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Enhancing Farmer's Income after Being Retrieved of Land to Build Industrial Park: Evidence from Vietnam

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In recent years, the economical scientific research community has had many papers to improve incomes for farmers after being retrieved of land to build an industrial park. However, the scientific foundation for the solution is out and left open, especially quantitative model factors affecting earnings. Therefore, identifying an appropriate quantitative model based on the theory of agricultural economics and practical evidence is a challenge for policy researchers. The research team collected data on incomes of 168 farmers in Loc Son Ward, Bao Loc City, Lam Dong province, Vietnam to seek empirical evidence for the model. The aim of this article focuses on two main issues: the theoretical framework of quantitative models and application results for farmers after being retrieved to build an industrial park.

Key words: *Income, labour, Industrial Park, regression.*

Introduction

The industrial park model has been constructed and developed in countries as an effective capital mobilisation tool for achieving socio-economic goals such as economic growth of locations where industrial parks are designed and put into action, promoting the creation of service industries, supporting manufacturing, creating employment, boosting income for local citizens and the surrounding region. The industrial park was built to concentrate the most favourable conditions for domestic and foreign investors and to add to the attractiveness and competitiveness of the investment climate of the nation (Le et al., 2020).

Accompanying with the comprehensive innovation in the economy, the formation and development of industrial parks in Vietnam has created a new infrastructure modernisation,

contributing to the rapid expansion of capital and is becoming an important factor affecting the GDP growth rate, job creation and creating multiple additional incomes according to the final report on activities of industrial parks (Huong and Dung, 2019; Ngan and Khoi, 2019). The development of industrial parks in local areas has been positively effecting to socio-economics of the countryside such as contributing to grow and transfer economic structure as industrialisation; increasing the State budget collection; developing infrastructure and building a new rural image, and bringing urban civilisation; creating more jobs for millions of employees; helping some of the farmers to transfer agricultural produce into industrial products or services; rising income, and improving the life of farmers. However, it is the development that negatively impacts rural areas such as the decreasing area of agricultural land and affecting food security in some local areas; some farmers became unemployed or could not change their jobs; cultural institution in rural areas changed and increasing environment pollution due to operations from industrial zones.

Industrial park quality has attracted the care of practitioners and academicians over the years but mostly in the manufacturing sector during the first stage. Since the 1980s, however, the importance of quality for business achievement in the service sector has also been widely recognized in the literature through the great influences on different dimensions of business achievement. Foreign direct investment capital into industrial parks annually accounts for 35% - 40% of Vietnam's total registered additional capital; particularly, the industrial sector accounts for nearly 80%. Arising from this important role, attracting investment in industrial parks has interested many researchers in many aspects, such as investment decisions of investors, results of investment attraction, the satisfaction of investors (Huong and Dung, 2019). However, the development of the industrial park has contributed significantly to industrial development and created a breakthrough in the process of industrialisation and modernisation of the economy - promoting the process of economic restructuring and job creation. Make workers, promote rapid technology transfer, produce a lot of highly competitive domestic consumer goods and export products. However, besides the achieved results in the development process, industrial parks in Vietnam also revealed its limitations, especially the issues related to services provided to investors - the most important objects in the development of industrial parks (Ngan and Khoi, 2019).

Vietnam built 326 industrial parks out of a total of 463 planned industrial parks. The total natural land area of these industrial parks was approximately 93,000 hectares, where 56,000 hectares of industrial land was leased accounting for about 66% of the entire natural land area. Industrial parks throughout the country have attracted about 7500 domestic investment projects with a total registered capital of about 970 trillion dongs and about 8000 projects of foreign investment with a total registered capital of about 145 billion USD. The occupancy rate of the industrial parkland area is about 73% (MPI, 2019). These industrial parks which are established and developed have contributed to economic restructuring, create jobs for a

large part of the labour force, developing local supporting industries and services. However, a large amount of agricultural and residential land of people was recovered when the industrial park was built and designed. According to data from the Ministry of Agriculture and Rural Development, an average of 73 thousand hectares of agricultural land is annually acquired, affected the lives of about 2.5 million people, and for every 1 ha of land received, ten people lost their jobs. This has greatly influenced and changed the livelihood strategies of people living around industrial parks (Le et al., 2020).

In recent years, domestic and foreign economic scientists have had many types of research on solutions to raise incomes for farmers after land acquisition to build industrial parks. Le et al. (2020) examine the impact of industrial park development on livelihoods of people through various channels of impact, including employment, means of production, and infrastructure. Research results show that the development of industrial parks has had a positive impact on people's livelihoods through additional employment, non-farm investments, access to policies, household labour, etc. However, the development of industrial parks also causes negative impacts on the livelihoods of the people that cause unemployment. Research data were collected from households regarding the acquisition of land and no acquisition of land residing near industrial parks. Research findings can be seen as a basis for helping to improve the positive influence and reduce the negative effect of industrial park growth on people's livelihoods in Vietnam. However, scientific arguments for existing solutions are still open, especially the quantitative model affecting income factors after land acquisition to build industrial parks. Therefore, identifying an appropriate quantitative model based on agricultural economics theory and empirical evidence is a challenge posed to policy researchers. To do this, the authors collected data on the income of 168 farmers in Loc Son Ward, Bao Loc, Lam Dong Province, Vietnam in May 2019 and sought practical evidence for the model. The objective of this article is to focus on two key issues: the hypothetical structure of quantitative models and the aftereffects of utilisation for ranchers to make a modern park after the land has been recovered.

Literature Review

Rapid urbanisation is observed in most development and transformation processes. An accepted principle of development documents is that in the process of economic transition structure is accompanied by economic development and the agricultural sector as a part of the country's GDP will decrease as GDP growth of a nationality (Chenery et al., 1975; Kuznets, 1957). Along with the formation and development of new industrial and service sectors (Timmer and Akkus, 2008), structural changes took place within agriculture and rural economy despite their nature, scale, and speed. The degree takes place in different countries. In Vietnam, the transition from farm to non-farm activities at the household level is shown by income structure.

GSO (2011, 2014) shows that the proportion of household income from agriculture (including forestry and fishery) decreased from 28.6 % in 2002 to 19.9% in 2012 and 17.4% in 2014. For rural households only, income from agriculture decreased from 43.4% in 2002 to 31.8% in 2012, due to an increase in salaries and remuneration and had a higher proportion of income from agriculture since 2010.

VARHS (2015) also shows that the diversification of economic activities of rural households is mainly driven by income opportunities. Low incomes and shocks often push farmers out of agricultural production (Newman and Kinghan 2015). In a broader sense, raising incomes by implementing income diversification is a sustainable livelihood for those affected by land acquisition. Based on the determinants of diversification into non-farm activities, they conclude that education, gender, land, and household size are the main determinants of participation in non-agricultural business. However, the value of assets, access to credit, social capital, households, and land are important determinants of non-agricultural businesses. Similarly, Ackah (2013) finds land area, education level at the primary level, and gender to be a determinant of diversification in Ghana, and women can participate in non-agricultural activities. High school education is of particular importance for stable employment. Benedikter et al. (2013) also notes the correlation between firm size and ownership. They find that savings, past work experience, and family/inheritance relationships are key factors in establishing non-agricultural businesses in the Mekong Delta, Vietnam. Micevska (2008) emphasises the importance of diversification education, recognising that individuals with higher levels of education tend to diversify into more profitable non-agricultural activities than the ones with limited educational attainments. This will affect income levels due to diversification. In general, this suggests that households with low levels of education may face significant barriers to engaging in non-agricultural activities. Giesbert and Schindler (2012) examined welfare policies among rural households in Mozambique.

If the land acquisition is considered a shock, then the driving factor to improve the income of farm households is to convert jobs from specialised agriculture to non-agricultural activities and consider improving income as a measure of efficiency. A case study from the World Bank in Vietnam, extracted from VARHS data, confirms that there is a significant move of labour from agriculture sector to household business activities and that attracts workforce from agricultural households. Diversification of income-generating jobs is also a source of welfare improvement of about 15%. Thus, attention should be paid to job creation, especially in rural areas, for agricultural producers. Research by Le Xuan Thai (2014) analyses the factors that increase the average income per capita in a farmer's household, which are arable land, production investment costs, participation in local organisations, and the number of people in the household. Tran Quang Tuyen (2014) believes that household size, dependency ratio, education level of members, and the land area directly affect the income of households having land acquisition. Nguyen Thi Hong Hanh, Nguyen Thanh Tra, and Ho Thi Lam Tra

(2014) in their research have confirmed that education levels and production capital affect the income of farmers whose land is acquired. Nguyen Quoc Nghi et al. (2012) confirmed the educational attainment of the head of household, the number of employees in the household, the percentage of dependents, the area of land recovered, the plan of using compensation money, and employment in industrial zones directly affects the income of households whose land is recovered.

Methodology

Based on the above experimental research approaches, the Model of factors affecting people's income after land acquisition to build industrial zones by Dinh Phi Ho (2011) and the research results of the authors mentioned above, we have included the variables of the household's head age, the number of schooling years by the household's head, the number of employees in the family, the ratio of the dependent, investment income, income of farm households after land acquisition by using the Logarithmic linear regression function to assess the correlation between income and influencing factors.

From the above theories, the author identified a theoretical model that shows the correlation between income and influencing factors as follows:

$$\mathbf{Y = Ln(Odds) = Ln[P(Y=0)/P(Y=1)] = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \beta_4 X4 + \beta_5 X5 + \beta_6 X6}$$

Dependent variables:

$P(Y=1) = P_0$: value 1 when household income increases

$P(Y=0) = 1 - P_0$: value 0 when household income does not increase

Independent Variables

X1: HOUSEHOLDER'S AGE (YEAR)
X2: QUALIFICATION OF HOUSEHOLDER (YEAR)
X3: NUMBER OF LABOURS IN HOUSEHOLD (PERSON)
X4: NO INCOME RATE (%)
X5: LABOURS WORKING IN INDUSTRIAL PARK (PERSON)
X6: INCOME FROM INVESTMENT (DUMMY)
Statistical data processing software is software R version 3.3.3.

Results

Akaike Information Criterion Selection

An important and useful measurement for deciding a simple and complete model is the Akaike Information Criterion (AIC). The model will stop when the minimum AIC value (Tuấn, 2016).

Table 1: Akaike Information Criterion Selection

Model	**AIC**
Y ~ X1 + X2 + X3 + X4 + X5 + X6	187.12
Y ~ X2 + X3 + X4 + X5 + X6	186.12
Y ~ X2 + X3 + X4 + X6	185.95

In the above results, R reports show every step of searching the optimal model. The first step is to start with all 06 independent variables with AIC = 187.12. The second step consists of 05 variables with AIC = 186.12. The third step is to find a model, R stops with a model of 04 independent variables (X2, X3, X4, X6).

Table 2: T-test

Ln(Odds)	**Beta**	**Std.Err**	**t**	**P-value**	**Decision**
Cons	-1.22326	0.86176	-1.419	0.155754	
X2	0.16350	0.06497	2.517	0.011852	Supported
X3	0.54966	0.19801	2.776	0.005503	Supported
X4	-3.91666	1.07098	-3.657	0.000255	Supported
X6	0.66387	0.40633	1.634	0.102298	Supported

All variables have P-value> 0.05 (Hill et al., 2018), so independent variables are correlated with independent variables in table 2.

Variance Inflation Factor

Table 3: Variance Inflation Factor (VIF)

Indicator	**X2**	**X3**	**X4**	**X6**
VIF	1.027243	1.040087	1.050106	1.032571

According to table 3, VIF for the independent variables is smaller than 10 (Miles, 2014), so there is no correlation between the independent variables.

Heteroskesdaticity

Table 4: Heteroskesdaticity

Source	**chi2**	**df**	**p**
White	4.8641	4	0.3015

White Test shows that P-value = 0.3015 and more than 0.05 (White, 1980), so it can be concluded that there is no heteroskedasticity in table 4.

Autocorrelation

Table 5: Autocorrelation Test

Durbin-Watson	**test for autocorrelation**
1.8843	0.2208
H0: no serial correlation	

Durbin-Watson Test shows that there is no autocorrelation from the model in table 5 (Breusch, 1978).

Bayesian Model Average (BMA)

Table 6: Probability of the model

Independent variable	**Probability related to income (%)**
X2: Qualification of householder (year)	83.8
X3: Number of labours in household (person)	86.9
X4: No income rate (%)	100.0
X6: Income from investment (dummy)	26.9
X2, X3, X4, X6	54.6

According to the results from table 6, the probability that the QUALIFICATION OF HOUSEHOLDER (YEAR) is related to the income of 83.8%. The probability that the NUMBER OF LABOURS IN HOUSEHOLD (PERSON) related to income is 86.9%. The probability that INCOME FROM INVESTMENT (DUMMY) related to income is 26.9%. The probability that all four factors related to income is 54.6%. The above analysis shows the regression equation below is statistically significant.

Y = - 1.22326 + 0.16350X2 + 0.54966X3 - 3.91666X4 + 0.66387X6

Discussion

X4: Negative sign (-): Opposite relationship: When the dependency ratio increases by 1%, income will decrease by 3.9%.
X2: Positive sign (+): positive relationship: When the number of years of schooling increases by 1%, the income will increase by 0.16%.
X3: Positive sign (+): positive relationship: When the number of employees increases by 1%, the income will increase by 0.54%.
X6: Positive sign (+): positive relationship: When income from investment increases by 1%, income will increase by 0.66%.

Thus, the income is positively related to the QUALIFICATION OF HOUSEHOLDER (YEAR), NUMBER OF LABOURS IN HOUSEHOLD (PERSON) and INCOME FROM INVESTMENT (DUMMY) opposite the rate of dependents (3.9%).

Conclusions and Implications

The goal of this article is to concentrate on two key issues: the theoretical structure of quantitative models and the results of the application for farmers to create an industrial park after the land has been reclaimed. Through the tests, it can be affirmed: The factors influencing income growth in the order of importance are the head of the household with educational attainment, the high number of family workers and low dependency, along with using compensation money to invest in production and business which will increase farmer's income.

Implications

First, encouraging and creating conditions for children of households whose land is recovered to go to school. Regarding the government, it is necessary to ensure the school facilities with all levels from elementary, junior high to high school to minimise the travel and accommodation costs of farmers' children when they want to graduate from high school.

Second, consulting, training on industries, production and business fields, plants, and animals suitable to the locality so that after receiving compensation, people will choose the appropriate investment form. In addition to facilitating market search, farmers can participate in the supply chain, from production to supply to market access.

Third, implementing vocational training projects and giving priority to children of farmers who have land recovered to study and get jobs in industrial parks in the area.

To create secure jobs especially for people with land acquisition and people living around the industrial park in general. The goal of this recommendation is to build employment for people with particular land acquisition and people living in industrial parks in general. When people have stable jobs, their income and living standards are stable. Implementing this solution should be: enhancing the quality of human resources and labour discipline of people whose land is acquired, in particular, and of people living around the industrial park to meet job requirements in a new context; enhancing job-seeking capacity for people when industrial parks are invested in building. Strengthening business, organizational, and unit obligation.

For the Vietnam government: There should be a short orientation and long-term in the overall planning work developing industrial zones. The construction of Industrial Park requires careful calculations of birth delivery options design and accommodation for households whose land is recovered. Research the policy of binding responsibility businesses for the livelihood and income of the community residential land was recovered such as building infrastructure local floor, for people to contribute stock is exactly the value of their acquired land to them enjoy full rights and benefits from real results business. This will help the business land acquisition quickly and smoothly at the same time, people's livelihood is guaranteed to; support vocational training to help households with land acquisition more convenient livelihood conversion.

For Vietnam local authorities: Deploy livelihood solutions for people whose land is recovered to build Industrial Park, creating the best conditions for jobs. There is an approval to create capital for households whose land is recovered to transfer to non-agricultural income-generating sector import is higher than agricultural production; owner request invests in the industrial zone to invest capital for vocational training workers.

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