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The impact of the “National target program on new rural development” on household income: The case of Go Quao district, Kien Giang province

Pham Chi Hieu¹ and Pham Le Thong^{2*}¹Kien Giang Organization Board of Party Committee of the Centrally-run Businesses’ Sector, Vietnam²College of Economics, Can Tho University, Vietnam

*Correspondence: Pham Le Thong (email: plthong@ctu.edu.vn)

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ABSTRACT

The present study was aimed at evaluating the impact of the National Target Program on New Rural Development on the household income in Go Quao district, Kien Giang province where had been selected as a pilot site of the program in the province since 2010. The data was collected from a survey on 194 households at the study site. The survey was conducted in 2015 to collect the retrospective data on the income of households and the socio-economic characteristics of households and communities from 2010 to 2014. Then, the Difference in Differences (DiD) estimator associated with the random effects model was applied to explore the impact as well as the determinants of household income. Estimation results showed that the impact was positive and significant in the first year but turned to insignificant afterwards. The household income is increasing during 2011 – 2013 and mainly dependent on the transportation infrastructure of the community and the participation in agricultural cooperatives. In addition, since household income mainly came from agricultural production, labor and landholding were also key predictors of income.

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1 INTRODUCTION

Under the Resolution No. 26-NQ/TW dated on August 5, 2008 of the 10th Central Executive Committee of Communist Party on “Agriculture, Farmers and Rural areas”, the government has taken several measures for the development of the agriculture and rural areas. One of the most important measures that has been comprehensively implemented nationwide is the “National target Program on New Rural Development (NTP-NRD) in the period 2010 - 2020”. The NTP-NRD aims at building new rural areas based on 19 socio-economic criteria.

The Mekong Delta (MD) is the home of about 17.5 million people, 75% of whom live in the rural areas (GSO, 2015). By 2014, 1,269 communes of the delta was reported to be involved in the program. The participation in the NTP-NRD of the delta partly resulted in the growth of the household income by 10% and the decrease in the poverty rate by 3% as compared with the year 2010. In addition, more than 3.200 km of rural roads were concreted. As a result, the living standards of the rural household have continuously been improved (Ministry of Agriculture and Rural Development, 2015).

Go Quao is considered a remote district of Kien Giang. The district consists of 11 administrative

units, including 1 town and 10 communes covering 424.4 km² of area with the population of 134.4 thousands. Its economy is heavily based on agriculture which accounts for more than 50% of the total value added of the district (Kien Giang Statistics Office, 2014). Labor working in agriculture was estimated to comprise of about 80% of the total labor in 2012 (Kien Giang Statistics Office, 2014). The district is the home of 3 main ethnic groups, including Kinh (67.56%), Khmer (30.56%) and Chinese (1.95%) and is one of the three most Khmer populated districts in Kien Giang (Kien Giang Statistics Office, 2014).

Since Go Quao is one the poorest districts of the province, it was selected to the program very early. In the end of 2009, the state government selected Dinh Hoa commune of Go Quao district to be one among 11 pilot communes of the country to implement the NTP-NRD. Early 2011, the provincial government added 35 out of 118 communes of the province into the program to expand it. Until 2013, 3 communes of Go Quao have been selected to be the pilot of the NTP-NRD, including Dinh Hoa, Dinh An and Vinh Hoa Hung Nam. Under 4 years of the program, the district constructed 234 km concrete rural roads, and reduced 1,970 temporary houses. The district also implemented several activities in order to increase the household income, including building irrigation system, mechanizing agricultural production, organizing large farms, vocational training for farm and non-farm activities, and providing job information (Go Quao People's Committee, 2014).

One of the key goals of the NTP-NRD is to increase the income and living standards of rural people (The Prime Minister, 2010). The rural residents are the ones who participate in, directly implement the program, and enjoy the benefits from the program. Assessing and proving the changes in household income due to the participation in the program provide evidences on the benefits of the program that may convince the government to continue investing and encouraging local people, especially the Khmer, to support and participate in the program. It is essential for the success of the program.

2 RESEARCH METHOD

The analysis uses the panel data to estimate the Difference in Differences (DiD) estimator representing the impact of the NTP-NRD on the household income. DiD is a method to evaluate the impact of a program based on the difference in the

difference in the outcome of interest (e.g. household income) between after and before the participation in the program and between treatment and non-treatment group. The empirical model of DiD takes the following form:

$$y_{it} = \beta_0 + \sum_{k=1} \alpha_k \mathbf{D}_{itk} + \beta_1 D_{it} + \sum_{k=1} \delta_k \mathbf{D}_{itk} \mathbf{D}_{it} + \gamma' \mathbf{X} + \mu_i + \varepsilon_{it} \quad (1)$$

where, y_{it} is the logarithm of income of the i household at time t ; ε is the disturbance term of the model; μ_i is the households' unobservables that affect y and are unchanged over time; α , β , γ and δ are vectors of parameters to be estimated. Since the program was initiated in 2010, it might take effects on the income of the treated households in the following years. The vector of dummy variables \mathbf{D}_{itk} controls for the time effects on household income during 2011-2014. The dummy D_{it} represents households in the treatment group (residing in communes with the NTP-NRD). Its coefficient represents inherent differences between households in treatment and non-treatment group. The parameters δ_{ks} show the net effect of the program on the income of households in the program during 2011-2014. δ_{ks} represent the difference in the increases in income between households in the program and their counterparts, and then, be called *DiD estimator*. The household income is also dependent on households' and communities' characteristics. Then the vector \mathbf{X} representing households' and communities' characteristics is added in the model (1) to avoid the omitted variable problem. These characteristics represent 5 livelihood capitals, including human capital (education, man-power, skill, etc.), natural capital (land, natural conditions, and so forth), physical capital (infrastructure, rural road, etc.), financial capital (cash, savings, borrowings, etc.) and social capital (social networks) (Ellis, 2000). These capitals are the resources of households to facilitate them to involve in income-generating activities. The variables in the model (1) are presented in Table 1.

The DiD estimator has obvious advantages over alternative estimators since it captures the net program impacts on the treatment group allowing for time changes. Since household panel data is used to estimate the parameters in the model, μ_i and ε_{it} may be correlated within a household across years. In order to solve for the correlation, the random effects model (REM) is applied to produce consistent estimates (Wooldridge, 2010).

Table 1: Description of variables in the model

| Variable | Description | Expected sign |
|-------------------------------|--|---------------|
| <i>Dependent variable (Y)</i> | Logarithm of household income (million dongs/year) | |
| <i>Independent variable</i> | | |
| <i>Impact evaluation</i> | | |
| D_{it} | Dummy variable takes value 1 if the household is located in the communes with the NTP-NRD, and 0, otherwise. | +/- |
| D_{itk} | Dummy variables represent each period during 2011, 2012, 2013 and 2014. | + |
| $D_{it} * D_{itk}$ | The interaction term between D_{it} and D_{itk} | + |
| <i>Human capital</i> | | |
| Years of schooling | The years of schooling of the household head, measured in years | + |
| Labor | The number of people in working age 15-60 | |
| Kinh | Dummy variable takes value 1 if household head is Kinh people and 0, otherwise | + |
| <i>Natural capital</i> | | |
| Landholding | Landholding of household, measured in 1,000 m ² . | + |
| <i>Financial capital</i> | | |
| Total asset | Total value of household fixed assets, measured in million dongs | + |
| <i>Physical capital</i> | | |
| Time to commune center | Time from home to commune center on road (minutes) | - |
| Truck | Dummy variable takes the value of 1 if trucks can reach the house and 0, otherwise. | + |
| Piped water | Dummy variable takes the value of 1 if household uses piped water and 0, otherwise. | + |
| <i>Social capital</i> | | |
| Cooperative participation | Dummy variable takes value of 1 if household participates in an agricultural cooperative, and 0, otherwise. | + |
| Extension services | The number of extension service training that the household head participates in the year. | + |
| Duration of residence | Time duration that household resides at the commune (years) | + |

3 DATA DESCRIPTION

The data in the analysis was collected from a survey on 194 households located at the communes with the NTP-NRD (treatment group) and without the program (control group) of Go Quao district. The survey was conducted from December, 2014 to February, 2015. The household heads were asked to recall the information of households' characteristics, income and living standards such as household members' education, ethnicity group, labor, landholdings, household assets, income, community infrastructure, etc. from 2010 to 2014. The collected data formed a panel dataset with 970 observations of 194 households¹.

Go Quao consists of 10 rural communes. Two communes in treatment group, namely, Dinh An and Dinh Hoa, and 2 communes in control group, namely, Vinh Phuoc B and Thuy Lieu were selected for the survey. The 4 communes in the analysis are located nearby each other and spread over a relatively homogenous natural area, and hence they have approximate geographic, and socio-economic characteristics that facilitate the evaluation of the impacts of the program (Go Quao People's Committee, 2014). Figures in Table 3 and 4 also confirm the similar features among the communes. Then, 2 villages in each commune were randomly selected. Referring to the list of households in each villages, households were randomly selected for the interview. The distribution of the households by communes is presented in Table 2.

¹ The number of observations in some analyses may not equal 970 due to missing information.

Table 2: Distribution of surveyed households by communes

| Commune | No. of households | Percentage (%) | Participation in NTP-NRD |
|--------------|-------------------|----------------|--------------------------|
| Dinh Hoa | 48 | 24.74 | Yes |
| Dinh An | 50 | 25.78 | Yes |
| Vinh Phuoc B | 52 | 26.80 | No |
| Thuy Lieu | 44 | 22.68 | No |
| Total | 194 | 100.00 | |

Source: Survey data in 2015

The income of households in the treatment and control groups is presented in Table 3. Household income of all groups was increasing from 2010 to 2013. Especially, in 2011, the increase was significant as compared with the remaining years, from 85 to 106 million Vietnamese dong (VND)/household for the treatment group and from 88 to 105 million dong/household for the control group. The program was first implemented at the study site in 2011 and hence, the households were given considerable physical support as well as infrastructure. The increase in the household income

was diminishing in 2012 and 2013. However, in 2014, the income of both groups was decreasing due to the sharp drop in rice price in 2014 (Ministry of Agriculture and Rural Development, 2015). Added to this was the fairly low yield of paddy rice due to the extensive use of inferior varieties supplied by seed stations in the district as stated by the surveyed households. Generally, the income of households in the control group was somewhat higher than that of the counterparts. However, the difference is not statistically significant according to the t-test.

Table 3: Household income by groups and by years (Unit: million VND)

| Year | Household income | | | Increase by year | |
|------|------------------|-----------------|-------------|------------------|-----------------|
| | Control group | Treatment group | t statistic | Control group | Treatment group |
| 2010 | 88.01 | 84.53 | 0.34 | | |
| 2011 | 104.89 | 105.69 | -0.06 | 16.88 | 21.16 |
| 2012 | 115.03 | 108.60 | 0.49 | 10.14 | 2.91 |
| 2013 | 116.22 | 111.08 | 0.39 | 1.19 | 2.48 |
| 2014 | 108.55 | 100.27 | 0.62 | -7.67 | -10.81 |

Source: Survey data in 2015

Table 4: Average value of variables in the analysis

| Variable | Unit | Control group | | | | | Treatment group | | | | |
|---------------------------|-------------------|---------------|-------|-------|-------|-------|-----------------|-------|-------|-------|-------|
| | | 2010 | 2011 | 2012 | 2013 | 2014 | 2010 | 2011 | 2012 | 2013 | 2014 |
| Years of schooling | year | 3.24 | 3.24 | 3.24 | 3.24 | 3.24 | 3.35 | 3.35 | 3.35 | 3.35 | 3.35 |
| Labor | person | 2.43 | 2.49 | 2.56 | 2.59 | 2.62 | 1.66 | 1.69 | 1.67 | 1.72 | 2.10 |
| Kinh | 0/1 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 |
| Landholding | cong ² | 7.72 | 7.74 | 7.73 | 7.70 | 7.70 | 9.66 | 9.66 | 9.66 | 9.70 | 7.45 |
| Total assets | Million dongs | 41.89 | 50.20 | 58.17 | 70.76 | 71.05 | 43.05 | 52.37 | 55.97 | 59.28 | 55.42 |
| Time to commune center | Minute | 32.85 | 30.04 | 26.73 | 26.31 | 23.18 | 36.93 | 33.94 | 26.81 | 23.93 | 26.17 |
| Truck | 0/1 | 0.00 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 |
| Piped water | 0/1 | 0.08 | 0.08 | 0.08 | 0.13 | 0.36 | 0.26 | 0.27 | 0.28 | 0.27 | 0.42 |
| Cooperative participation | 0/1 | 0.01 | 0.08 | 0.08 | 0.09 | 0.09 | 0.02 | 0.05 | 0.05 | 0.07 | 0.09 |
| Extension services | 0/1 | 0.08 | 0.14 | 0.40 | 0.43 | 0.41 | 0.44 | 0.54 | 0.70 | 0.74 | 0.55 |
| Duration of residence | year | 36.52 | 37.52 | 38.52 | 39.52 | 40.52 | 42.71 | 43.71 | 44.71 | 45.71 | 46.71 |

Source: Survey data in 2015

Table 4 shows the household characteristics during 2010-2014. In general, household characteristics of human capital (education, man power and ethnicity)

slightly varied over time. The average years of education of the household heads were relatively low, about 3, and almost indifferent between the two

² Cong is a local common measurement unit of area, equal to 1,000 m²

household groups. Households in the control group had more labors than the others did, 2.6 and 2.1, respectively. There was a large difference in ethnicity between two groups. More than half of the households in the control group were Kinh whereas only 14% of households in the treatment group were.

Each household in the control group holds an average land area of 7.7 cong while the other households own 9.7 cong. Given that the number of labor per household are 2.6 and 2.1 for the control and treatment group, respectively; the average area of land per labor is relatively small.

Figures in Table 4 also showed an improvement in infrastructure indicators during 2010-2014. The proportion of households in the control group using piped water significantly increased from 8% in 2010 to 36% in 2014 though it was much lower than that

of the treatment, 42%. However, the percentage of the households having houses with truck road was still low, about 2-3%. The number of households participating in agricultural cooperatives accounted for 9% for both groups in 2014. Extensive services were hardly found at the survey site. Most of households had resided at the communes for as long as 40 years. Residing for long time at the communes may establish strong social networks within the communities.

4 RESULTS AND DISCUSSIONS

The estimation results of the REM in equation (1) are presented in Table 5. The significance of the Wald test shows independent variables have significant effects on the household income. The independent variables explain 22% of the variation of the dependent variable.

Table 5: Estimation results of the REM with DiD estimator

| Variable | Estimated coefficient | t-statistic |
|------------------------------------|-----------------------|-------------|
| <i>Impact evaluation variables</i> | | |
| D_{2011} | 0.0751 ** | 2.31 |
| D_{2012} | 0.1257 *** | 3.66 |
| D_{2013} | 0.1189 *** | 2.99 |
| D_{2014} | 0.0031 | 0.05 |
| D | -0.1700 | -1.48 |
| $D \times D_{2011}$ | 0.0898 ** | 2.12 |
| $D \times D_{2012}$ | 0.0296 | 0.54 |
| $D \times D_{2013}$ | 0.0428 | 0.71 |
| $D \times D_{2014}$ | 0.0767 | 0.66 |
| <i>Human capital</i> | | |
| Years of schooling of the head | 0.0100 | 0.69 |
| No. of labor | 0.0851 ** | 2.10 |
| Kinh people | -0.2890 ** | -2.31 |
| <i>Natural capital</i> | | |
| Landholding | 0.0414 *** | 6.53 |
| <i>Financial capital</i> | | |
| Total assets | 0.0004 | 0.79 |
| <i>Physical capital</i> | | |
| Time to commune center | -0.0078 *** | -4.42 |
| Truck | 0.5048 *** | 3.44 |
| Piped water | -0.1623 | -1.26 |
| <i>Social capital</i> | | |
| Cooperative participation | 0.3936 *** | 3.62 |
| Extension services | 0.0483 * | 1.88 |
| Duration of residence | 0.0048 * | 1.82 |
| Constant | 3.8068 *** | 20.30 |
| No. of observations | 920 | |
| R^2 | 0.22 | |
| Wald χ^2 | 322 | |
| $Pr > \chi^2$ | 0.0000 | |

***, **, and *: indicate the significance level at 1%, 5% and 10%, respectively

Source: Estimated from survey data 2015

4.1 The impact the NTP-NRD on the household income

Figures in the Table 5 showed that the impact of the program on the household income was not clearly found from the estimation. All DiD estimators were positive but only the one of the year 2011 was statistically significant at 5%, indicating that the program brought the treatment group significantly positive treatment effect only in the first year during the implementation. Given other things equal, the growth rate of the income of households in the communes with the NTP-NRD was higher than that of the counterparts by about 9%. The treatment effect attenuated afterwards. Then, the program had only the temporary effect when first initiation. According to the sampled households in the treatment group, in 2011, they were given considerable physical supports such as capital, seed, technical training, irrigation services, housing, etc. Therefore, their household income significantly increased. However, the supports were not adequately maintained in the following years. Then, the high increase in income was not persistent.

Despite the program, the income of households of both groups increased during 2011-2013. In 2011, at the significance level of 5%, the household income increased by 7,5% compared to 2010 while the increase in 2012 was estimated at 12,6% at the significance level of 1%. The income in 2013 also increased by about 12% compared to 2010. Then, the income in 2013 was approximate to that in 2012. The estimated coefficient of the year 2014 was not statistically significant, indicating no difference in income between the year 2014 and 2010. Then, if compared to the 2013 income, the income in 2014 dropped. This result might come from the drop in rice price and yield at the study sites in 2014. Rice production is the main income-generating activity of farm households in the region. Therefore, whenever unfavorable events on the rice market and production conditions occur, the household income is badly affected.

4.2 The impact of households' livelihood assets on household income

The estimation results showed that the household income at Go Quao was strongly dependent on household's livelihood assets, especially, physical capitals and social capital. These capitals were meaningful to policy makers since they were closely related to the supply of civil services of the government. The estimated coefficients of the variable "Time to commune center" and "Truck" were all statistically significant at 1% and positive, indicating that transportation infrastructure was a

key predictor of household income. According to the estimation results, households residing nearby roads for trucks obtained income as much as 50% higher than the others, while shortening the time to the commune centers could also increase the income. Therefore, one of the main factors contributing to the success of the NTP-NRD was to build rural road and to improve physical infrastructure of the communes. The improvement of rural road was likely to reduce the transportation costs, input prices and consumption goods' prices, but increase the agricultural product prices since it enhanced the access of rural households to the input and output markets. The improvement of the infrastructure was also found to link the suppliers of raw materials with food processing zones, then it motivated the development of the raw material production (Mu and van de Walle, 2011). Mu và van de Walle (2011) found that rural road building significantly contributed to the development of rural households' living standards in Vietnam, while Khandker *et al.* (2009) found a considerable reduction of poverty due to road building in Bangladesh. In addition, the study of Yamauchi (2014) showed that infrastructure improvement resulted in an improvement in human capital in rural Indonesia that helped farmers participate more in non-farm activities.

Figures in Table 5 also showed significant and positive effects of social capital on household income in Go Quao. Participation in cooperatives, in extensive service programs were likely to create social networks, promoting the information exchange, and the cooperation in doing farm and non-farm activities (Narayan and Pritchett, 1999, Woolcock and Narayan, 2000). As the estimation results showed the cooperative participation could increase the income by 39%, and participation in extensive services might also increase the income. Households participating in cooperative enjoyed more supports on irrigation service, seed, subsidized inputs, and so forth, then, were able to increase income. Households residing long at the commune were also able to increase their income. Duration of residence was possibly considered a social capital since it helped farmers establish relationships among the community as well as gain knowledge of the land and people of the community that facilitated them to participate in income-generating activities.

The number of labor in the household was also found to have positive and significant effect on the income. It was evident that the more labor the household had, the more income-generating activities they were able to involve in. Therefore, households with more labor were likely to generate

more income than the others were. However, education was not likely to affect the household income. It was plausible that most of rural income-generating activities might not require professional skills and knowledge but experiences and manpower. It was interesting that the income of Kinh households was likely lower than that of the Khmer ones. As observed from the survey, in recent years, the State and provincial government provided massive supports to ethnic minority groups, including housing, education, health insurance, seed, favorable credit and so forth. These supports had significantly increase the income of ethnic minority groups at the district.

Landholding was also found to be a key predictor of the household income. The income was increasing with the landholding. It was evident that rural households at Go Quao mainly relied on agricultural production which required land as an important production factor. Then, the larger area of land the households had, the more income-generating activities the household was able to involve in, and the more income was earned.

5 CONCLUSIONS AND RECOMMENDATION

By using the DiD estimator associated with the panel data of 194 households at 4 communes with and without the NTP-NRD of Go Quao district during 2010-2014, the present study found a significant treatment effect of the program on household income in the first year after the initiation. However, the treatment effect was not statistically significant in the following years since the supports from the program were discontinued, causing the increase in household income of the treatment group to be non-persistent.

The income of households at Go Quao was increasing during 2010-2013, but decreasing in 2014 due to unfavorable conditions in production and markets. Household income was also found to be dependent mainly on the development of rural transportation infrastructure, cooperative participation, extensive services, and landholding. Therefore, in order to increase household income and maintain the positive effect of the NTP-NRD,

the concerned authorities should maintain physical supports to the households as long as the households are able to establish firm background for their income-generating activities. Building rural roads, expanding the cooperatives, and enhancing extensive services are also among the important tasks that provincial and district government should pay much attention.

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