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Policy support and emerging farmer professional cooperatives in rural China

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ABSTRACT

Most farms in China are small and vulnerable to the forces of powerful markets. Recognizing the challenges of small farming, China has promoted farmer professional cooperatives (FPCs) during the past two decades. The overall goal of this study is to analyze the emergence and current status of FPCs, the nature of recent policy initiatives and the role of government policies that have played in promoting recent trends. Based on a unique panel data from two rounds of national representative surveys of 380 villages in 2003 and 2009, this paper shows that while there was nearly no FPC in late 1990s, there were FPCs in 21% of China's villages and these FPCs provided services to about 24 million farm households in 2008. The determinants of FPC analysis show that the role of the government is of primary importance. Policy support measures and, most likely, the new legal setting in China after the passage of the 2006 FPC law, account for most of the growth of FPCs.

1. Introduction

China's economic reform from 1978 to 1984 was initiated within its agricultural sector through the implementation of a household responsibility system (HRS). This reform equally allocated collectively owned (or village-controlled) land to individual households in each village. Households had land-use rights for 15 years. In the mid-1990s land-use contracts were renewed for another 30 years and in 2008 China's leadership announced that these user rights would be indefinitely valid (State Council, 2008).

Previous studies have shown that HRS significantly improved China's agricultural productivity and increased farmer income in the early reform period (1978–1984). The annual growth rate of grain production was nearly 5% between 1978 and 1984 (NSBC, 2004–2009). The production of cash crops increased even more quickly (e.g., oil crops grew by 14.9% annually; cotton by 19.3% annually), and meat production grew by 9.1% annually (NSBC, 2004–2009). Increasing productivity and rising agricultural prices led to improved farmer income and reduced levels of rural poverty. Per capita income in real terms increased 150% between 1978 and 1984. The incidence of rural poverty fell from 30.7% in 1978 to 14.8% in 1984 (NSBC, 2007). HRS also facilitated China's market expansion in the later reform periods (after 1984). China's rural developments helped many farmers make planting and marketing decisions based upon market prices, which led many farmers shift into the production of higher valued crops (Huang & Rozelle, 2006). Productivity gains and institutional reform in rural China contributed to the majority of economic progress during the early reform period (McMillan, Whalley, & Zhu, 1989; Lin 1992; Huang & Rozelle, 1996; Fan 1997).

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Table 1
The emergence of farmer professional cooperatives (FPCs) and average farm size in China, 1984–2008.
Sources: FPC numbers are from authors' 2 rounds of surveys in 2003 and 2009. Average farm size numbers are from NSBC, various issues from 1986 to 2008.

Year	Percentage of villages with FPCs		Average farm size in China (ha)
	Based on 380 villages surveyed in 2003 and 2009[a]	Based on entire sample (2459 villages) from 2003 survey	
1984	0.00	0.00	0.73
1985	0.00	0.00	0.70
1986	0.00	0.00	0.70
1987	0.00	0.08	0.69
1988	0.00	0.08	0.68
1989	0.00	0.08	0.68
1990	0.00	0.14	0.67
1991	0.00	0.19	0.68
1992	0.00	0.26	0.65
1993	0.00	0.32	0.67
1994	0.00	0.52	0.65
1995	0.00	0.58	0.65
1996	0.00	0.59	0.67
1997	0.00	0.64	0.61
1998	0.00	1.57	0.59
1999	1.04	2.70	0.58
2000	1.38	3.43	0.55
2001	2.65	4.35	0.56
2002	3.64	5.07	0.55
2003	4.85	5.65	0.54
2004	5.11		0.55
2005	4.90		0.57
2006	6.73		0.58
2007	10.59		0.58
2008	20.75		0.60

[a] Numbers in 2004–2008 are based on the second round of survey in 2009. The slight lower numbers in 2004 and 2005 compared to those in 2003 are likely due to errors of recall by the village leaders who may have forgotten the activities of FPCs in the past.

Although HRS contributed to the outstanding performance of China's agriculture in the early reform period and facilitated many of the subsequent economic reforms, the nature of China's demographic organization, in fact, created a set of challenges to those charged with transforming agriculture into a modern sector in the 1980s. Given the large rural population (more than 800 million in the early 1980s residing in approximately 200 million households), the average size of a farm in China was only about 0.73 ha in 1984 (Table 1). With rising rural households, the average farm size actually fell during the first 25 years of reform. By 2003 each rural family, on average, had only 0.54 ha on which to grow crops. Although there has been a slight rise in the average size of each farm (for the first time since the 1950s) due to cultivated land rental transactions among farm households, which has accompanied the large shift of labor into the off farm sector, the average farm size was still only 0.6 ha in 2008 (Table 1). Furthermore, the typical farm in the early 2000s in China had productive assets valued at less than US$700, or 5600 yuan (Rozelle & Huang, 2006). Today, most farms in China are small, labor-intensive units that are vulnerable to the forces of powerful markets.

Internationally, although there are active debates in the literature regarding farmer cooperatives and agricultural development (e.g., Staatz, 1987), most development economists believe that cooperative arrangements play an important role for emerging economies. When production systems are atomistic, infrastructure and information networks tend to be poor, which can limit the income earning possibilities of farming households (Mendoza & Rosegrant, 1995). In many developing countries, cooperatives have been shown to help farm households access inputs at lower prices, sell their output and improve production efficiency (Fulton, 1995; Lele, 1981).[1]

A review of the literature also shows that it is important that the right agency or institutional framework be arranged to promote farmer cooperatives (Ostrom, 1990; Stefanson, 1999). Often farmers need to be encouraged or enticed to join such organizations, but to be successful farmer cooperatives must also be voluntary (Harris, Stefanson, & Fulton, 1996; Cook, 1994). Around the world governments (or some agent of the government) often are involved with cooperatives in one way or another (Fulton, 2005). For example, in the US it is the job of some agents in the extension service to support the work of cooperatives. In Japan there is a special ministry-level cooperative commission. European cooperative movements are quite mature, and local cooperatives are bound together by informal networks of upper-level, pan-national cooperative associations (often with strong

[1] The literature has documented many advantages that FPCs can provide to farmers. Several papers have general reviews of the benefits that FPCs can give to farmers (Staatz, 1987; Fulton, 2005). A number of other authors have cited specific advantages. For example, FPCs may reduce transaction costs by reducing taking advantage of bulk sales (Holloway, Nicholson and Delgado, 2000; Hellin, Lundy and Meijer, 2009; Blandon, Henson and Cranfield, 2009). FPCs also have been shown to reduce marketing risks by helping to provide stable channels through which farmers can take their products to market (Kimball, 1988; Albaum, 1966). FPCs can also help improve the position of farmers when they are negotiating in the market to gain more competitive prices for both inputs and outputs (Cotteril, 1984; Torgerson, Reynolds and Gray, 1998). FPCs have been shown to reduce information asymmetry between farmers and the external market (Bijman and Hendrikse, 2003). Finally, FPCs can facilitate large scale, multiple-household investments as well as helping the government to establish extension networks that can provide better information on technology and information services (World Bank, 2006).

government ties). Currently, in China the government (and, in particular, the agricultural ministerial system) is responsible for promoting and fostering the nation's farmer cooperatives.[2] Recognizing the challenges of developing a decentralized agricultural economy in terms of improving agricultural labor productivity and modernizing the agricultural production and marketing process, China has promoted different forms of farmer professional cooperatives during the past two decades. While, in theory, extension initiatives have emphasized the voluntary nature of farmer participation, the government has taken on the role as the major catalyst to promote farmer professional cooperatives. In the 1980s some government officials directly engaged in the creation of farmer cooperatives. During the 1990s officials in some areas used additional measures to promote agricultural input supply cooperatives or professional production and technology-based associations. Local governments have provided financial support aid for cooperatives (Han, 2007). In recent years legal reforms and intensifying levels of aid have contributed to the emergence of farmer professional cooperatives in China.

So what is the status of farming cooperatives today in China? There are a number of questions that have been raised about the current status of farmer professional cooperatives in China, the policy environment and the role of the actions of governments on their development. Specifically, what has been the trend of farmer professional cooperatives in recent years? How do farmer profession cooperatives function? What kind of services do they offer their members? What efforts are being made by the government to promote farmer cooperatives? What is the role of these measures in facilitating the emergence of farmer professional cooperatives?

Surprisingly, although the promotion of farmer professional cooperatives in rural China has been one of major rural policies in recent years (State Council, 2009), such institutions are still relatively low profile. There has been little written about their emergence and development that is based on carefully collected field survey data from samples that cover large areas of China. Because of this absence of information, it is difficult to answer the questions raised in the paragraph above. The Ministry of Agriculture claims that the number of farmer professional cooperatives reached 180 thousand in 2008 (MOA, 2009). The same source states that 9.7% of farmers belong to at least one farmer professional cooperative (which would mean that China has 24.6 million farmer cooperative members). Yuan (2008) states (without documentation/attribution) that there were 150 thousand farmer professional cooperatives with 35 million members (accounting for 13.8% of farm households). Are these numbers accurate? The source of these numbers is typically not clear. Of the academic studies of farmer professional cooperatives in the literature inside China, most of the papers/articles are based on individual case studies or small local investigations (e.g., Kong & Guo, 2006; Huang, Fu, & Huang, 1999; Han, 2007; Xu & Huang, 2009; Zhao, 2009). Rarely do the studies seek to document trends over time. With the exception of Shen, Rozelle and Zhang (2005) and Han (2007), no study has tried to estimate the trajectory of the emergence of farmer professional cooperatives. Shen et al. (2005)) reports on a data collection effort from six provinces and shows that about 10% of villages in China had farmer professional associations by 2003, rising from almost none in the early 1990s. Han (2007) estimates that there had been an increasing trend of farmer professional associations, and by 2004 there were about 22% villages in China that had farmer professional associations.

The overall goal of this study is to answer some of the basic outstanding questions about the emergence of China's farmer professional cooperatives. More precisely, we are interested in describing the emergence and current status of farmer cooperatives, the nature of recent policy initiatives and the role of that government policy has played in promoting recent trends.

In order to achieve these general goals, the paper is organized as follows. In the next section our sampling procedures, the data collection efforts of the authors and the scope of the data used in this study are described. Then we will trace out the evolution of farmer professional cooperatives and illustrate their organization. This section also documents recent policy changes involving farmer professional cooperatives. Section 4 provides descriptive/correlation analysis on the relationship between recent government initiatives to promote farmer professional cooperatives and their emergence. Section 5 seeks to more formally analyze the same question by specifying an econometric model and presenting the results of the multivariate analysis. The final section concludes.

Studies of changing institutions, such as farmer professional cooperatives, necessarily require careful definition and will involve certain limitations. For example, there are many different types of organizations—professional and otherwise—emerging in rural China. In this paper we restrict our attention to farmer organizations that are involved in agricultural production (as opposed to organization that have arisen for industrial production; managing flooding; etc.). Today's FPCs are different than the communes and brigades that used to be the basic unit of agricultural production in the 1950s, 1960s and 1970s. FPCs in China are more like cooperative elsewhere in the world and include organizations that supply inputs, manage production and promote technology as well as those that are engaged primarily with marketing). Cooperative organizations in China have had different names and acronyms. To simplify, we use the term of farmer professional cooperatives (or FPCs) in the rest of this paper.

[2] We would like to thank the anonymous reviewer for this comment. In fact, in many countries, particularly in developed countries, governments only play a minor role in supporting cooperatives. Many countries have a cooperative law, stipulating what a cooperative is and what its right and obligations are. Thus, countries have set an enabling institutional environment, but do not necessarily support cooperatives directly. In many developing countries direct government interference with cooperatives has lead to cooperatives becoming political instruments and/or cooperatives being inefficient due to incompetent leaders (see Hussi, Murphy, Lindberg and Brenneman (1993) for a review of the development of cooperatives and the negative role of state interference in Sub Saharan Africa). In those countries, the word 'cooperative' has a negative connotation. New forms of producer collective action in those countries are now named Producer Organizations (see for instance World Bank, 2006).

2. Data

The data used in this study are from a subset of data that was collected during two rounds of nationwide surveys. The survey efforts were carried out by the authors in late 2003 (collecting primarily 2003 data) and early 2009 (collecting primarily 2008 data). Prior to the launching of the first round of the survey, we designed a sampling procedure using the village as the basic unit of analysis.[3] We chose the sample and implemented the survey in 6 provinces and 36 counties in a nearly nationally representative sample.[4] The sample provinces were each randomly selected from each of China's major agro-ecological zones.[5]

The sample villages were selected by a process that the survey teams implemented uniformly in each of the sample provinces. Six counties were selected from each province, two from each tercile of a list of counties arranged in descending order of gross value of industrial output per capita (GVIO/capita). GVIO/capita was used on the basis of the findings in Rozelle (1996) that GVIO is one of the best predictors of standard of living and development potential, often making it more reliable (in a statistical sense) than net rural per capita income (although it is highly correlated with per capita income; the correlation coefficient between per capita GVIO and per capita rural income is higher than 0.75). Within each county, we also chose six townships, following the same procedure as the county selection. When our enumerator teams visited each of the 216 townships (6 provinces × 6 counties × 6 townships) officials asked each village to send two representatives (typically the village leader and accountant) to a meeting in the township. On average, enumerators surveyed around 11 villages in each township. In total, we surveyed 2459 villages.

In this paper we drew mostly on survey data that was focused on FPCs. After answering questions about the economic, political and demographic conditions of their villages in 1997 and 2002, we also asked the respondent if any farmers in their villages belonged to an FPC. The respondent was asked to divide participation between those that were part of an FPC that was established within their village and those that were part of an FPC outside the boundaries of the village.[6] If the answer was "yes, there is an FPC in or around the village" the respondents answered a set of questions about the activities of the FPCs. The questionnaire was designed to elicit information about the size of the association, its coverage, its main functions, information about its charter, registration rules and internal organization. The survey also included a sub-block that attempted to understand how the actions of government agencies affected the start-up and operation of the FPCs.

In the 2009 survey we conducted a second round of data collection in 380 villages, all of which were chosen from among the previous 2459 villages that were surveyed in 2003. We reduced the size of the village sample because in the second round we wanted to conduct intensive interviews with the FPC managers in addition to repeating the village leader survey. To ensure that the second survey would also be nationally representative, we followed a carefully selected the subsample of villages to be included. First, we eliminated Gansu Province because we already had a province (Shaanxi) that was representative of Northwest China. In the five provinces surveyed, we randomly selected one county from each tercile (there were three terciles with six counties surveyed in each province in 2003). Within each selected county, we divided six of the sample towns (from 2003) into two groups (one including the three poorest towns and other including the three nonpoor towns). We then randomly selected one from each of the two town groups. Within the selected towns, as before, we included all of the villages in the town (that is, we did a census of FPC activity in all of the villages in the town). In total, the second round of survey in 2009 covered five provinces, fifteen counties, thirty townships and 380 villages.[7]

After the survey of village leaders was completed (during which we gathered general information about villages and their economic/policy environment), we made appointments with the managers of every single FPC in all of 380 villages where an FPC was present. In total we interviewed the managers of 112 FPCs. The questionnaire focused on collecting basic information about the start up of the FPC, the nature of its management, governance, business practices as well as a variety of other questions about FPC activities and its interaction with government policy support measures.

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[3] In China, the village is the most basic administrative unit. According to our data, the typical village in China contains 1390 individuals, about 390 households and nearly 200 ha of cultivated land in 2008. In fact, FPCs do not need to be organized at the village level. It is possible (and in fact there are FPCs that are organized in more than one village). However, there are several reasons that we choose to use the village as the basic level of analysis. First, in our pretests we discovered that most FPCs were, in fact, organized at the village level. There are naturally closer connections among the households within the same village. As a consequence it is easy to see why it is easier for them to unite as a cooperative. Because of this natural tendency to organize FPCs around villages, government officials in charge of FPCs often use villages to promote FPC activities. Moreover, all farmers in China belong to a village. Therefore, even if there was an FPC that included farmers from more than one village, the village leader would know about such an organization.

[4] Comparing descriptive statistics from our sample with 2003 national numbers from the 2004 yearbook of the China National Statistical Bureau (NSBC, 2004) shows that, in fact, our data appears to be representative. The differences, for example, between our numbers and NSBC numbers for land per capita; household size and rural per capita income are fairly small.

[5] The sample villages come from six representative provinces. Jiangsu represents the eastern coastal areas (Jiangsu, Shandong, Shanhai, Zhejiang, Fujian and Guangdong); Sichuan represents the southwestern provinces (Sichuan, Guizhou, Chongqing and Yunnan) plus Guangxi; Shaanxi and Gansu represents the provinces on the Loess Plateau (Shaanxi and Shanxi), neighboring Inner Mongolia and the rest of the provinces in the northwest (Gansu, Ningxia, Qinghai and Xinjiang); Hebei represents the north and central provinces (Hebei, Henan, Anhui, Hubei, Jiangxi, Beijing, Tianjin and Hunan); and Jilin represents the northeastern provinces (Jilin, Liaoning and Heilongjiang). While we recognize that we have deviated from the standard definition of China's agoecological zones, the realities of survey work justified our compromises. Pretests in Guangdong demonstrated that data collection was extraordinarily expensive and the attrition rate high. One of our funding agencies demanded that we choose at least two provinces in the northwest. Our budget did not allow us to add another central province (e.g., Hunan or Hubei) to the sample.

[6] To avoid the double accounting of FPCs, in our analysis we only use data about membership in FPCs that are within the village.

[7] Descriptive statistics from the data that covered village characteristics (e.g., average per capita income—2003; per household cultivated land holdings—2003; and the size of village's population—2003) in the 380 sample villages were found to be *not* statistically significant different from average values of the same village characteristics of the 2459 villages (that is the average value of the variables measured with 2003 data) that were surveyed in 2003, but not in 2009. This finding helps support our assertion that in 2009 we drew a sample that is representative of our original sample. This in itself is important, since as stated above in footnote 1, the original sample in 2003 can be shown to be representative of China—when examining the average level of many variables.

3. The evolution of FPCs and China's policy environment

In this section we document recent trends in the emergence of FPCs over the past three decades and describe some of the services that FPCs offer to their members. Although the sample size was relatively small (only 0.38% of China's villages in the 2003 survey and 0.06% in the 2009 survey),[8] under the assumption that our sample is national representative and using the regional village numbers as statistical weights (as we do in the rest of this paper), we can estimate (by extrapolation from our sample to the rest of China) national FPC point estimates and trends.[9]

The results of the emergence of China's FPCs are presented in columns 1 and 2 in Table 1. The first column has the estimated number of FPCs through 2008. These numbers are based on our panel data from the 380 villages (the 2009 survey). The numbers in the second column are referenced by date according to the entire sample that was collected in 2003 (that is, the 2459 village survey). Comparing columns 1 and 2, the data from the smaller sample (collected in 2009) seems to slightly underestimate the percentage of villages that have FPCs in all years (when compared to the larger, 2003 sample). The differences in the levels of the two trends generated from the two waves of our survey should not disguise a more important point: the overall trends from both sets of estimates (estimates that were done five years apart) are similar, which may provide confidence that the estimates are relatively consistent.

Table 1 reveals several interesting findings. The trends created from our surveys are consistent with the evolution of the national government policy effort. Most poignantly, according to our data, during the 1980s and 1990s, the exponential increase of FPCs never occurred. According to either data set (the 2003 or 2009 data set), FPCs were slow growing during the early and middle reform years (1980s and 1990s). For example, according the 2003 survey, after FPCs appeared in 1987, the percentage of villages with FPCs rose only marginally from 0.14 in 1990 to 0.64 in 1997 (Table 1, column 2).

While an advocate of cooperatives might be disappointed with these results, in fact, the almost complete absence of FPCs was consistent with the political will of the leadership during this time. After the implementation of HRS and the abolishment of the commune system, farmers in some places found it difficult to purchase inputs (Stone, 1988). Part of the problem was that the Agricultural Input Supply and Marketing Cooperatives (AICs), which were set up to service collective farming through planning system before economic reform initiated in the late 1970s, failed to provide marketing service for millions of individual small farmers. During this time, agricultural input market liberalization in China was in its early infancy and there were few competing sources of input supply (Sicular, 1988). In order to facilitate better access to inputs, in 1987 the State Council issued a policy document encouraging AICs to work with farmers and jointly establish early versions of FPCs. While this might have triggered an early surge of FPC emergence, simultaneous concern about the creation of alternative bases of political power (inside the FPC movement) essentially undermined this first attempt at promoting FPCs.

In fact, a more favorable policy environment for FPCs did not appear until the late 1990s. By this period the reforms China's agricultural commodity and input markets had already become well established and were becoming increasingly integrated and efficient (Rozelle, Park, Huang, & Jinet, 2000). Hence, from this point of view there was less of an imperative to establish FPCs. However, at the same time, two trends were working in a way that would make FPCs more attractive (and needed). First, China's cultivated land was becoming increasingly fragmented (Table 1, column 3). Second, with the rise of markets there were increasing opportunities to specialize in producing higher-value cash crops and specialty commodities. In order to take advantage of these new opportunities, it was clear that farmers could benefit from the services of a strong FPC. In 1998 the government began its first serious effort at promoting FPCs. The first directive (The State Council, 1998) stated that as long as FPCs were based on the principal that they were voluntary organizations established by farmers themselves to target input supply and technology and/or marketing activities, they should be encouraged and supported by the government.

Since this initial effort, a number of other directives came out in support of FPCs. Above all, the Ministry of Civil Administration, the National Science and Technology Commission and the Ministry of Agriculture (MOA) began to slowly promote FPCs and launch pilot programs in the late 1990s and early 2000s. For example, in 2002 the MOA selected 100 FPCs throughout China for which they would provide support as pilot FPCs to demonstrate the importance of farmer-led organizations. To develop their pilot FPCs, MOA officials provided services in the areas of marketing information and technology availability. FPC managers were trained in quality control and product certification (among other activities). In 2004 the MOA invested 20 million yuan to support a second set of 100 farmer-led FPCs.

As a result of these efforts, according to our first round survey (Table 1, column 2), the share of villages that started FPCs increased from 0.64% in 1997 to 5.65% in 2003 (column 2, Table 1). If our 2003 sample was representative of the whole nation, this would imply that in 2003 there were more than 36 thousands villages in China with at least one FPC. While the percentage point estimates are slightly lower, the 2009 survey recorded similar rates of growth in the late 1990s and early 2000s (Table 1, column 1).

The most rapid growth of FPCs, however, according to our data, occurred after 2005 (column 1, Table 1). The percentage of villages that had FPCs in China reached 6.73% in 2006 and 10.59% in 2007. The number further doubled in 2008 over 2007, reaching 20.75% in 2008. Assuming that our data can be used to predict point estimates for China, our data imply that there were about 133 thousands villages that already had at least one FPC in 2008 (Table 2). Because some villages had more than one FPC, the total number of FPCs located in villages reached 208 thousand in 2008.[10]

[8] The number of villages in China was about 640,000 in 2006.

[9] The numbers in 2003 and 2009 were actual numbers reported by village leaders for the current year. The historical data (all numbers except for those for 2003 an 2008) were generated based on the recall of village leaders.

[10] In 2008, among villages with FPCs, shares of villages had 2, 3, and 4 or more FPCs were 13.2%, 5.3%, and 2.6%, respectively.

Table 2
Estimated numbers (thousands) of FPCs, villages with FPCs and number of farm households that belonged to or were associated with FPCs in China in 2008. Source: Authors' 2009 household survey.

	Villages with FPCs	Number of FPCs			Farm households belonging to FPCs		
		Total	Registered	Not registered	Total	As formal members	As informal members
Total		212	185	27			
FPCs located in villages	133	208	181	27	23,809	9906	13,904
FPCs located at county seat		4	4	0	NA	NA	NA

Note: FPCs located in villages include those in the townships. NA: not available.

So what triggered the rapid growth in the second part of the 2000s decade? Almost certainly one main impetus was the FPC law of 2006 (Sonntag, Huang, Rozelle, & Skerritt, 2005).[11] Above all, the national FPC law gave confidence to the officials that were charged with promoting FPCs that their mission was in sync with the nation's development efforts. This law also gave formal legal status to FPCs. After the passage of the law, FPCs were able to sign contracts and act as business entities.[12]

To estimate the total number of FPCs in China there needed to be one more set of FPCs in our 2009 data. We had to consider FPCs located in county seat (or county capital) because it is possible that FPCs are concentrated in such location. If the FPCs in county seats are not accounted for, it is possible that we are underestimating the total number. This is especially true since we did not include county seats in the original survey (in 2003).

The number of FPCs in county seat was estimated by asking county leaders the following question: how many FPCs are located in your county seat (and not in any of the surrounding villages or towns). The reason that we had to consider them separately (by conducting a separate survey) is that these were the only FPCs that could not be identified in a village-based survey. When accounting for the FPCs in county seats the estimates of the number of FPCs change. Our survey shows that in 2008, on average, there were 2.16 FPCs located in each of 15 county capitals covered in this study. Based on this information, and given that there are about 2000 rural based counties in China, we estimate that there were about 4000 FPCs located in county seats.[13] Combining the estimated number of FPCs in villages and towns with the estimated number of FPCs in county seats, we can come to a final estimate: In 2008 there were a total of 212 thousand FPCs in China (Table 2).

Table 2 also shows that among 212 thousand FPCs, there were 185 thousand (or about 87%) that were registered with a local government agency in 2008. While we report registration as a way of assessing how many FPCs were willing to be formally recognized by local governments (due to their registration), the reader needs to be careful in not assuming that registration automatically means that FPCs are any more formal or responsive to farmer needs (or effective in improving agricultural production). The share that was registered in 2008 is much higher than the 69% of FPC that was registered in 2003 (not reported in Table 2).

The FPCs also serve a large number of farmers—who participated both as formal and informal members. In many villages in China FPCs are careful to distinguish between these two types of members. Formal members are often those that have formally joined a cooperative and in some cases have paid a membership fee (which is sometimes called a formal membership fee). Informal members are typically more loosely associated with the FPC, but, often are included in many activities. Specifically, according to our estimates the FPCs that are located in villages alone (not counting those operating in the county seats) have 23.8 million members (formal and informal). This means that, according to our estimates, 9.5% of rural households participated in FPCs in 2008. There also were 9.9 million formal members and 13.9 million informal members in 2008 (Table 2).[14] Interestingly, our estimated number of FPCs is surprisingly close to those of the Ministry of Agriculture (MOA) which reports that in 2008 there were 180 thousand registered FPCs.[15] MOA's estimates also demonstrate that there were 24.6 million households participating in FPCs in 2008. According to the MOA, 9.7% of rural households belonged to FPCs (although the MOA study does not differentiate between formal and informal members).

In sum, by 2008, although only a small share of China's villages hosted FPCs, we find that there is a relatively large absolute level of FPC activity because China is such a large nation. Given the fact that most FPCs were established during the recent two to three years, and if the growth rate of FPCs during these recent years is sustained in the near future, we would expect that in the coming years a lot more villages and farmers will start and be active in FPCs.

[11] More precisely: the new national law on cooperatives was adopted on October 31, 2006, by the 10th National People's Congress of the People's Republic of China. The law was later ratified as Order 57 by President Hu Jintao, and became effective on July 1, 2007.

[12] Prior to the passage of the law allowing FPCs to sign contracts, FPCs could still carry out their activities (e.g., procure inputs, provide technology extension services, and help farmers market their output). However, since they lacked legal status, FPCs could not sign legally binding contracts with suppliers and/or buyers. Although this certainly in many circumstances made it more difficult to help farmers, there were still many ways to conduct business without having to using formal contracts.

[13] In 2007 China had 2859 counties. Among them, 856 counties had no farming sector. Hence, we estimate that there were about 2000 rural-based counties in 2008. This means that in the typical county, the county seat itself hosted two FPCs.

[14] Normally FPCs have formal and informal members. Informal members are those who are not formal members but who do have some regular association/interaction with the FPCs (e.g., in terms of sharing information and arranging inputs and/or marketing output).

[15] The numbers from Ministry of Agriculture were given to the authors by the officials in charge of FPCs in the ministry.

Table 3
Share of FPCs by type of service provided to farmers in 2008.
Sources: Authors' 2009 survey.

	No any service	Provision of technology or information services	Purchase of agricultural inputs	Output marketing services		Credit services	FPC provided at least three types of services [a]
				Sold to FPC	Arranged by FPC		
Average	4	91	49	17	34	1	38
Jiangsu	8	88	42	15	26	2	31
Sichuan	0	100	70	10	50	0	60
Shaanxi	0	94	50	22	44	0	39
Jinli	0	92	50	17	42	0	42
Hebei	0	100	86	29	43	0	57

[a] In total there were four main types of services (columns 2 to 5). In column 7 we present the share of FPCs that present at least three of four types of services to their farmers.

3.1. Organization of and services provided by FPCs

One of the most important findings of our study (beyond providing point estimates of FPC trends) is our documentation of the varied nature of the cooperatives in China's emerging FPC movement. During the second round of the survey in 2009 we also asked a series of questions to the managers of FPCs regarding the services provided by FPCs to their members. Using the data from this block of the survey, we grouped all of the services provided by FPCs to their members into the following four categories: FPCs that mainly supply technological or information services; FPCs that mainly purchase agricultural inputs for their members; FPCs that mainly provide output marketing services for their members; and FPCs that mainly provide credit services to their FPC members.

The results of the survey of FPC services are presented in Table 3. Among all the FPCs surveyed, only 4% of them did not provide any of these services. Moreover, the non-functional FPCs (or those FPCs that did not provide services) occurred in only one of five of the study provinces in 2008 (Table 3, column 1).

So what services do FPCs provide for their members in rural China today? According to the data, providing production technologies and/or marketing information services are the most common services. Table 3 (column 2) illustrates that 91% of FPCs provided technology and/or marketing information to farmers in 2008. Production technology services mainly included services such as the provision of crop management approaches, breeding techniques, pest and disease control suggestions and animal disease prevention and control. Marketing information services mainly included the provision of information about prices and access to marketing channels.

Many FPCs also have begun to provide marketing services for *both* inputs *and* outputs. According to our data, although not every FPC provides all types of services for their members, nearly half (49%) of FPCs did help arrange for the purchase of agricultural inputs (column 3). By far, the most common input procurement service includes the supply of fertilizers (for crops) and feeds (for animals). In some cases, the FPCs were also involved in the provision of pesticides and seeds.

Our data also demonstrate that a similar percentage of FPCs were engaged in the provision of output marketing services (51%, 17 + 34, columns 4 and 5). There were about one fifth of the FPCs, ranging from 10% of the sample villages in Sichuan Province to 29% of the sample villages in Hebei Province, that purchased agricultural outputs from their members (column 4). In many cases the FPC would then resell the output of the FPC members to some outside purchasing agents (Table 3, column 4).

Table 3 also reveals that there is still room for improvement—in the area of providing better services to their farmers. In some countries one of the most important services provided by cooperatives to their members is the provision of credit. For example, Credit services have been important to cooperative members in countries such as Japan, Korea, and Taiwan China (Fukuyama, Guerra, & Weber, 1999; Huang et al., 1999). In our sample villages, however, we only found one FPC in Jiangsu Province that provided informal credit services to its members.[16] In fact, the absence of credit services in FPCs in China might be a result of the fact that the new FPC Law that does not include “credit services” in the list of activities that are allowed to be provided by FPCs to their members.

Table 3 also reveals that FPCs in China are not full service operations. Specifically, the data can be used to show the number of different services that FPCs provide to their members. On average, only 38% of FPCs provided at least three kinds of services in 2008. Most provided only one or two.

4. Government supporting policies and China's FPC

In this section we provide an overview of a number of the policy measures that are being used to promote FPCs at local levels. We also examine the relationship between the policy measures and the emergence of FPCs. The material in this section goes beyond most previous work that examines the main laws and regulations (as discussed above). To collect this new, grassroots information,

[16] This FPC is called Goat Professional Cooperative. Besides providing services on information about new technology and management practices, the FPC also had 30,000 yuan from its share capital that was available to be lent to its members.

Table 4
Share of villages with policy support measures designed to promote FPCs, 1995–2008.
Sources: Numbers are from authors' 2 rounds of surveys in 2003 and 2009.

Year	Percentage (%) of villages with policy support measures for FPCs						
	Any type of support (any of columns 2 to 7)) (1)	Official documents/mobilization meeting during or before the year indicated (2)	Financial support or tax exemption (3)	Credit support (4)	Technical training (5)	Provision of land or office space (6)	In cash or in kind award (7)
1995	2.8	2.6	0.2	0.2	0.2	0.0	0.0
1996	3.3	2.9	0.2	0.4	0.2	0.0	0.0
1997	4.7	4.1	0.2	0.8	0.8	0.0	0.0
1998	12.2	6.3	1.6	5.1	4.9	2.2	1.8
1999	13.3	7.4	1.6	5.1	4.9	2.2	1.8
2000	18.5	11.9	3.5	5.5	6.6	2.4	2.2
2001	20.7	14.2	4.6	6.1	8.2	2.4	2.6
2002	23.8	16.5	5.7	6.6	9.1	3.1	2.6
2003	33.2	24.5	9.1	8.2	11.8	4.3	3.3
2004	39.9	29.4	14.9	10.7	15.6	5.2	4.2
2005	46.9	35.5	18.6	11.5	17.9	6.2	4.2
2006	52.1	39.9	20.9	13.7	20.5	7.8	5.1
2007	57.4	45.9	24.8	17.4	25.6	10.0	5.5
2008	68.2	57.8	30.4	21.5	32.1	12.9	8.8

in the village leader survey we collected detailed information on policy initiatives that are being executed from the upper-level government. We asked three sets of questions: a.) What kinds of supporting policies have been executed by the upper level government in your village? If there were, then: b.) When was each of these policy measures started? and: c.) Are these policy measures still in effect now? According to the data, the major supporting policies include official documents to promote FPCs, mobilization meetings, financial support, tax exemptions, the issuance of credit, technical training for farmers providing land (and/or office space) for FPCs and awards in cash or in kind from the upper level government.

4.1. Supporting policies

Based on the information collected, we estimate percentage of villages receiving past FPC policy supports (Table 4). It is interesting to note that overall the trend of providing policy support for FPCs is similar to the emerging trend of FPCs. While policy support for FPCs was already presented in the middle of the 1990s, in 1997 only 4.7% of villages had access to some kind of policy measure that encouraged/supported that setting up of FPCs (column 1, Table 4). As the macro policy environment towards FPCs improved after 1997, access to such policy support broadened. By 2005 village leaders in nearly half of the villages (46.9%) reported that they would have been able to gain access to at least one of six main supporting policy measures. In fact, the trend has continued. On an annual increase basis, the largest rise was observed after 2007 during the time period after the implementation of the Cooperative Law. In 2008 respondents in more than two thirds of villages stated that they have access to government support for FPCs (68.2%, column 1).

Real fiscal support has also been rising. While it is perhaps true that traditional support measures through official document directives, extension meetings and technical training sessions emerged first and have continued to rise, more real support is also emerging. In 2008 leaders in about 30% of villages report that they were offered financial support (e.g., grants or subsidies) or tax exemptions from government officials (column 3). Credit support for FPC production and commercial and subsidized loans were also offered in 21.5% of villages (column 4). Although arranging access to land and office space occurred in less than 13% of the villages (column 6), some FPC leaders told us that the financial support systems significantly contributed to the establishment of FPCs.

4.2. Supporting policies and FPCs

The data—when more formally analyzed—show the importance of government support for promoting FPCs in a number of ways. First, when we divide the sample villages into villages that did and did not have access to policy, there is a clear relationship between FPCs and policy support (Table 5). For example, in villages without access to any policy support, 92.4% of them never had any FPCs. The corresponding number was 73.0% in the case of villages that had access to some type of policy support measures. In 2008, this correlation is even more pronounced. In 2008 in the case of villages that did not have access to policy support measures, there were less than 7.3% of the villages that had FPCs. The share of villages with FPC rose to 26.3% in the case of villages that did have access to some type of policy support.

Second, the importance of access to policy support is also apparent. The research shows that any number in row 1 (villages without FPCs) are statistically significantly lower than the corresponding number in row 2 (village with FPCs, Table 6).

Table 5
FPCs by villages with access to and villages without access to policy support measures from upper level governments.
Sources: Numbers are from authors' 2 rounds of surveys in 2003 and 2009.

	Sample	Percentage of villages		
		Never had FPC	Once had FPC	Had FPC in 2008
Villages without access to any policy support measures	262	92.4	0.3	7.3
Village with access to some type of policy support measure	118	73.0	0.7	26.3
Average	380	78.6	0.7	20.7

5. Econometric model, estimation and results

Based on the two rounds of surveys, we created panel data for 380 villages in years for the years 2002, 2007 and 2008. We use only these three years instead of data on other years for two reasons. For many explanatory (or right hand side) variables, we want to use variables that are lagged 5 years, which are only available in our dataset for these years (1997, 2002 and 2003). We are also concerned about relying too much on recall data by our village leader/FPC manager respondents.There are a number of reasons why using panel data is attractive, especially compared to the alternative—relying on a single cross section of data. Panel data allow us to not only capture the dynamics of the evolution of FPCs over time, but they also help control some of the endogeneity problems that plague cross sectional analysis (due to omitted variable bias). Based on the panel dataset, we employ an empirical framework to examine whether access to policy support measures for FPCs significantly affect the emergence of FPCs in the sample villages. Our empirical model, in its most basic form, can be specified as:

$$FPC_{it} = a + b\,P_{it-n} + c\,X_{it-5} + d_1 D_{2007} + d_2 D_{2008} + v_i + e_{it} \quad (1)$$

where the dependent variable, FPC_{it} is a dummy variable indicating whether the ith village had an FPC in time period t (either 2002, 2007 or 2008), $FPC_i = 1$ if FPC there was an FPC in the village; otherwise it equals zero. P_{it-n} is the key independent variable(s) of interest on the right hand side of Eq. (1). It is a dummy variable which measures whether or not there was any policy support available for those in the village for the creation of an FPC—before the appearance of the first FPC in the village. In creating this variable, n is equal to or greater than 0. In using this variable in the empirical estimation, we specify the variable measuring whether or not there was policy support for FPCs in two alternative ways. One is a single variable, which equals 1 if there was any kind of policy support measure available to village leaders before the first FPC was established in the village. The other is to specify each individual policy as an independent variable (using the data as they are disaggregated in Table 4). The variable, X_{it-5}, is a vector of explanatory variables to control for the impact of other variables. All of the variables (which are measured at the village level) in X_{it-5} are lagged by 5 years. The control variables in X_{it-5} include a variable controlling for the village's land endowment (average per household cultivated land in the village); a variable controlling for the cropping structure (measured as cash crop sown area as a share of total sown area); a variable measuring economic development (average per capita income); a variable measuring the locational advantage of each village (measured as the distance of the center of the village—the location of the village committee's office or party secretary's house in villages without an office—to the seat of the township government); a variable measuring the village's political capital (which is measured as the number of people working at township government as share of the village's population); and a variable measuring the size of the village (e.g., the total number of households in each village). The variables, D_{2007} and D_{2008}, are year dummies for the years 2007 and 2008. We add these two year dummies to the model in order to capture the effects of the passing of the FPC Law (that was decreed in October 2006) in addition to all other year varying effects. The symbol, v_i represents unobservable effects that vary across villages and which are invariant across time. The term e_{it} is the idiosyncratic error term. The coefficients to be estimated include a, b, c, and d A summary of statistics of both the dependent and independent variables are presented in Appendix A.

5.1. Estimation approach

Eq. (1) is estimated by two alternative approaches. In our first approach, we assume that the independent variables in the model affect the dependent variable in a linear way. If the unobservable effect is correlated with explanatory variables, the unobservable effect is accounted for by including a set of fixed effects, which is just adding a village dummy variable for each of our sample villages. After including the fixed effects, the coefficients in Eq. (1) can be estimated with an Ordinary Least Squares

Table 6
Share (%) of villages with access to different types of policy support measures before FPCs were established in 2002, 2007 and 2008.
Sources: Numbers are from authors' 2 rounds of surveys in 2003 and 2009.

	Sample	With any kind of support	Official document/ mobilization meeting	Financial support or tax exemption	Credit support	Technical training	Provision of land or office space	In cash or in kind award
Villages without FPCs	1012	45	36	16	12	18	6	4
Villages with FPCs	128	77	63	42	33	53	27	16
Average	1140	49	39	19	15	22	9	5

Table 7
Estimated parameters of the determinants of villages with FPCs, based on panel data from 2002, 2007 and 2008 (dependent variable — FPC_{it}: dummy variable = 1, if village has FPC; Independent variable of interest: P_{it-n}, which in this table is measures as a variable which is equal to 1 if there was any type of policy support measure).

	OLS-FE (1)	GLS-RE (2)	Logit-RE (3)
With any policy support measure P_{it-n}	0.08	0.08	0.03
	(2.61)***	(3.68)***	(2.92)***
Average HH land area in village$_{t-5}$	0.03	0.05	0.02
	(0.94)	(2.56)**	(2.37)**
Share of sown area in village devoted to cash crops$_{t-5}$	0.000	0.000	0.000
	(0.11)	(0.39)	(0.58)
Per capita income in village$_{t-5}$	0.01	0.01	0.002
	(0.46)	(1.11)	(0.7)
Distance of village office to township$_{t-5}$	−0.01	−0.004	−0.002
	(1.33)	(1.66)*	(1.73)*
Share of village pop'n that is serving as township officials$_{t-5}$	0.15	0.10	0.02
	(3.51)***	(3.14)***	(2.13)**
Number of households in village$_{t-5}$	0.01	0.02	0.01
	(0.60)	(4.65)***	(3.44)***
2007 year dummy	0.04	0.04	0.04
	(1.91)*	(2.19)**	(2.35)**
2008 year dummy	0.13	0.13	0.09
	(4.85)***	(5.68)***	(3.15)***
Constant	−0.05	−0.11	NA
	(0.63)	(3.41)***	

Note: *, **, *** means that coefficients are statistically significant at the 10%, 5% and 1%, respectively. Number of observation is 1140 (which means that we are using panel data from 2002, 2007 and 2008 for 380 villages).

estimator (henceforth, *OLS-FE*). In contrast, if the unobservable effect is uncorrelated with explanatory variables, the unobservable effect can be defined as a random effect (RE) and a Generalized Least Squares (GLS) estimator is not only consistent but also efficient. Henceforth, this estimator is called the *GLS-RE* model The Hausman specification test can be used to compare the performance of the OLS-FE and GLS-RE modelling approaches.

In our second approach, we assume that the model is in nonlinear form because the dependent variable is a dummy variable. To account for this, we can use a logit model for cross-sectional/time-series datasets to estimate the coefficients in Eq. (1) (Wooldridge, 1999). Like in the case of OLS, logit models can be used under the assumption that fixed effects are needed (*Logit-FE*) or random effects are needed (*Logit-RE*). Therefore, when we estimate Eq. (1), we produce four sets of results: namely, those from OLS-FE, GLS-RE, Logit-FE and Logit-RE models.

Table 8
Estimated parameters of the determinants of villages with FPCs, based on panel data from 2002, 2007 and 2008 (dependent variable — FPC_{it}: dummy variable = 1, if village has FPC; Independent variable of interest: P_{it-n}, which in this table is measured as a variable which is equal to 1 if there an official document or mobilizing meeting promoting the creation of FPCs).

	OLS-FE (1)	GLS-RE (2)	Logit-RE (3)
Official document/mobilizing meeting (one type of policy support measure) P_{it-n}	0.08	0.07	0.02
	(2.70)***	(3.33)***	(2.34)**
Average HH land area in village$_{t-5}$	0.03	0.05	0.02
	(0.95)	(2.50)*	(2.32)**
Share of sown area in village devoted to cash crops$_{t-5}$	0.000	0.000	0.000
	(0.03)	(0.33)	(0.56)
Per capita income in village$_{t-5}$	0.01	0.01	0.001
	(0.49)	(0.96)	(0.51)
Distance of village office to township$_{t-5}$	−0.01	−0.004	−0.002
	(1.42)	(1.67)*	(1.74)*
Share of village pop'n that is serving as township officials$_{t-5}$	0.16	0.11	0.02
	(3.61)***	(3.33)***	(2.25)**
Number of households in village$_{t-5}$	0.01	0.02	0.006
	(0.61)	(4.79)***	(3.61)***
2007 year dummy	0.04	0.05	0.04
	(2.07)**	(2.51)**	(2.47)**
2008 year dummy	0.13	0.13	0.10
	(4.92)***	(6.02)***	(3.31)***
Constant	−0.04	−0.10	NA
	(0.54)	(3.18)***	

Note: *, **, *** means that coefficients are statistically significant at the 10%, 5% and 1%, respectively. Number of observation is 1140 (which means that we are using panel data from 2002, 2007 and 2008 for 380 villages).

Table 9
Estimated parameters of the determinants of villages with FPCs, based on panel data from 2002, 2007 and 2008 (dependent variable — FPC_{it}: dummy variable = 1, if village has FPC; independent variable of interest: P_{it-n}, which in this table is measured as a variable which is equal to 1 if there a specific type of policy support measure promoting the creation of FPCs).[a]

Policy support measures (alternative types of variables) P_{it-n}	OLS-FE (1)	GLS-RE (2)	Logit-RE (3)
Official document/mobilizing meeting	0.08	0.07	0.02
	(2.7)***	(3.33)***	(2.34)**
Financial support or tax exemption	0.19	0.15	0.06
	(5.34)***	(6.01)***	(2.75)***
Credit support	0.17	0.13	0.05
	(3.93)***	(4.8)***	(2.27)**
Technical training	0.21	0.18	0.08
	(5.97)***	(7.5)***	(3.16)***
Provision of land or office space	0.27	0.26	0.14
	(5.72)***	(7.91)***	(2.66)***
In cash or in kind award	0.28	0.21	0.09
	(4.52)***	(4.86)***	(1.75)*

Notes: *, **, *** means that coefficients are statistically significant at the 10%, 5% and 1%, respectively. Number of observation is 1140 (which means that we are using panel data from 2002, 2007 and 2008 for 380 villages).

[a] Note the coefficients in this table are from regressions that are estimating the models from Eq. (1). Each row is from a different regression model (each of which differs by the type of policy support measures). The reported coefficients are estimates of the different types of policy support measures on the emergence of FPCs (or the coefficient for the variable P_{it-n}). The coefficients of the control variables (X_{it-5}, and D_{2007}, D_{2008}) are suppressed for brevity.

Based on the panel data in 2002, 2007 and 2008, we estimated all of the models and conducted the Hausman test on the performance of each model. The test shows that the GLS-RE model performs better than the OLS-FE model. Therefore, in reporting the results in Table 7, we mainly rely on those coefficients estimated by the GLS-RE model (columns 2, 3, 5 and 6). For comparison purposes, however, we also present a subset of the results from the OLS-FE model (Table 7, columns 1 and 4).

5.2. The results

When using the explanatory variable of interest with the most broad definition ($P_{it-n}=1$ if the village had access to any type of policy support), the estimation of Eq. (1) appears to perform well (Table 7). Many of the estimated coefficients of the control variables (X_{it-5},) have signs that are intuitive. The signs (and often the levels of statistical significance) for many of estimated coefficients of the control variables are robust when using the alternative econometric approaches (OLS-FE—column 1; GLS-RE—column 2; Logit-RE—column 3). For example, the year dummy variables are positive and highly significant (at a 1% level of statistical significance) in all of the columns (rows 8 and 9). Although the coefficients on the two year dummy variables measure the effects of all factors associated with the years 2007 and 2008 (not accounted for by the other control variables in the model), it is likely that a large share of the effect is due to the FPC law and its stimulating effect on the creation of new FPCs. Altogether, the variables account for 9 to 13 percentage points of the growth in FPCs between the base year (2003) and 2008 (the coefficients from the OLS-FE and GLS-RE is 0.13; and the coefficient from the Logit-RE is 0.09). The coefficient on the variable measuring the connections of the village in the township also demonstrates that villages with better connections will expand their FPCs more frequently (row 6). As in the case of the Year Dummies, the coefficients are positive and significant in all of the regressions (columns 1 to 3).

The coefficients on a number of the other control variables also are consistent across the different estimators. The signs on the average size of land holdings (row 2), the distance of village office to township (row 5), and the size of the village's households (row 7) are positive in all of the equations (although the levels of the statistical significance differ across the estimators). Specifically, in the case of the coefficients of both variables the levels of significance show that the coefficients are different than zero in two of the three regressions.

The most important results (given the objective of the paper) can be seen from the coefficients on the variable measuring the policy support measures (Table 7, row 1). The coefficients on the variable are positive and significant when using all of the alternative estimators. These findings support the notion that government support is an important part of the strategy to promote the development of FPCs.

The results of the regression when the policy support variable created using information on all of the measures of support are similar to the results of the regressions when the specification of the measures of the variable using single policy initiatives (Tables 8 and 9). The signs, magnitudes and levels of significance on the control variables are almost identical. The signs on the policy support variable when measuring the incidence of official documents and extension meetings (Table 8, row 1) are all positive and significant. This is also true when using any alternative individual measure of policy support (Table 9, rows 2 to 6). The signs and levels of significance show that all of the measures of policy support have been effective in promoting FPCs.

While there are many variables in the different sets of regressions that are shown to be important determinants of the emergence of FPCs, two stand out. Of the 17.1 percentage point growth of FPCs between 2002 and 2008 (Table 1), the 2008 year policy dummy (the effect of FPC law) and the policy support measure variables largely account for the growth. This can be seen by

summing the two products of the change in the level of the explanatory variables and the estimated coefficients. Using the coefficients from the GLS-RE model in Table 7, the total effects of the two variables equal 60% of the total growth.

Surely if the year dummy and the policy support measures are mostly effects caused by the actions of the government, the support of the government can be seen to have been the key to the past expansion of the FPC movement (and likely is the key to future expansion as well).

6. Summary and conclusions

The overall objective of this paper was to describe the emergence and current status of farmer professional cooperatives (FPCs) in China, the nature of recent policy initiatives and the role of that government policy has played in promoting the recent trends. We pursued this objective using a set of panel data that has been collected from villages across China. The nature of the data, when used with a weighting scheme can be used to produce point estimates of the trends of the emergence of FPCs and the importance of government support policies in the promotion of the growth. In briefest summary, our best estimate is that there were FPCs in 21% of China's villages (and county seats) and these FPCs provided services to about 24 million farm households in 2008.

According to the findings of the study, we have found that after decades of sluggish growth, since the late 1990s FPCs have gradually been appearing in the landscape of rural China. In the past three years, the growth has accelerated. Moreover, our data show that the new FPCs are providing most of the services that cooperatives provide farmers in other countries—access to inputs and technology and assistance in marketing output. The only service that is absent that has been thought to be important elsewhere in the world is credit; China's FPCs provide little in the way of credit to its members.

While there has been great growth, the fact is still clear that FPCs are still in a small share of China's villages. And, while there are many factors that correlate with why some villages have FPCs and other do not, the determinants of FPC analysis is clear that the role of the government is of primary importance. Policy support measures (and, most likely, the new legal setting in China after the passage of the 2006 FPC law) account for most of the growth of FPCs. This makes sense since rural China is still a place in which the economy is made up of millions of small farmers, traders, businessmen/women and other atomistic actors. Without an alternative form of organization that can promote this new institutional form (that is, FPCs), the government's role has been key in the past. It likely will be in the future.

There are still a lot of outstanding questions about the current new wave of FPCs. It is not clear if these are sustainable. Can they last without continual government support? Is there an alternative form of support that can be more effective, cost efficient and sustainable? Are FPCs positively affecting farmer income and productivity? These questions and more need to be on the research agenda in the coming years.

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Appendix A

Table A1

Summary of all variables used in regression analysis in Table 7.

Variables	Mean	Std. dev.	Min	Max
Dummy variables				
Village with FPCs	0.12	0.27	0.00	1
Villages w/ access to any policy support measures	0.49	0.50	0.00	1
Official document/mobilizing meeting	0.39	0.49	0.00	1
Financial support or tax exemption	0.19	0.39	0.00	1
Credit support	0.15	0.35	0.00	1
Technical training	0.22	0.41	0.00	1
Provision of land or office space	0.09	0.28	0.00	1
In cash or in kind award	0.05	0.23	0.00	1
Average HH land area in village$_{t-5}$ (ha)	0.47	0.46	0.03	7
Share of sown area in village devoted to cash crops$_{t-5}$ (%)	26.22	21.93	0.00	100
Per capita income in village$_{t-5}$ (thousand yuan/person)	2.09	1.25	0.05	8.14
Distance of village office to township$_{t-5}$ (km)	4.97	4.16	0.00	40
Share of village pop'n that is serving as township officials$_{t-5}$ (%)	0.18	0.29	0.00	4
Number of households in village$_{t-5}$ (100 hhs)	4.03	3.08	0.16	19

Note total sample size is 1140. Means are weighted average of all samples.
Sources: Numbers are from authors' 2 rounds of surveys in 2003 and 2009.

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