog production households, which usually do not hire laborers, and large-scale producers, which hire laborers. A specialized household's herd size ranges from dozens to hundreds of hogs. In contrast, a large-scale producer's herd size usually ranges from several hundreds to millions of hogs.

Specialized hog production households emerged in rural China during the implementation of agricultural reform in the late 1970s. Before the reform, backyard hog producers faced at least two challenges—namely, credit constraints and policies that discouraged the development of the private economy. Therefore, although almost every household raised hogs, they usually raised only very few hogs (Chen, Liu, Ruth, & Xiao, 2012). The agricultural reform gradually eliminated these antidevelopment policies (Wang & Xiao, 2008). As economic growth accelerated following the agricultural reform, farmer income increased significantly (NBSC, various years). Some backyard producers expanded their herd sizes and became specialized households. As shown in Table 1, in terms of the number of hogs slaughtered, the share of specialized households increased from 3% in 1985 to nearly one-third in 2011.

At the same time, most backyard producers abandoned hog farming, for two reasons. First, the vibrant non-farm labor market absorbed a considerable amount of rural labor, especially female laborers who traditionally had been involved in backyard hog production. Second, as their income increased, farmers increasingly wanted a cleaner environment. A backyard producer must share a small lot, usually less than 1/6 acre, with hogs, other livestock, and poultry. Of course, hog manure is unpleasant. Therefore, as farmer income increased, their reservation price for a cleaner living environment increased. As a result, most backyard hog producers gradually abandoned hog farming (Chen et al., 2012; Chen & Wang, 2013). According to industry reports, the number of backyard hog producers has declined consistently since the mid-2000s (Gale et al., 2012). As shown in Table 1, as of 2011, about 80% of households in China do not raise hogs.

On the other hand, pork demand has increased rapidly as per-capita income has grown. According to China's national statistics (NBSC, various years), since 1978, the real total income of rural residents has increased by more than 12 times, while the real

Table 1
Hogs slaughtered by farm size, 1987–2012.

		1987	2002	2007	2011	2012
Households (%)	0	24.39 ^a	57.11	67.62	78.25	79.59
	1–49	75.46 ^a	42.46	31.49	20.72	19.36
	50–499	0.15 ^a	0.41	0.83	0.94	0.95
	500 +		0.01	0.05	0.09	0.10
Hogs slaughtered(%)	1–49	95 ^a	73	52	35	
	50–499	3 ^a	17	27	29	
	500 +	3 ^a	8	22	36	

Data source: National Bureau of Statistics of China (various years).

^a The 1987 data are calculated based on Chang & Zuo (1988) and National Bureau of Statistics of China (1999).

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