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Tax Incidence of Philippine Tax Reform: Poverty and Distributional Effect

Ricardo Laurio DIZON¹

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Abstract

The purpose of the study is to determine the poverty and distributional effects of the implementation of Tax Reform for Acceleration and Inclusion Law. The Computable General Equilibrium-Top Down Behavioral Microsimulation was used to obtain the effects of the tax reform on macroeconomic and microeconomic levels. Moreover, the Poverty Gap Index, Squared Poverty Gap Index, Foster, Greer, and Thorbecke Measures of Poverty, and Sen-Shorrocks-Thon Index were used to measure the poverty effect of the tax reform. Meanwhile, the Gini Coefficient and SST Gini Coefficient Index were used to measure the distributional effect of the tax reform. The results show that the implementation of the tax reform has resulted in a significant increase in household income and disposable income. Region IV has the highest estimated increase in household income. Meanwhile, Region IV remained to have the lowest household income. Further, the findings of this study suggest that the tax reform resulted in a significant decrease in the magnitude of poor and the number of poor in the Philippines. However, the result of the study also suggests that the effect of tax reform manifests no differences in terms of the poverty gap measured through the Foster, Greer, and Thorbecke poverty index due.

Keywords: Distributional Effect, Poverty Effect, Tax Incidence, TRAIN Law

JEL Classification Code: H20, H21, O11, G38

1. Introduction

The Philippines has introduced various reforms in tax collection in view of sustainable economic development. Despite these tax reforms, the country is still lagging behind its neighboring countries due to tax collection efficiency (Tanzi & Shome, 1992). With the aim of correcting several deficiencies in the Philippine tax system and achieving a fair, simple, and tax collection efficiency, the Tax Reform for Acceleration and Inclusion (TRAIN) has been enacted and implemented on December 19, 2017. The implementation of TRAIN has brought controversial issues such as the increase in taxes levied on petroleum products and sugar-sweetened

beverages (DBM, 2018). Mapa (2017) concluded that the increase in taxes on diesel would cause an increase in prices that could affect both the poor and non-poor households. Moreover, the increase in taxes on diesel by Php6.00 would have an increase in inflation rate by 10 times on poor households compared to non-poor households. Further, the Php6.00 excise tax rate on diesel resulted in an estimated additional Php0.205 million burden on the household sector. The DBM, though admitted that some households will be worse off due to the implementation of TRAIN, defended that the government implements a policy to mitigate the adverse effect of TRAIN through conditional cash transfer amounting to Php200.00 per month per household to the poorest 50% of households or ten million households. This cash grant would be more than enough to compensate for the temporary increase in prices as the TRAIN Law takes effect.

Economists use tax incidence in studying what particular sector of the economy bears the burden in the changes in the tax policy of a country. In economics, tax incidence or tax burden is the effect of a particular tax on the distribution of economic welfare. *Tax incidence* refers to how the burden of a tax is distributed between firms and consumers. The alteration and inefficient tax system changes the movement of supply and demand; thereby, creating a negative impact

¹First Author and Corresponding Author. Associate Professor, Master of Science in Economics, Graduate School, Polytechnic University of the Philippines, Philippines [Postal Address: 262 Sizzling House, Teresa Street, Sta. Mesa, Manila, 1016, Philippines]
Email: rldizon@pup.edu.ph

on the economy (Maswadeh & Hanandeh, 2020). Kotlikoff and Summers (1987) cited that tax incidence is required in characterizing the effects of alternative tax measures on economic equilibrium. The burden of taxes is not necessarily borne by those upon whom they are levied. Moreover, tax reform results in changes in the equilibrium in the economy, prices of goods, and the rewards for factors. The assessment of the impact of tax policy enables a country to increase the value relevance (VR) for unexpected earning by providing pretax and post-tax forecasts. This study aims to analyze the distributional and poverty effects on household sectors of the implementation of TRAIN Law. Further, this research also aims to assess if these changes in the poverty and distribution of income of households significantly differ because of the TRAIN Law.

2. Literature Review

The trade-off between lowering income poverty and increasing well-being is stipulated in the optimal tax theory. Optimal tax theory or the theory of optimal taxation is the study of designing and implementing a tax that maximizes a social welfare function subject to economic constraints. The theory emphasizes that the objective of the planner is to design a tax-transfer system that would alleviate poverty and allow households to consume goods more than the poverty line. It also posits that the tax-transfer is a proven optimal choice to alleviate poverty among households and incentivize those poor households to earn more. Moreover, tax reforms lead to financial inclusion that reduces poverty, increasing development, attaining equitable distribution of income, and financial system stability (Ratnawati, 2020). Ahmed et al. (2010) pointed out that effective and efficient implementation of tax collection in the form of excise tax on goods usually consumed by rich families translates into the realization of the objective of tax reform for the benefit of the poor households. Developing countries should enhance the collection of taxes in an indirect tax system which must be based on the following elements: (a) excises on alcohol, tobacco, petroleum products, and some luxury goods, (b) a Value Added Tax with one or two rates and some exemptions; and (c) subsidies for certain groups of people. Ahmad and Stern (1991) emphasized that in comparison to developed countries which are highly dependent on personal income, developing countries are heavily dependent on indirect taxation. In the case of developing countries, personal capital income can be easily evaded since most taxpayers are employed in small businesses and are mostly self-employed. The investment through the tax-benefit change enables to help the investor to attain bargaining power in the financial market (Yaken, 2020).

The household wage income tax affects the supply of labor in the long-run period, where a higher wage tax results to lower labor supply and capital stock. To maintain the level

of capital stock and consumption, the increase in percentage tax should be equal to the increase in the supply of labor (Kotlikoff & Summer, 1987). The model developed by Espinoza and Ruiz (2014) assumed that the supply of labor affects the wage of skilled laborers. The skilled laborer's wage is negatively correlated to the level of unemployment; thus, the corresponding supply of labor is characterized as upward sloping. In the short-run period, the effects of employment depend on the demand for and supply of labor. If labor supply is more inelastic, more laborers are needed in the market, and reducing social security taxes through an increase in wages will have a minimal effect on employment.

The changes in total factor productivity and capital-to-labor ratio are represented in the first term in each equation. The second and third terms in each equation capture changes in the relative productivity of sectoral and skill-group labor inputs. Meanwhile, the fourth and fifth terms represent the change in aggregate labor and the change in sectoral aggregate labor. The reduction in the labor tax increases the labor participation rate and noticeably leads to an increase in the contribution of labor to total economic growth. This was due to the increase in the production of labor (IMF, 2015).

3. Research Methods and Materials

3.1. The Sources of Data

To determine the distributional and poverty effects of Philippine TRAIN Law, this study had used the Family Income Expenditure Survey (FIES) in the year that had been taken from the official site of the Philippine Statistical Authority (2015). Meanwhile, the tax tables (new and old) and the government revenues collection were culled from the Bureau of Internal Revenue (2019). This study had used the results of Computable General Equilibrium simulation from the study of Tũaño et al. (2018).

3.2. The Computable General Equilibrium – Top-Down Microsimulation

The combination of Top-Down Behavioral Microsimulation and Computable General Equilibrium (CGE) has been used to determine the effect on poverty and distribution of income due to TRAIN. The CGE has been used to investigate the macro-level effect of the TRAIN Law, while the Top-Down Behavioral Microsimulation had been used to analyze the micro-level effect. The CGE Top-Down Behavioral Microsimulation has the capability to determine the changes in poverty incidence and distribution of income due to changes in tax policies. The CGE Top-Down Behavioral Microsimulation is a three steps procedure in studying the effects on the distribution of income and poverty (Figure 1). It involves the following steps: (1) The estimation of household income before the implementation

of TRAIN Law and determining the estimated distribution of income and poverty incidence, (2) the integration of CGE simulation to the estimated household income; and (3) The estimation of household income that determine the poverty incidence and distribution of income after the TRAIN Law. The Household Income before the implementation of TRAIN Law is the aggregation of income from employment, entrepreneurial farming activities, and entrepreneurial non-farming activities as represented by equation 1 below:

$$Y_{h,t} = \sum_{i=1}^N w_t^{sk} I(E_{i,t}^{sk} = 1) + \sum_{i=1}^N w_t^{msk} I(E_{i,t}^{msk} = 1) + \sum \pi_{h,t}^j N_{h,t}^{j,sk/msk} + y_{h,t}^{ex} \tag{1}$$

The first term is the income of the household from employment. Meanwhile, the second term is the income of the household income from both farming and non-farming entrepreneurial activities. The household income due to employment was derived by employing the Two-Step Heckman Selection procedure. The income of the household both from farming and non-farming activities was estimated using the Instrumental Variable Regression. The Heckman Two-Step Selection model involves two steps which are: (1) the determination of selection equation which determine whether household head would have opted to be in wage sector or transfer to another occupational choice which was determined using the personal characteristics such as gender, urban classification, age, region, education, and the number of children, and (2) determining the estimated labor income (equation 3). The Inverse Mill Ratio has been used to account for selection bias when the Ordinary Least Square (OLS) is used. This was due to the reason that the omitted variables may influence both the probability of entering the wage worker sector and the estimation of the natural logarithm of wage. The Heckman Selection model requires that the variables in the first stage of regression (in this case, the region and number of children) must not appear in the second stage of regression. The procedure’s exclusion restriction allows influencing the probability of being in the wage sector but does not allow influencing the natural logarithm of wage.

The Instrumental Variable (IV) Regression was used to determine household income due to farming and non-farming entrepreneurial. The estimated income derived was used to estimate the poverty and distribution of income which reflects the base indices before the implementation of TRAIN Law. The poverty and distribution of income indices were calculated using the Distributive Analysis Stata Package (DASP) module. This study also analyzed the impact of TRAIN on variation in the number of poor and distribution of income in each period. The variations in the real consumption of the household were obtained through the variation in household incomes. To estimate the changes in poverty and inequality, the per capita consumption at constant prices was obtained. To generate consistency with the poverty measurement, household consumption was converted to monthly consumption by dividing the total consumption for each commodity for the year by 12 months. The total consumption of each individual is aggregated and converted to monthly consumption. To measure how much each household falls below the poverty line, this study had used the poverty gap index. The poverty gap index is expressed in terms of the percentage of households who are below the poverty line (Haughton & Khandker, 2009). To consider the inequality among the poor, this study used the index for the squared poverty gap which is a measure of the severity of poverty (Haughton & Khandker, 2009). It is the weighted average proportion of the poverty gaps in the poverty line. To measure the household income gap among the poorest members of the society and in the Philippines, this study had used different indices of Foster, Greer, and Thorbecke (FGT) such as headcount, poverty gap, and poverty severity (Haughton & Khandker, 2009).

This study also used the index of Sen Shorrocks and Thon (SST) to measure the depth of inequality among households (Haughton & Khandker, 2009). The SST index is composed of three measures which are averages of the poverty gap and poverty headcount index, and Gini coefficient. This research paper used the poverty gap indices and Gini inequality index to investigate the poverty and distributive effects of the implementation of TRAIN Law (Haughton & Khandker, 2009). The SST Gini coefficient was used to measure income inequality (Haughton & Khandker, 2009).

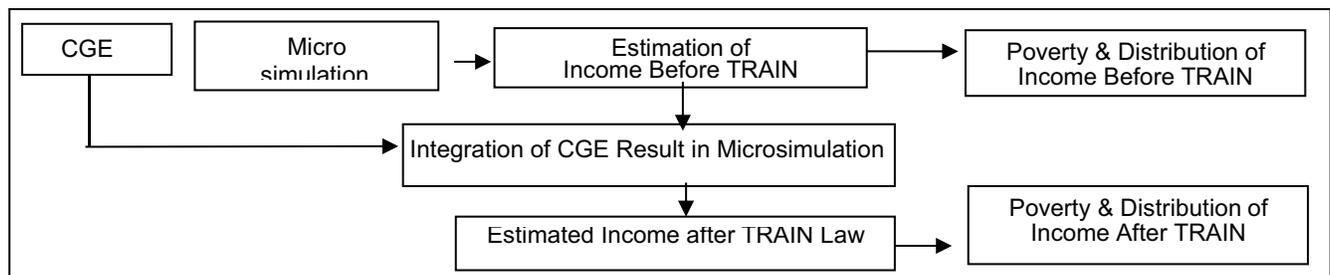


Figure 1: The Flow of Investigating The Impact Of TRAIN on Poverty and Distribution Of Income

4. Results

4.1. The Estimation Results

The wage income of the household for both skilled and unskilled workers was estimated using the Heckman Two-Step Procedure which was shown in Table 1 and Table 2. The results show that the individual's educational attainment and age have a significant positive impact on labor income since the probability of 0.009 and 0.09 are less than 5% and 10% level of significance, respectively. The findings are supported by the Theory on Human Capital (Mincer, 1974) that emphasized that experience and education have a significant positive impact on the income of laborers. Further, the higher the educational attainment translates to an increase in individual income as emphasized by the Mincerian Wage Equation (Mincer, 1974). Meanwhile, gender has a significant negative impact on skilled wages. Consequently, male laborers had higher income compared to female laborers (Ledic, 2012; Ahmed et al., 2010). Also, male laborers had a higher probability of joining the wage income sector compared to female workers who were supported by the studies of Bourguignon et al. (2007) and Ledic (2012). This study also found that those individuals who are living in urban areas have a higher probability of joining the wage income sector compared to those individuals living in rural areas, and the result has been supported by the study of Colombo (2010). Besides, the more the number of children, the educational level increases the chances of joining the wage income sector. Meanwhile, the regional differences had shown insignificant effects on the choice of worker of either to be in employment sector or not which was supported by the study of Ledic (2012) since the p-value of 0.751 is higher compared to 5% chosen level of significance. This indicates that individual living in the first region had a higher probability of being employed compared to those people who are living in the other regions since most of the job opportunities in the Philippines is concentrated in the region near to Metro Manila which serves as the center of economic activity. Further, age has a significant positive effect on the labor income of unskilled laborers with a 0.0188 coefficient.

The variables such as urban, education, sex, no. of children, region, and age had been used to estimate the income of the household due to farming activities using the Instrumental Variable method of estimation, and incorporating the Inverse Mill Lambda to address the problem of potential endogeneity between the family size and the number of household members directly involved in farming activities. The variables such as region, urban, sex, education, number of children and married had significant effects on household profit due to farming activities. This is reflected on the respective p-values which are less than the 5% level of significance. The statistical results show that an increase in the number of households

who are directly involved in the farming activity results in an increase in the income derives from entrepreneurial farming activities. The explanatory variables such as the number of family workers in non-farming activities, region, urban, sex, education, and the number of children had significant effects on the household income from entrepreneurial non-farming activities. Meanwhile, the statistical results revealed that the number of family members working in non-farming activities has a positive effect on household entrepreneurial income. Likewise, those individuals who are living in rural areas have lower household entrepreneurial non-farming income compared to those individuals living in urban areas. Moreover, the increase in the number of children decreases the profit for entrepreneurial non-farming activity. The primary reason for the decrease in profit due to the increase in the number of children is that most of the informal sector businesses often divert their capital and profit to sustain the primary needs of their children.

4.2. The CGE- Microsimulation Results

The results of the CGE simulation in the study conducted by Tuaño et al. (2018) were integrated into the Top-Down Behavioral Microsimulation. The study used the 2012 Input-Output (IO) table culled from the Philippine Statistical Authority. Based on the study, the low skilled workers had an increase in income by 3.20% due to TRAIN. Meanwhile, the highly skilled workers would increase the income by 2.70%.

This study had used different poverty indices to compare the pre and post-implementation effects of the TRAIN Law. The index for the poverty gap before and after the TRAIN is shown in Table 3. The results revealed that the Poverty Gap Index is anticipated to show an improvement due to TRAIN. The index serves as a guide for the policy-making body on the amount of subsidy to be given to households who belong to the poor population to exceed the poverty line, and this index enables the government to save its budget allocation and alleviate poverty in the country. The findings are supported by the study of Chen et al. (2001) which emphasized that taxes levied from petrol product has the so-called pass-through impact which decreases the burden of tax into households. The study also revealed that TRAIN Law results in a smaller gap in poverty which is supported by the study of Ahmad and Stern (1991). Ahmad and Stern (1991) had postulated that developing countries should do away from too heavily dependent on the collection of taxes from personal income since it is vulnerable to tax evasion. The entrepreneurial farming class had the lowest poverty gap with an index of 0.60. Meanwhile, the entrepreneurial non-farming workers had the highest Poverty Gap Index with 1.04 due to TRAIN. The wage workers and entrepreneurs in non-farming have posted the highest benefit due to TRAIN with 0.03 percentage points. Contrary to the result of the Poverty Index, the unemployed workers got the highest Squared Poverty Gap Index of 2.71

before the TRAIN Law and 2.66 after the TRAIN Law (Table 3). This means that the severity of poverty occurred in this type of occupational choice. The TRAIN Law results in an improvement in the severity of poverty among this group of labor. The non-farming entrepreneurial workers recorded the highest improvement in the severity of poverty in the Philippines from an index of 2.45 to 2.39 or an improvement by 0.06 percentage points. The result of the poverty severity index test of this study is supported by Llambi et al. (2016) which also found a decline in severity of the poverty gap due

to the implementation of the income tax reform. The major driving forces to the improvement in the severity of poverty are associated with an increase in mean per capita household income driven by the reduction in the unemployment rate, growth in average wages, and capital income (Llambi et al., 2016). There is noticeably a reduction in the unemployment rate in the Philippines due to expansionary fiscal policy and incentives to work due to the increase in disposable income brought about by tax reform due to the implementation of the TRAIN law.

Table 1: The Estimation of Individual Wage for Skilled Laborers

Dependent Variable: Skilled Laborers (LN)				Dependent Variable: Unskilled Laborers (LN)		
Variables	Coefficient	Standard error	P> z	Coefficient	Standard error	P> z
Constant	-0.4664	0.0166	0.0000	10.9566	0.0145	0.0000
Education	1.0928	0.0028	0.0090	-0.8685	0.0180	0.0000
Age	0.0074	0.0826	0.0900	0.0188	0.0031	0.0000
Sex	-0.1401	0.1336	0.0000	0.5220	0.0897	0.0000
Dependent Variable: Salaried						
Constant	1.8124	0.0042	0.0000	1.8125	0.0526	0.0000
Sex	-0.3030	0.0005	0.0000	-0.3029	0.1860	0.0000
No of children	0.0323	0.0186	0.0000	0.0323	0.0045	0.0000
Urban	-0.2654	0.0141	0.0000	-0.2654	0.0156	0.0000
Education	0.0205	0.0045	0.0000	0.0205	0.0042	0.0000
Region	-0.0001	0.0156	0.7510	-0.0001	0.0006	0.7510
Inverse Mill lambda	-0.9081	0.4437	0.0410	-3.8015	0.4830	0.0000
Rho	-0.1926	Wald Chi Square =4,710.45		Rho=-0.7140	Wald Chi Square= 2,371.95	
Sigma	4.7145	Probability	0.0000	Sigma=5.3242	Probability	= 0.00000

Table 2: The Estimation of Household Profit Due to Farming and Non-Farming Activities

Dependent Variable: Household Profit Due to Farming Activity			Dependent Variable: Household Profit Due to Non-Farming Activity	
Variables	Coefficient	Probability	Coefficient	Probability
No.of Family Workers in Farm	3.2150	0.0030	3,228.98	0.0800
Region	0.0068	0.0000	204.77	0.0010
Urban	4.8962	0.0000	-36,936.49	0.0000
Sex	-0.7499	0.0000	37,981.33	0.0000
Education	-0.5268	0.0000	31,134.19	0.0000
Number of Children	0.1850	0.0000	-3,031.27	0.0000
Married	0.1339	0.0000	-707.00	0.7330
Instrumented: No. of Family Workers in Farm; Instruments: region urban sex education number of children married family				

Table 3: Poverty and distributive indices before and after the TRAIN law

Labor Classifications	Poverty Gap	Squared Poverty Gap Index	FGT Indices			The Sen-Shorrocks-Thon Index				Gini Coefficient Index
			Headcount Index	Poverty Gap Index	Poverty Severity Index	Average Poverty Headcount	Average Poverty Gap	Gini	Sen-Shorrocks-Thon	
Philippine Poverty and Distribution of Income Indices Before the implementation of TRAIN Law										
Wage Workers	0.73	0.70	68.80	28.24	14.45	0.6767	0.2923	0.4514	0.2871	0.4514
Farming Entrepreneurial	0.62	0.60	78.95	36.49	20.14					
Non- Farming Entrepreneurial	1.04	1.01	62.92	25.65	13.13					
Unemployed	0.84	0.82	60.02	26.56	15.10					
Philippine Poverty and Distribution of Income Indices Simulated effects after the implementation of TRAIN Law										
Wage Workers	0.73	0.70	67.13	26.86	13.53	0.6594	0.2794	0.4513	0.2871	0.4513
Farming Entrepreneurial	0.62	0.60	77.62	35.05	19.04					
Non- Farming Entrepreneurial	1.04	1.01	60.83	24.41	12.29					
Unemployed	0.84	0.82	58.18	25.44	14.33					

The FGT measures are shown in Table 3. The recorded poverty gap, poverty rate, and severity of poverty were recorded in the entrepreneurial non-farming sector with a respective index of 36.49%, 78.95%, and 20.14%. Meanwhile, entrepreneurial farming had 12.29% recorded severity of poverty which is considered the lowest figure among the various sectors. Further, the greatest beneficiary of TRAIN is those in the farming entrepreneurial class since it posted an improvement of 2.09% which means that the tax changes had benefitted the 2.09% of the population. Likewise, the entrepreneurial non-farming class had recorded the highest improvement in the severity of poverty due to the implementation of TRAIN recording a decline by 1.1% from 13.13% in the base period.

The Gini Index measures the extent of distribution of income or expenditure among households with an index of zero means that equality is perfect and 100% means inequality. The country had posted minimal improvement on the distribution of income with a 0.4515 Gini index in 2019 from 0.4515 before the TRAIN Law which translates to a reduction of 0.000120 percentage point (Table 3). The results of the study were supported by Llambi et al. (2016) which postulates which progressive direct tax on income leads to lower Gini inequality by one-point, and the population who belong to the richest decile had become loser under the progressive tax system. Among regions, the TRAIN had improved the unequal distribution of CAR with a decline by 0.000150 percentage point. The improvement in the distribution of income was also seen in Regions 6, 7, and 9 with a decrease of 0.014% in Coefficient of Gini. The SST index is composed of three measures which are average poverty gap, average poverty, Gini coefficient,

and headcount index. The results of the study revealed that the average poverty headcount index had declined by 2.56 percentage points from 0.6767 in 2018 to 0.6594 in 2019 due to TRAIN. This means that there is an improvement in the number of households that belong to the poverty line as a result of TRAIN law which had resulted in an increase in disposable income. The index of the average poverty gap index in the Philippines has shown an improvement by 4.41 percentage points with 0.2794 due to TRAIN, and this means that TRAIN had resulted in an improvement in poverty depth in the Philippines. The simulated Gini coefficient for the poverty gap revealed that there is a conservative decrease in inequality in the country with an index of 0.4513. The poverty gap Gini Coefficient is often had a conservative percent change compared to the changes in income among the household who are considered non-poor. The SST usually ranges between zero (no poor) and one (all individuals are poor). The SST index is slightly improved posting a 0.287072 due to TRAIN Law from 0.287096 which signifies that fewer people are becoming poor. The findings of this study are supported by Ahmed et al. (2010) who had emphasized that the reform on excise tax products resulted in a decrease in the number of households who belong to the poor population.

5. Conclusions

The results of the study revealed that the magnitude of the number of poor households and the number of poor significantly decreases due to TRAIN. On contrary, the distribution of income among households is anticipated to worsen the condition. It is recommended to the government

to include in the TRAIN Law II a wider incentive in tax for the entrepreneurial farming workers in a form of tax credits, capital acquisitions tax relief, tax investment credit, tax exemption for land least security for farmers. The government is also encouraging to give form social security specially dedicated to farmers and members of the family working in the agricultural and farming sector. It is also recommended to give monetary and non-monetary incentives to those farmers who may opt to stay in the farming sector and opt to preserve their agricultural land. The adverse effect of TRAIN due to discrimination, social tensions, poverty traps can be resolve by giving monetary and non-monetary incentives for the poorer businessman.

The study also recommended that the Philippines may opt to adopt the United States' tax credit from earned income that can be allocated to those individuals who belong to poor household working or runner non-farming businesses. To lessen inequality, the Philippines may implement a geographical targeting of areas and regions with a higher prevalence of inequality, and to implement an improvement in access to roads, markets, and communication that would encourage the poor and non-poor entrepreneurial due to more efficient delivery of their products. The number of households who belong to chronic poverty maybe lessened by providing and increasing the number of available permanent work and decreasing the number of contractual employees. Meanwhile, the number of households who belong to transient poverty can be reduced by providing temporary work such as contract work.

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