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Differential market entry determinants for for-profit and non-profit long-term care providers

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Abstract

This study considers market entry determinants for both for-profit and non-profit at-home long-term care providers in Japan. It examines market structure incentives and barriers to entry using a panel dataset of 48 Japanese municipalities for the 2003–2011 period. Estimation results show that for-profits and non-profits face different determinants of entry. Potential for-profit entrants are sensitive to profit considerations and therefore adapt to the market structure and clear barriers to entry. However, potential non-profits with preferential tax treatment and the constraint of non-distribution of profits enter disadvantaged municipalities. Both profits and non-profits have become integrated in Japanese at-home care markets.

JEL Classifications: C33, I13, L22, L33, R19

Keywords: Entry, For-profit, Non-profit, Long-term at-home care, SUR

1. Introduction

This study considers the determinants of entry for both for-profit and non-profit long-term care providers in the same market. In 2000, a long-term care insurance (LTCI) system was introduced in Japan to solve the long-term care problem of the elderly. Before the introduction of LTCI, long-term care services were provided only by local public or non-profit providers. Since 2000, however, for-profits have been allowed to provide at-home long-term care services and have been competing against non-profit providers for the same market: the municipalities (e.g., cities, towns, and villages) that manage LTCI. While the first stage of LTCI introduction has received considerable research attention, as shown in section 2, no study has so far examined the determinants of entry for for-profit and non-profit care providers. This study aims to describe the determinants of entry of both for-profit and non-profit care providers based on the market traits of each municipality.

The study of market entry determinants for for-profits has been an important field of research since Orr (1974), the earliest empirical work on this topic. The researcher found, using Canadian manufacturing data that expected profit and entry barriers affect market entry. In addition, Gorecki (1975) found that market growth is the most important determinant of market entry. However, he did not find clear evidence that barriers obstruct entry. The relationship between market structure and the determinants of entry/exit has been an interesting research question and an important topic for policy discussion (e.g., Geroski, 1995, Caves, 1998, Manjón-Antolín, 2010). These empirical studies on the determinants of entry/exit were based on the premise that for-profit firms seek to maximize profit. A potential entrant decides whether to enter based on the expected profit, and the market structure (barrier).¹

The behavioral principle that the previous studies discussed is clear for for-profit firms, but not for non-profit organizations. Non-profit organizations might act as for-profit firms do, or they might enter a market (municipality) facing worse conditions (e.g., low profitability) than others. However, non-profit care providers are different from for-profit providers in the matter of, for example, preferential tax treatment and non-distribution of profits (Hansmann, 1980). These differences might affect the determinants of entry for non-profit providers (discussed in section 2).

This study compares estimation results on non-profit and for-profit providers' entry into the Japanese at-home long-term care market. The results show that the determinants of entry differ between for-profit and non-profit providers. Potential for-profit entrants, who are sensitive to profit consideration, adapt to the market structure and clear the barriers to entry. However, potential non-profit providers who are entitled to preferential tax treatment in exchange for the constraint of non-distribution of profits could easily enter municipalities that are at a disadvantage in terms of profit-earning opportunities. Moreover, both profit and non-profit care providers have gradually become

¹ Geroski and Schwalbach (1991) discuss the relationship between entry and market structure. Siegfried and Evans (1994) survey the empirical studies on the determinants of entry/exit. Pehrsson (2009) presents a detailed discussion on the barriers to entry.

integrated in Japanese local at-home care markets.

The paper is organized as follows. Section 2 explains the institutional background of the local long-term care reform of 2000 and reviews previous studies on for-profit and non-profit providers' activities in Japan. The empirical methodology is presented and data described in Section 3. Section 4 shows the estimation results and discusses the main results. Section 5 concludes the study.

2. Background

In most developed countries, the need for long-term care for the elderly has become a great problem with an increase in the aging population. In Japan, one of the most aged countries in the world, LTCI was introduced for the elderly in 2000 to solve the long-term care problem. With the introduction of LTCI, for-profit providers were allowed to enter the at-home care services market to address the short supply of long-term care.² At-home care delivered by for-profit providers is increasing, and constitutes a major part of the supply. According to the Ministry of Health, Labour and Welfare (MHLW),³ the numbers of non-profit and for-profit at-home care providers in 2000 were 6,858 and 2,975, respectively.⁴ The numbers increased to 8,831 and 12,484, respectively, in 2011. The ratio of for-profit to total providers increased rapidly from 30% in 2000 to 59% in 2011.

LTCI is managed by each municipality. However, the central government has established a highly standardized LTCI management system. Specifically, the central government has framed uniform rules regarding age ranges covered by LTCI, the certification standard of long-term care need, the procedure of certification, the self-burden ratio and the upper bound, types and contents of services covered by LTCI, and prices of services (Shimizutani and Inakura, 2006). Therefore, providers cannot change prices or contents of the long-term care services. Thus, for-profit and non-profit providers compete completely on equal terms.

The insurer under LTCI is the municipality, and those aged 65 years and more (category I) and 40–64 years (category II) are covered. The insurers have established special accounts for LTCI and manage the program over a three-year “program management period.” When an insured needs long-term care, the Certification Committee for Long-term Care Need of the municipality in which he or she resides evaluates the condition requiring care (certification of long-term care need). The conditions requiring care range from a mild to a serious case in a multistep approach. An allowance is set for each stage. For example, the benefit limits for at-home long-term care range from approximately 50,000JPY (US\$620) to 358,000JPY (US\$4,420) per month. Benefit limitations are also set for the utilization of facility services by facility type, according to the stage of care need.⁵

Eligible insured individuals can purchase long-term care services at a fixed-rate burden of 10% of

² For-profit providers are not allowed to enter the long-term care facility services market.

³ The national survey of long-term care facilities and offices (2000, 2011).

⁴ Non-profit providers include providers managed by the local government.

⁵ Of course, the insured can purchase additional services above the limit at his or her own cost.

the service cost.⁶ The remaining 90% of the service cost is covered by LTCI benefits, which are financed by premium revenues, subsidies from upper-level governments (i.e., the central and prefectural governments), and financial transfers from the general account of the municipality to the LTCI special account. If eligible insured individuals require services that are beyond the specified limits or not covered by LTCI, they can avail themselves of such services at their own cost.

Several studies have focused on the Japanese at-home long-term care market, comprising for-profit and non-profit providers. Noguchi and Shimizutani (2005a) investigated for-profit and non-profit providers from the perspective of quality-of-service differences. They pointed out that non-profit providers offer high-quality services because they have no incentive to maximize profit. On the other hand, Suzuki (2002) denied any quality-of-service differences between for-profit and non-profit providers. Shimizutani and Suzuki (2002) examined whether the entry of for-profit providers improved the efficiency of the market. They reported that new entrants were more efficient than the established providers. Using micro-level data, Noguchi and Shimizutani (2005b) argued that “supplier-induced demand” does not exist in the at-home care market. From these studies, we can conclude that the entry of for-profit providers has improved competition in the market.

3. Hypotheses, data, and empirical methodology

3.1. Difference between for-profit and non-profit providers

As described above, for-profit providers are motivated by the profit maximization objective. Their entry decision is based on user acquisition potential and supply cost (including barriers to entry) because they cannot change their prices in Japanese local at-home care markets. If expected user acquisition is low and barriers to entry are high, they will abandon the municipality.

However, non-profit providers’ behavioral principles are different. They are not believed to aim at profit acquisition. Newhouse (1970) was the first to characterize non-profit organizations from the viewpoint of non-distribution of profits. Based on a stream of research from Newhouse (1970), non-profit providers can potentially aim to expand the supply scale and improve the quality of supply.⁷ Moreover, non-profit providers could enjoy preferential tax treatment in exchange for the constraint of non-distribution of profits. Thus, non-profit providers are assumed to have a lower average cost of supply compared to for-profit providers. Therefore, for-profit providers might be more sensitive to the market structure. This market sensitivity is considered to be stronger for for-profit providers although non-profit providers might also aim at user expansion as for-profit providers do.

⁶ While benefits typically do not cover meals or residential expenses for those hospitalized and institutionalized, individuals from low-income households (e.g., incomes lower than the municipal tax exemption level) are granted coverage with a ceiling amount for extra benefits.

⁷ Christopher and Carey (2000) and Holtmann and Idson (1993) clarified that nurses’ wages and quality of service were higher in non-profit than for-profit firms.

This study analyzes the market entry differences between for-profit and non-profit providers using a common municipality variable (market structure).

3.2. Market structure and barriers to entry

Unlike previous studies that examine the entry/exit of firms for a specific segment of industry, research on the at-home care market is constrained by the lack of profit rate data (e.g., price cost margin) for each municipality. Therefore, I assume that the entry of each provider is based on user acquisition potential and supply cost (including barriers to entry). Then, I select the following market structure variables.

Possibility of user acquisition is a strong incentive for the entry of potential providers, especially for-profit providers. The first variable I adopt is the ratio of eligible insured individuals to total employees (professional caregivers) of the municipality (*EII_care*). Presumably, potential entry providers can easily acquire users when this index is large. Second, I calculate the ratio of eligible insured individuals to the elderly population (*r_EII*). This index also shows the possibility of user acquisition for potential entry providers. An increase in the certification rate implies an increase in the number of users. Another market structure variable related to expected profit is the ratio of the low-income elderly (*low*). Potential for-profit providers might have a strong incentive to enter a municipality with a large number of high-income elderly who might avail themselves of expensive additional long-term care services at their own cost. I also adopt the total capacity of long-term care facilities relative to the elderly population (*faci*) as a variable that might counterbalance the at-home long-term care demand.

A new entrant needs to compete with existing entrepreneurs on non-price characteristics. The new entrant will need to provide a quality of service that matches that of the existing providers to lure their users. This is a cost-pushing factor for the new provider. In each municipality, existing providers have a different situation, which becomes a barrier to entry. The barriers-to-entry variables are the ratio of skilled caregivers to total employees (*r_skilled*), the ratio of full-time caregivers to total employees (*r_full*), the average scale of existing providers (*ave_scale*), and the ratio of non-profit providers to all providers (*r_nonprof*). The national standard of long-term care skill is the index of quality of service for users. However, providers will need to pay a comparatively higher salary to employ skilled caregivers. When a new provider decides to enter a municipality with a high ratio of skilled caregivers, the provider should employ skilled caregivers to lure users from existing providers. A high ratio of full-time caregivers is also a cost-pushing factor for new providers. A high average scale of existing providers is assumed to be a barrier to entry because a small-scale new provider would be at a disadvantage. The average scale of existing providers in each municipality is calculated based on the number of users serviced by existing providers. The ratio of non-profit providers to all providers represents the market share of non-profit providers. While potential for-profit providers might avoid competing against existing non-profit providers, potential for-profit providers might enter a municipality with the idea of engaging in competition with existing for-profit providers. I assume that

potential for-profit providers are more sensitive to these barriers than potential non-profit providers are. The definitions of these variables and their expected influence on the entry of for-profit and non-profit providers are shown in Table 1.

[Table 1 here]

3.3. Data

This study is based on panel data of 48 municipalities from 2003 to 2011 (384 observations). The analysis was limited to municipalities for which at-home long-term care market data are publicly available. Moreover, some data (e.g., the ratio of low-income elderly, average scale of existing providers) are available only from 2003.

First, I define the ratio of entry for each type of provider. The rate of entry is calculated based on the number of providers in each municipality by year. Thus, I could not determine the gross entry/exit data for each provider type. This study uses *net* data of for-profit/non-profit providers.

$$Ent_{i,t,p} = \frac{(N_{i,t,p} - N_{i,t-1,p})}{N_{i,t-1}} \quad (1)$$

Ent is the net entry rate. The subscripts *i*, *t*, and *p* stand for municipality, year, and provider (for-profit/non-profit), respectively. The right denominator $N_{i,t-1}$ of expression (1) shows the total number of existing providers at *t*−1. The net entry rate of each municipality depends on its market structure and barriers to entry. Table 2 shows the descriptive statistics and data sources.

[Table 2 here]

The highest net entry rate is quite large because some municipalities were amalgamated in this period. To control for the influence of amalgamation, I adopt a dummy variable for amalgamated municipalities from the year of amalgamation (*d_amalg*). In addition, I adopt an LTCI revision dummy (*d_rev*). As mentioned above, LTCI is adjusted after every three-year “program management period.” LTCI was revised in 2006, 2009, and 2011.

3.4. Empirical methodology

This study adopted the following estimation method to examine the determinants of entry of for-profit and non-profit providers. First, I estimate pooled data using ordinary least squares (OLS) based on the hypothesis that the constant terms of municipalities are equal. Then, I check this hypothesis using an F test. Second, I use least-square dummy variables (LSDV) to test the hypothesis based on the pooled data. Next, I use the Hausman test to choose between a fixed-effect and random-effect model.

This study compares the entry determinants of for-profit and non-profit providers. Both providers decide simultaneously whether to enter or not. Thus, the decisions possibly influence each other. However, the distinct analysis of for-profit and non-profit entry determinants using pooled OLS or panel estimation (LSDV) could not capture this relationship. This simultaneity problem is often pointed out in the analysis of determinants of entry/exit. Cable and Schwalbach (1991) reported a high correlation between the rates of entry/exit in different countries and periods. Shapiro and Khemani (1987) advocated the use of a simultaneous equations model (SEM) such as seemingly unrelated regression (SUR). SUR is used to estimate a system of equations involving contemporaneous correlation between the errors of different equations for the same period.⁸ The coefficients of regression by SUR and OLS are the same but the standard error and significance are different, because all explanatory variables of the two equations are the same. After estimating SUR, I check the hypothesis of independence of both equations using the Breusch-Pagan (BP) test.

Thus, I use pooled OLS, LSDV, and SUR using the LSDV method. The estimation equation is as follows:

$$\begin{aligned}
 Ent_{i,t,p} = & \alpha_{i,p} + \beta_{1,p} ELL_core_{t-1} + \beta_{2,p} r_EII_{t-1} + \beta_{3,p} low_{t-1} + \beta_{4,p} faci_{t-1,p} + \beta_{5,p} r_skilled_{t-1,p} \\
 & + \beta_{6,p} r_full_{t-1,p} + \beta_{7,p} ave_scale_{t-1,p} + \beta_{8,p} r_nonprof_{t-1,p} + \beta_{9,p} d_ama1g_{i,t,p} + \beta_{10,p} d_rev_{i,t,p} \\
 & + \varepsilon_{i,t,p}
 \end{aligned} \tag{2}$$

Pooled OLS estimation is based on the assumption that no fixed effects are significantly different.

4. Estimation results

The estimation results are presented in Table 3.

[Table 3 here]

Table 3 shows the F test, Hausman test, and BP test results. The F test rejects the null hypothesis that all fixed effects are equal to zero. The Hausman test result supports fixed effects. Moreover, the BP test rejects independency of both estimation equations. Considering these tests, I use the SUR result based on the LSDV method in the following analysis.

The coefficient of *EII_care* is significantly positive for both results. The coefficient of the for-profit entry rate is greater than that of the non-profit rate. This means that potential for-profit providers tend to react to the possibility of user acquisition. The coefficient of *r_EII* is not significant for both results contrary to the assumption. The possible reason is that a high ratio of eligible insured individuals in a municipality does not directly lead to an increase in the number of at-home care users because

⁸ Previous studies such as Carree and Thurik (1996) and Manjón-Antolín (2010) used SUR and three-stage least squares (3SLS) to consider the simultaneity of entry/exit. Carree and Thurik (1996) reported that both estimation techniques are consistent under the null hypothesis of exogeneity, but SUR is the more efficient one because SUR is not consistent under the alternative hypothesis of endogeneity while 3SLS is.

different types of long-term care services are covered by LTCI. The coefficient of *low* shows a different result. The coefficient is significantly positive for non-profit providers, but is not significant for for-profit providers. This result means that potential non-profit providers tend to choose disadvantaged municipalities rather than aiming to earn profit. That is to say, their entry decision is based on considerations other than profit maximization. The coefficient of *faci* is positive for for-profits and negative for non-profits, but is not significant. This result means that the capacity of long-term care facilities is not utilized for at-home care needs. Long-term care facilities are presumably not considered as an alternative for at-home long-term care, because facilities run short of the requirement by far and accommodate only serious cases among the eligible insured.⁹ These results show that potential for-profit providers tend to react to the possibility of user acquisition. On the other hand, potential non-profit providers tend to choose disadvantaged municipalities rather than looking for profit opportunities.

Then, I examine the results on barriers to entry. The coefficient of *r_skilled* shows different results. The coefficient of the for-profit provider is significantly negative, but that of the non-profit provider is not significant. This result means that a high ratio of skilled caregivers acts as a barrier to entry for potential for-profit providers. If a new for-profit provider obtains a sufficient number of users in a municipality with a high ratio of skilled caregivers, the provider will need to employ more skilled caregivers than existing providers do. This will increase the labor cost, reducing earnings. However, it is not a barrier to entry for potential non-profit providers because they are not constrained by profit distribution and can therefore afford a higher labor cost than for-profit providers.

The coefficient of *r_full* is negative for for-profits and positive for non-profits, but not significant for both result. A high ratio of full-time caregivers will increase labor costs, stifling earnings. However, this is not a significant barrier to entry for for-profit providers. The coefficient of *ave_acle* shows a different result. It is significantly positive for non-profits, but not significant for for-profits. The average scale of existing providers is apparently related to competition domination. Non-profit providers with preferential tax treatment in exchange for the constraint of non-distribution of profits could easily enter a municipality where the average scale of existing providers is high.

The coefficient of *r_nonprof* shows contrasting and intriguing results. It is significantly positive for for-profit providers, but significantly negative for non-profit providers. This result means that for-profit and non-profit providers have gradually become integrated in Japanese local at-home care markets. A high ratio of existing non-profit providers seems to be a barrier to entry for for-profit providers. However, this result signifies that for-profits and non-profits might not target the same class of users. The effect of amalgamation is significantly positive for for-profit providers. LTCI revision does not affect either estimation.

This study finds the following results on for-profit and non-profit at-home care providers' entry: (1) Both potential for-profit and non-profit providers react to market structure characteristics related to

⁹ Kawase and Nakazawa (2009) and Nakazawa (2012) argue that the lack of long-term care facilities and welfare cause migration of the elderly in Japan.

user acquisition possibility. However, for-profits are more sensitive to these than non-profits are. (2) Barriers to entry such as the ratio of skilled caregivers influence the determinants of for-profit entry, but do not affect non-profit entry. (3) Thus, potential for-profit providers who are sensitive to profit considerations adapt to the market structure and clear barriers to entry. On the other hand, potential non-profit providers entitled to preferential tax treatment in exchange for the constraint of non-distribution of profits could easily enter municipalities that are at a disadvantage in terms of profit-earning opportunities. (4) Finally, both profit and non-profit care providers have gradually become integrated in the Japanese local at-home care markets.

5. Conclusion

Since the reform of the Japanese long-term care system in 2000, for-profit firms have been allowed to provide at-home long-term care services. Thus, the Japanese local at-home care market consists of both for-profit and non-profit providers. This study examines the determinants of entry for both for-profit and non-profit providers in the Japanese local at-home care market. Several previous studies have considered the market entry of for-profit firms. However, this study focuses on both for-profit and non-profit providers. Based on some empirical tests, I adopt the SUR estimation method, which shows that the determinants of entry differ between for-profit and non-profit providers. For-profit care providers who are sensitive to profit considerations can potentially adapt to the market structure and clear the barriers to entry. However, non-profit providers entitled to preferential tax treatment in exchange for the constraint of non-distribution of profits could easily enter municipalities that are at a disadvantage in terms of profit-earning opportunities.

Moreover, both for-profit and non-profit providers have gradually become integrated in Japanese local at-home care markets. This finding is meaningful for long-term care policy discussions. As shown in the review of previous studies in section 2, the presence of non-profit providers and the entry of new providers hold a promise of quality improvement of service with competition from for-profit providers in municipalities dominated by non-profit providers, and vice versa. Moreover, non-profit providers' entry might correct the disparity in the delivery of at-home long-term care services among municipalities because potential non-profit providers tend to enter municipalities that are at a disadvantage in terms of profit-earning opportunities.

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Table 1. Determinants of entry of for-profit/non-profit providers

Variables	Expected Sign	
	For-profit	Non-profit
<i>Market structure related to user acquisition possibility</i>		
Ratio of eligible insured individuals to total employees (<i>EII_care</i>)	++	+
Ratio of eligible insured individuals to elderly population (<i>r_EII</i>)	++	+
Ratio of low-income elderly (<i>low</i>)	—	
Capacity of long-term care facilities relative to elderly population (<i>faci</i>)	—	
<i>Market structure related to barriers to entry</i>		
Ratio of skilled caregivers to total employees (<i>r_skilled</i>)	—	
Ratio of full-time caregivers to total employees (<i>r_full</i>)	—	
Average scale of existing providers (<i>ave_scale</i>)	—	
Ratio of non-profit providers to total providers (<i>r_nonprof</i>)	+—	

Table 2. Descriptive statistics and data sources

Variables	Mean	S.D.	Min	Max	Source
<i>Ent (for-profit)</i>	0.106	0.540	-0.617	8.506	A
<i>Ent (non-profit)</i>	0.033	0.177	-0.433	2.066	A
<i>EII_care</i>	27.983	15.687	4.934	220.249	A, B
<i>r_EII</i>	0.174	0.025	0.129	0.237	B
<i>Low</i>	0.456	0.210	0.148	0.804	B
<i>Faci</i>	0.029	0.006	0.017	0.053	A, B
<i>r_skilled</i>	0.323	0.076	0.148	0.583	A
<i>r_full</i>	0.485	0.064	0.209	0.720	A
<i>ave_scale</i>	42.576	9.227	22.142	70.789	A
<i>r_nonprof</i>	0.411	0.124	0.187	0.719	A

Sources: A = National survey of long-term care facilities and offices (2002–2011), Ministry of Health, Labour and Welfare. B = Annual reports of long-term care insurance (2002–2010), Ministry of Health, Labour and Welfare.

Note: Please see Table 1 for variable definitions.

Table 3. Estimation results

Variables	OLS		LSDV		SUR	
	For-profit	Non-profit	For-profit	Non-profit	For-profit	Non-profit
<i>EII_care</i>	0.025 *** (18.50)	0.007 *** (15.26)	0.029 *** (19.42)	0.010 *** (17.76)	0.029 *** (21.08)	0.010 *** (19.27)
<i>r_EII</i>	2.34 ** (2.52)	0.104 (0.31)	0.888 (0.27)	-1.271 (-1.02)	0.888 (0.29)	-1.271 (-1.10)
<i>low</i>	0.362 ** (2.35)	0.259 *** (4.73)	0.208 (1.25)	0.191 *** (3.08)	0.208 (1.36)	0.191 *** (3.34)
<i>faci</i>	-11.603 *** (-3.08)	-0.833 (-0.62)	-5.185 (-0.72)	0.467 (0.17)	-5.185 (-0.78)	0.467 (0.19)
<i>r_skilled</i>	-0.856 ** (-2.16)	-0.032 (-0.23)	-0.841 * (-1.74)	-0.146 (-0.81)	-0.841 * (-1.89)	-0.146 (-0.88)
<i>r_full</i>	-0.361 (-1.11)	-0.0161 (-0.14)	-0.557 (-1.42)	0.077 (0.52)	-0.557 (-1.54)	0.077 (0.57)
<i>ave_scale</i>	0.0001 (0.00)	-0.00004 (-0.33)	0.0001 (0.03)	0.003 (1.64)	0.0001 (0.03)	0.003 * (1.78)
<i>r_nonprof</i>	0.064 (0.31)	-0.228 *** (-3.09)	0.743 ** (2.23)	-0.719 *** (-5.77)	0.743 ** (2.42)	-0.719 *** (-6.26)
<i>d_amalg</i>	0.064 (0.31)	0.0448 (1.62)	0.165 ** (2.22)	0.041 ** (1.49)	0.165 ** (2.41)	0.041 (1.62)
<i>d_rev</i>	-0.077 (-1.65)	-0.0222 (-1.32)	-0.049 (-1.12)	-0.013 (-0.81)	-0.049 (-1.22)	-0.013 (-0.88)
<i>constant</i>	-0.382 (-1.26)	-0.153 (-1.41)				
<i>Fixed effect</i>	No	No	Yes	Yes	Yes	Yes
<i>R-sq.</i>	0.487	0.395	0.615	0.516	0.644	0.540
<i>F test</i>			2.83 ***	1.96 ***		
<i>Hausman test</i>			85.98 ***	93.96 ***		
<i>BP test</i>					115.133 ***	
<i>Sample size</i>	384	384	384	384	384	384
<i>Group size</i>			48	48	48	48

Notes: OLS = ordinary least squares, LSDV = least-square dummy variables, SUR = seemingly unrelated regression. Asterisks ***, **, and * indicate statistical significance at the 0.01, 0.05 and 0.1 levels, respectively. Figures in parentheses are t-statistics and z-statistics. Please see Table 1 for variable definitions.