CHANGES IN PERSONAL INCOME AFTER LAND EXPROPRIATION FOR INDUSTRIAL PARKS: INFLUENTIAL FACTORS AND POLICY RECOMMENDATIONS

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As more and more industrial parks are being constructed, compulsory purchase of land for this purpose has been carried out all over Vietnam, especially in rural areas. Those households whose land was expropriated are now facing changes in their resources of livelihood. For a sustainable development of industrial parks and for industrialization's sake, proper care should be given to the living standards and income of expropriated residents. One primary principle of land expropriation is to guarantee that the expropriated people's life and income will be improved, or at least as good as they were. Finding out about changes in their income and influential factors to it is a challenge which scientists and policy-makers must overcome as it provides scientific grounds for compensation policies for expropriated people. The authors built a model of Binary Logistic Regression out of the theoretical framework on sustainable livelihood and reality in Vietnam with a view to quantifying the influential factors to the expropriated households' income. To apply and test the model in practice, a survey was conducted directly on 94 households whose land was zoned for Tân Phú Trung Industrial Park located in Củ Chi District of HCMC. The result shows that there are six elements affecting a household's income: (1) the householder's educational background, (2) the number of laborers per household, (3) use of compensation payments, (4) new jobs from industrial park, (5) the dependency ratio, (6) the area of expropriated land.

Keywords: industrial park, land expropriation, Binary logistic regression.

1. Introduction

The building and expansion of industrial parks (IP) have brought with them a modern infrastructure, helped tap various sources of capital and played an important role in the GDP growth, changes in structure of industry, creation of new jobs and sources on income. Land expropriation for industrial development, therefore, is progressing rapidly across the country. In the 2001-2007 period, the total area of agricultural land which was expropriated for non-agricultural purposes amounted to 500,000 ha. If one hectare of the land affected 10 agricultural laborers [3], then the land expropriation during the past seven years had its effect on the lives of five million laborers. Numerous researches have been done on the land clearance and compensation in IPs, but little attention has been paid to changes in the expropriated people's life and income, especially the quantifying of the influential factors to their income. As a result, it is a tough task for researchers and policy-makers in Vietnam to identify them. In doing so, the authors carried out a case study in HCMC's Củ Chi District-based Tân Phú Trung IP to seek practical evidence. This paper is to deal with (1)

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constructing a quantitative model of the influential factors to changes in people's lives after land expropriation and (2) offering policy recommendations.

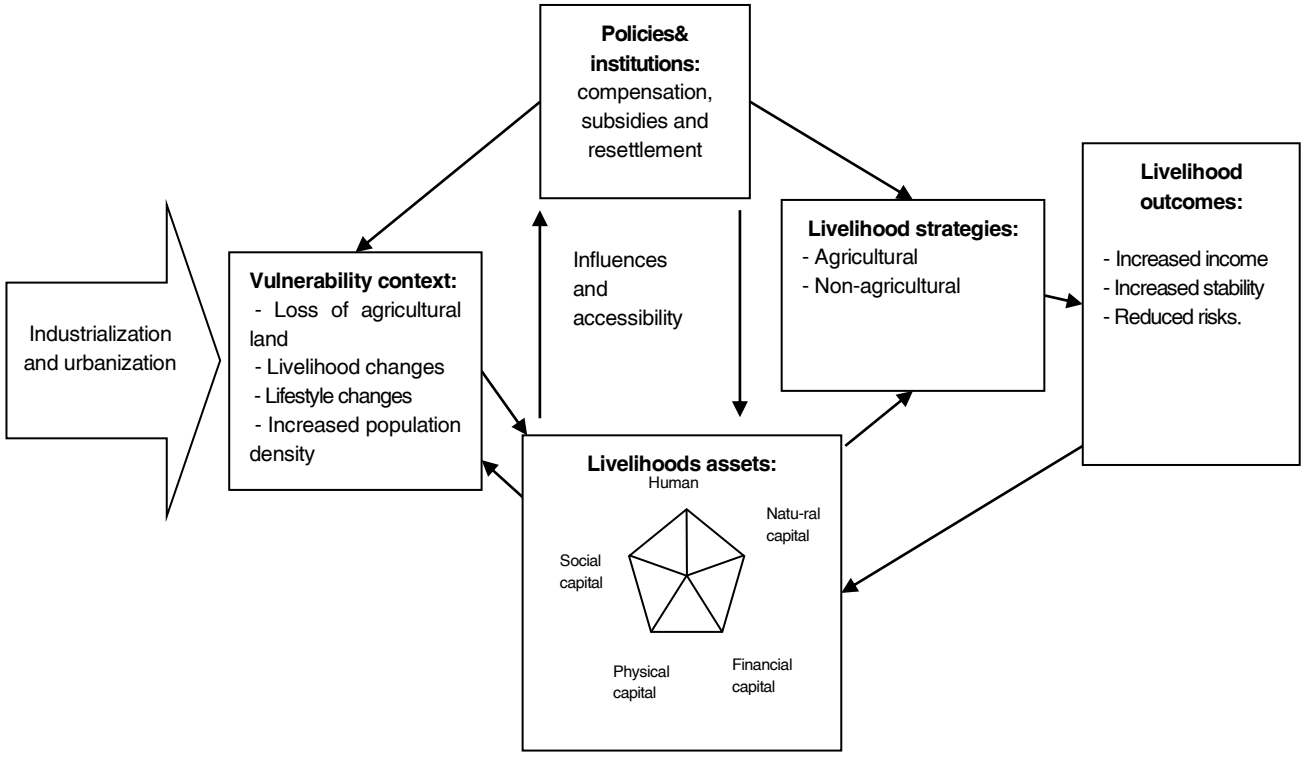
2. Theoretical basis and research model

a. Theoretical basis:

By the Land Law [5], land expropriation is the government's decision to retrieve land and land use right under local authorities' management. Land expropriation and displacement can cause severe damage to the economy, society and environment if not planned carefully. According the Asia Development Bank (ADB), since such damage is inevitable, expropriation projects should be accompanied by prior planning and treated as a development program. The bank also points out that those affected by land expropriation should be given support to enhance, or at least recover, their living standard (ADB, 1995) [1]. According to the World Bank (2004) [6], income recovery is an important part of a land expropriation policy because of the loss of jobs, business profits or other income suffered by the expropriated people. Here are some ways to create income: (i) Offering direct credit to small-sized and self-employed businesses; (ii) Developing skills through training; (iii) Providing support in finding jobs in state-owned and private companies; (iv) Giving priority to expropriated laborers in recruitment. In a broader sense, not only income but also stable livelihood should be improved for those influenced by compulsory purchase or expropriation of land. A livelihood consists of abilities, assets (including social and physical capital) and activities to earn a living (DFID, 1999) [2].

A livelihood is sustainable when it can cope with and recover from stresses, shocks and maintain or enhance its capacities and assets both now and in the future, while not undermining the natural resource base (Tim

Figure 1: Analysis of sustainable livelihoods



Source: Based on the sustainable livelihoods framework (DFID 1999)

Hanstad, Robin Nielsn and Jennifer Brown, 2004) [4]. As shown in Figure 1, a compensation policy creates sustainable livelihoods if it affects livelihoods assets (human, social, physical, financial and natural capital) and combines with changes in means of livelihood (agriculture and non-agriculture) to guarantee better income after land expropriation.

b. Quantitative model:

In reality, some households enjoy higher income after getting compensation payments for land expropriation. However, some others do not have their income increased, and even suffer some decrease. Thereby, the authors propose the following Binary Logistic regression model in an attempt to find out about influential factors to probability of improving the income of peasants after land expropriation:

$$Ln\left[\frac{P(Y=1)}{P(Y=0)}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + .. + \beta_i X_i$$

P(Y=1) = P_0: Probability of increased income (improved income)

P(Y = 0) = 1- P0: Probability of non-increased income (non-improved income)

Xi: Independent variables

$$Ln\left[\frac{P_0}{1-P_0}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + .. + \beta_n X_n$$

$$O_0 = \frac{P_0}{1-P_0} = \frac{P(improvedincome)}{P(non-improvedincome)}$$

(Odds coefficient)

$$LnO_0 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + .. + \beta_n X_n$$

The log of the Odd coefficient is a linear function with independent variables Xi (i =1, 2..n)

Based on the analysis of sustainable livelihoods framework and the characteristics of Vietnam's rural areas, the following variables are selected for the model:

The Binary logistic regression function that identifies influential factors to the probability of improving people's income can be rewritten as follows:

$LnO_0 = \beta_0 + \beta_1$*edu + β_2*TuoiCh+ β_3*Tlpthuoc + β_4*ldong + β_5*dtđth + β_6*(D-invest)+ β_7*(D-Ldong) + ε

3. Results

In order to apply the model in practice, authors conducted in December 2010 a survey of 94 households (10% of the total households)

Table 1: Influential factors to peasants' income after land expropriation

Variable	Symbol	Definition	Unit	Expected sign
Dependent variable	Y	Dummy variable equaling 1 when income increases and 0 otherwise.		
Householder's education	Edu (X_1)	The number of schooling years	Year	+
Householder's age	TuoiCh (X_2)	The age of the householder	Year	+
Dependency ratio	tlpthuoc (X_3)	The ratio of the non-working members to the total population of a household	%	-
Number of laborers per household	ldong (X_4)	The number of laborers per household	Person	+
Area of expropriated land	Dtdth (X_5)	The area of agricultural and non-agricultural land expropriated	m^2	-
D-Invest	D-Invest X_6	Dummy variable equaling 1 when compensation is spent on business activities, and 0 otherwise		+
D-Ldong	Dldong X_7	Dummy variable equaling 1 when members of a household work in Tân Phú Trung IP, and 0 otherwise.		+

whose land was taken away for development of the Tân Phú Trung IP in Củ Chi District, HCMC. Construction of the 552.3-hectare IP affected the lives of some 900 households. As most of them received compensation in 2006, the comparison of their income before and after the land expropriation is based on the data collected in 2006 and 2010. Then the inflation rate announced by the GSO is employed to convert income of 2006 to that of 2010 for making the comparison.

a. Changes in income:

Table 2: Evaluation of income changes after land expropriation

Changes	Number of households	Percentage
Increased	35	37.23
Non-increased	59	62.76
Consisting of:		
Unchanged	40	42.55
Decreased	19	20.21
Total	**94**	**100.00**

Source: Authors' survey and calculations

Table 2 shows that 37.23% of the surveyed households confirm a rise in their income, 42.55% reveal that their income remained unchanged and the other 20.21% say that their income decreased after the land expropriation.

However, it is necessary to take inflation rate into account in order to gain some insight into income changes.

As can be seen in Table 3, the income of all households increased if not adjusted to inflation. Specifically, after land expropriation, the increased income group enjoyed a per capita income rise from VND9,032 million to VND19,076 million (up by VND10,044 million). As for the non-increased income group, their per capita income was VND12,551 million, up by VND1,873 million.

After adjustment to inflation, however, the real income of the households changed greatly. That is, the income after land expropriation rose only VND5,086 million for the increased income group and decreased VND3,988 million for the non-increased income group. Therefore, if local authorities do not take appropriate measures to support those households, then it is very hard to observe the primary principle of land expropriation. It is the case when their real income falls, althought its absolute value rises.

b. Factors affecting changes in income:

- Table 4 indicates that if the significance level of the Wald test is <0.05, most of the varibles are statistical significant except for the variable "Householder's age" (with its significance > 0.05)

Table 3: Average personal income among expropriated households

Household group	Before expropriation (VND1,000)	After expropriation (VND 1,000)	Comparison	
			±#	%
1. Before adjustment to inflation				
- Households with increased income	9,032	19,076	10.044	111.2
- Households with non-increased income	10,677	12,551	1.873	17.5
2. After adjustment to inflation				
- Households with increased income	13,990	19,076	5.086	36.4
- Households with non-increased income	16,539	12,551	-3.988	-24.1

Source: Authors' survey and calculations

Table 4: Estimation of Binary logistic regression model

Variable	β coeffient	Wald	Sig.	Exp(B) e^{β}
Constant (C)	-3.169	2.444	.118	0.042
Householder's education	0.308	7.044	.008	1.361
Householder's age	0.003	0.008	.929	1.003
Number of laborers per households	1.040	7.765	.005	2.830
Dependency ratio	-3.619	3.994	.046	0.027
Area of expropriated land	-0.0004	8.376	.004	0.999
Dinvest	1.821	6.179	.013	6.179
Dldong	1.428	3.947	.047	4.171
Omnibus test	Chi-square	Sig.		
	51.784	0.000		

Dependent variables: Household type (Increased income group = 1; non-increased income group = 0)

- The Omnibus test shows that the theoretical model is fit if its significance is over 95%.

- With other factors remaining unchanged, an increase of one laborer per household means a rise in the probability from 10% to 23.89%.

Table 5: Estimate of probability of improving income

	Marginal impact coefficient (e^{B_k})	Probability of improving the income estimated when independent variable changes one unit – and initial probability (%)		
		10%	**20%**	**30%**
Householder's education	1.361	13.13	25.37	36.82
Number of laborers in household	2.830	23.89	41.39	54.76
Dependency ratio	0.027	0.30	0.67	1.14
Area of expropriated land	0.999	9.99	19.98	29.98
Dinvest	6.179	40.63	60.63	72.53
Dldong	4.171	31.62	50.99	64.07

Table 5 indicates the probability of improving income under the marginal impact of each factor with the assumption that the initial probability is 10%.

- For the variable "Householder's education", a rise of one schooling year increases the probality to 13.13%, supposing the initial probability is 10%. The figure climbs to 25.37% and 36.82% if the initial probability is 20% and 30% respectively. Thus, one schooling year increases the probability by 3.13% with the initial probability being 10%.

Similarly, here is how the other varibales are interpreted:

- If the dependency ratio rises by 1%, the probability falls from 10% to 0.3%.

- With other factors remaining unchanged, an increase of $1m^2$ in expropriated land makes the initial probability fall from 10% to 9.99%.

- With other factors remaining unchanged, reasonable use of compensation payments (such as investing them in businesses) makes the probability rise from 10% to 40.67%.

- Employment opportunities offered by tân Phú Trung IP help increase the probability to 31.62%.

The influential factors in the order of their importance are: the use of compensation, jobs supplied by IP, the number of workers per household, the dependency ratio, householder's educationa and the area of expropriated land.

The Binary logistic regression function identifies influential factors to the probability of improving income is as follows:

LnO_0 = -3.169 + 0.308edu – 3.619Tlpthuoc + 1.040ldong – 0.0004dtđth +1.821(D-invest) + 1.428(D-Ldong) + ε

4. Policy recommendations

The results of the model reveals that there are four factors which increase the probabability of improving the income of the expropriated people, namely the householder's education, the number of laborers per household, effective use of compensation payments and job opportunities from the IP. The dependency ratio and the area of expropriated land, meanwhile, decrease the probability. Therefore, proper care should be given to the following aspects:

a. Land expropriation and compensation:

Land expropriation greatly affects people's lives and means of livelihood and diminishes the probability of improving their income. In fact, expropriated residents suffer heavy losses due to development of IPs and new urban areas. Hence, authorities should carry out policies on land expropriation as recommended by international agencies. Otherwise, this can plant the seeds of social unrest. In reality, plenty of mass lawsuits were filed on this issue. The surveyed households say that compensation levels are much lower than market prices. As a result, the compensation for future land expropriation should be adjusted as close to the market prices as possible. This task could be assigned to the invisible hand of the market; that is, compensation is determined on the basis of agreement between the land owner and the investor.

In carrying out a project related to land expropriation, it is necessary to prepare local residents for the project, help them take part in preparation and implementation of the project because it influences directly their livelihoodd. Besides, there should be plans on recovering their income.

b. Education:

The survey reveals that 84.1% of the householders and 70% of the laborers investigated received a junior secondary education at most, and some of them got no education at all. Nowadays, schooling is very essential for acquiring increased income. The more education workers obtain, the more likely they are to have good jobs and sufficient income.

Authorities should encourage and facilitate people's schooling, especially the expropriated households'. Apart from families who earn better income after land expropriation and can afford to send their children to school, many ones are put at a disadvantage for education due to their wrong use of compensation. Hence, reduction or exemption from school fees for poor and expropriated families can solve the problem.

c. Population and employment:

In the survey, 233 out of 418 respondents are in working age and the average number of laborers per household is 2.48. The average dependency ratio is 44.3%. Besides, a difference is seen in the employment structure between households with increased income and non-increased income. Thus, authorities should take measure to enhance awareness of birth control (there should be no more than two children per family). This will decrease the number of dependants and help them increase their personal income.

Employment after land expropriation is a major concern for relevant residents, for it directly affects their lives. So vocational training classes and job opportunities should be provided for the local laborers affected by IP development projects, especially those who are forced to change their jobs because of loss of farming land. In addition, project investors should give them preference in recruitment.

d. Regarding the use of compensation payments:

The research shows that spending compensation properly, for example on doing business, considerably contributes to improving the income of the expropriated households.

According to the survey, however, compensation is mainly used for building houses by 84.04% of the surveyed households and for purchasing home furnishings by 87.23%. Meanwhile, only 31.91% and 11.7% of the households spend the money on business activities and building boarding houses respectively.

To deal with this problem, when paying compensation to the households, authorities should hold consultative workshops as to how to spend it appropriately so that they will not place much emphasis solely on building houses and consumer goods. Moreover, profits from IP development projects should be shared with the households, such as selling IP shares to these households based on the proportion of their expropriated land, which further helps sustain the lives of their families.

e. Further application of the model:

In addition to its application to the land expropriation in Tân Phú Trung IP, the model can be employed for other IPs with larger samples to enhance the reliability of policy recommendations, thereby offering scientific arguments about and better solutions to sustainable livelihood and income for expropriated households■

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