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How far are Chinese Farmers from "Internet Plus"? Empirical Study of Factors Influencing Farmer's Adoption of Internet Application

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How far are Chinese Farmers from "Internet Plus"? Empirical Study of Factors Influencing Farmer's Adoption of New ICT-based Applications

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Introduction

- While "Internet + Agriculture" is among one of the hottest topics in China, it is far from clear whether and to what extent rural farmers are ready to take advantage of this e-commerce revolution.
- Opinions are mixed: some argue huge gaps of infrastructure and population quality between urban and rural are the biggest obstacles, while others argue micro-level household and individual characteristics are the most important factors. Both are lack of empirical evidence.

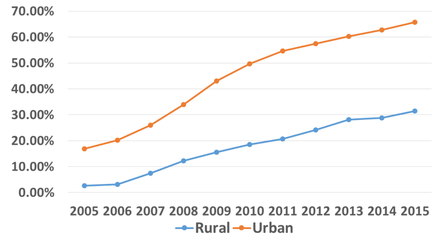

Fig 1: Internet Penetration in China Urban and Rural Area

Some New ICT-Based Applications

An instant messaging platform with multi-functions such as, instant text messaging, voice/video chat, etc.

A mobile terminal App. featuring instant messaging, relayed or instant voice chat, e-commerce, online payment, etc.

A microblogging service (a hybrid of Twitter and Facebook in China), interactive info. dissemination.

E-mail in mobile, convenient point to point personal communication.

Online consulting service to disseminate policies, regulations, agricultural technologies through voice databases, and interactive videos.

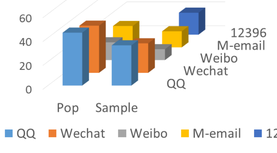

Fig 2: APP Penetration in Population and 712 Farmer samples

Econometric Approach

- Adoption Choice: Binary choice model

$$\mathrm{P}(y_i = 1|x) = P(U_i^* > 0|x) = 1 - \mathrm{G}[-(\beta_0 + X_i\beta)] = G(\beta_0 + X_i\beta)$$

$$P_i = P[y_i = 1\,|x] = \frac{e^{x_i\beta}}{1+e^{x_i\beta}}$$

- Adoption Intensity: Poisson Count Model

$$\mathrm{f}(y_i|x_i) = P(Y_i = y_i) = \frac{e^{\lambda}\lambda^{y}}{y!},\ y = 0, 1, 2, 3 \ldots$$

$$\ln\mathrm{L}(\beta) = \ln\left[\frac{e^{\lambda}\lambda^{y}}{y!}\right] = -\exp(x_i'\beta) + y_i(x_i'\beta) - \ln(y_i!)$$

Results

Table 1. Determinants of Farmers' Adoption of Any ICT-based Application (Logit Model)

Variables	Coefficient (SE)	M Effect (SE)
Age	-0.0421*** (0.0107)	-0.0105*** (0.0027)
Education level	0.8553*** (0.2814)	0.2017*** (0.0605)
Cost of Networks Access	0.00035** (0.00015)	0.000086** (0.000038)
Status of Transferred Employment （1=part-time farming, 0=off-farm totally）	-0.5966*** (0.208)	-0.1477*** (0.0508)
Household Asset	0.0569*** (0.0188)	0.0142*** (0.0047)
Area of arable land	0.0240** (0.0118)	0.0060** (0.0029)
Telecommunication Cost	0.0068*** (0.0017)	0.0017*** (0.0004)
Distance from Traffic Road	0.0357* (0.0197)	0.0098** (0.004)
Distance from Education Station	-0.3773* (0.2124)	-0.1004* (0.0522)
Interest	0.1930** (0.0953)	0.0478** (0.0237)
Usefulness	0.2330*** (0.0608)	0.0579*** (0.0151)
Easiness	0.3507*** (0.1045)	0.0872*** (0.026)
Convenience	0.2499** (0.1337)	0.0621* (0.0325)

***,**, * signifies 1%, 5%, 10% level of significance, respectively.

Table 2. Determinants of Adoption Intensity (i.e., number of applications adopted) (Poisson Model)

Variables	Coefficient	Marginal Effect
Age	-0.0172*** (0.0045)	-0127*** (0.0033)
Education level	0.3942*** (0.0893)	0.2904*** (0.0659)
Household Asset	0.0423*** (0.009)	0.0311*** (0.0065)
Household Total Income	0.0989** (0.0439)	0.0728** (0.0321)
Personal off-farming income	0.0490** (0.0224)	0.0361* (0.0163)
Cost of Networks Access	0.0003*** (0.00001)	0.0002*** (0.00005)
Telecommunication Cost	0.0015** (0.0005)	0.0011** (0.0003)
Distance from Traffic Road	0.0170*** (0.0059)	0.0125*** (0.004)
Distance from Education Station	-0.272*** (0.0868)	-0.1966*** (0.0617)
Cable TV Connected	-0.0168* (0.0087)	-0.0123* (0.0064)
Usefulness	0.0947*** (0.0262)	0.0698*** (0.0192)
Easiness	0.2348*** (0.0421)	0.1605*** (0.0311)
Convenience	0.2258*** (0.0545)	0.1538*** (0.0402)

***,**, * signifies 1%, 5%, 10% level of significance, respectively.

Conclusions

1. Farmers' age, education level, household assets, household income and occupation all matters in household's decision and intensity of adoption of ICT-based applications.
2. The study also points toward the importance of the perceived features of an application in farmers' adoption decisions. Perceived usefulness and easiness of an ICT-based application are positively and significantly correlated with the likelihood and intensity of farmers adoption of the application.
3. Finally, the fact that the distance to education station has negative effect on adoption decision and adoption intensity supports the importance of ICT infrastructure.

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