Does the Pro-Poor Financial Package Work? Evidence from Vietnam

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Abstract

This article examines the causal effects of the National (Pro-poor) Targeted Programs (NTPs) on both poverty incidence and inequality in Vietnam over the period 2002–2010. While the independent links between pro-poor expenditure and (1) poverty alleviation, (2) income inequality have previously been analysed, this study is the first to offer a comprehensive analysis of NTPs expenditure on poverty and inequality at the same time. Applying a system generalised method of moments (GMM) estimator to a panel of Vietnamese regional data, we are unable to establish that NTPs have significantly mitigated poverty incidence. However, we estimate that NTPs significantly increased inequality as measured by the Gini coefficient. We offer two possible explanations and discuss the possible policies which can reduce both poverty and inequality simultaneously.

Keywords: Pro-poor programs; Poverty; Inequality**;** Vietnamese public spending**;** GMM estimators

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1. Introduction

The primary objective of this paper is to shed light on the extent to which the governmental pro-poor expenditure influences both income inequality and poverty reduction. Ravallion (2005) and the World Bank (2005) show that countries with low inequality perform substantially better in reducing poverty, and furthermore that excessive inequality erodes the positive effect of economic growth on poverty reduction. Rising inequality impedes poverty reduction in the long run because it prevents the poor from socioeconomic advancement (Ravallion 2004). Additionally, inequality is harmful for growth itself since it obstructs the accumulation process of human capital of poor households (Cornia and Court 2001). Effective antipoverty policies should address inequality because a more equitable economy stimulates the poorest groups to accumulate assets (World Bank 2001). Thus, assessing the independent link between and among pro-poor expenditure and inequality and poverty reduction is an important undertaking because poverty reduction may come at the expense of a more unequal distribution of income.

Research on the simultaneous impact of pro-poor spending on both poverty and inequality is limited. Up until 2010, only four studies consider total public expenditure as an explanatory variable for economic inequality (Afonso et al. 2010). Among these four studies, only Gustafsson and Johansson (1999) concentrate on a regression between the budget dedicated to social security and inequality in 16 selected OECD countries, but the main results are statistically insignificant. Li et al. (2000) apply nonparametric methods to analyse the inequality–economic growth correlation and treat government spending as a control variable. Data from a large panel of countries show evidence that public expenditure reduces inequality over the period 1960–2000.

Evidence from the Asian region seems to support the statement of conflicting trends in inequality and poverty. Inequality has increased steadily in a number of developing countries although the poverty incidences fell over time. Inequality rises because income of the richest group grew at a faster pace than those at the lower tail of the

income distribution (Zhuang et al. 2014 35). The International Monetary Fund (2014 30-31) notes that the effects of social assistance programs in Asia Pacific are ambiguous with respect to poverty reduction since they often overlap with growth enhancing policies (e.g. educational services, and infrastructure capacities). The paucity of evidence is a result of a number of factors: (1) overlapping objectives usually implies that different ministries and government agencies get involved, which makes implementation complicated; (2) mistakes in identifying beneficiaries (pro-poor programs were leaked to non-poor households); (3) low coverage of various programs; (4) and reliance on poorly justified in-kind and price subsidies. This ambiguity implies that evidence on the extent to which specific pro-poor programs are helpful in reducing poverty and inequality within an Asian context like Vietnam is in demand and indeed highly policy relevant.

This paper contributes to the literature by using data from Vietnam to estimate these causal relationships. Vietnam presents an interesting case study for two reasons. First, the country is known as a good example of poverty alleviation as the poverty headcount ratio (HCR) decreased substantially from 58% in 1993 to lower than 14.5% in 2008 (World Bank 2012 1) based on the US$ 1.25 (PPP) poverty line. The Vietnamese economy also experienced a fair stability in the Gini coefficient of consumption expenditure below 40 over the 2000s (World Bank 2012 155; World Bank 2014a), which is in contrast to several of other Asian rapid growth economies (e.g. China, Indonesia). Three factors fostering the equitable growth are the geographic broad-based strategy of development, the transitory of agricultural labourers to manufactural sectors, and the domestic remittance from urban workers (World Bank 2014a).Despite this success, both inequality and poverty are still explicitly targeted by the Government which have applied pro-poor policies and directed financial resources towards these priorities. Second, Ravallion (2007) points out that the decentralisation of anti-poverty programs is likely to raise inequality because local authorities tend to set poverty lines lower than national standards due to resource constraints. Perhaps, identical poor people benefit differently from the national programs with respect to the geographic conditions. The absence of transparent and unified implementations across the country begs a question of whether Vietnam suffers from this kind of bias while pro-poor programs are continuously in the central concerns of the Government’s development strategies.To estimate the effects of NTPs on poverty and inequality, we use a dynamic panel

estimator, particularly the system generalised method of moments estimator. This estimator is the most appropriate for the unbalanced longitudinal data with a short time dimension where the fixed-effects and the ordinary least-squares (OLS) methods could perform ineffectively. System GMM computes correlation coefficients through both the level and difference equations where the lagged first differences are used as instruments in level equations and lagged first levels used as instruments in difference equations (Bun and Sarafidis 2013). System GMM exhibits less bias than the fixed-effects and least-squares estimators when variables are dynamic (Arellano and Bond 1991). For completeness and benchmarking, estimates from OLS estimators are also presented.

The rest of the paper is structured as follows. The next section provides a background of Vietnamese programs of poverty and inequality reduction. Section 3 examines the data and describes the methodology. The empirical analysis is in Section 4. We discuss the results in Section 5 where we also conclude with policy suggestion.

2. Background of the Vietnamese National (Pro-poor) Targeted Programs

National (Pro-poor) Targeted Programs (NTPs) are a group of strategies, policies, and financial investments delivered by the Vietnamese Government to improve multiple aspects of human wellbeing of communities and households who are most vulnerable (i.e. SRV 1998). These comprise: (1) Program 135[1]; (2) Hunger Eradication, Poverty Reduction, and Job Creation (HEPR-JC); (3) Safe water and Rural sanitation; (4) Family planning; (5) Sociocultural enhancement; (6) Education and Training[2]. Financial resources for increasing the number of programs have risen subsequently since 2000. The Government approximately tripled the expenditure on NTPs from over 4200 to more than 14 000 in billion VND (273.8 to 739.5 million current US$ equivalent)[3] which accounts for 1.7% of the total annual budget over the 2000s on average (Figure

[1] It is a pro-poor policy with three tasks: improvement in the transportation capacities; provision of subsidy in-kind for targeted households; and reallocation of cultivation lands for landless households, which the Government targeted directly to the least developed communes across the country in 1998 (SRV 1998).

[2] A challenge for an evaluation of the program effectiveness is that it lacks information on whether different tasks are financed identically between provinces. Perhaps, this paper is unable to examine the effects of the specific tasks of the programs; instead, we analyse the causal relationship at the average of initial amount dedicated to NTPs within provinces.

[3] The exchange rate is as follows: 1 USD = 15 337 VND (2002), and 18 932 VND (2010) (Ministry of Finance 2002; 2010b).

1). An exception is in the financial year 2006 when this indicator shows a drop by about one third compared with 2005[4]. The central government allocates NTPs to provinces based on preliminary information on the socioeconomic status and the amount of poor households. For instance, a thorough investigation of communes and households suffering from extreme hardship was prepared carefully for Program 135 approval (SRV 1998). Decisions and implementations of the other programs also follow an analogous procedure to Program 135. Details of the size of provincial NTPs are documented in Appendix 1.

[FIGURE 1]

Despite remarkable economic growth, the poverty ratio in Vietnam remained high in the 1990s irrespective of any poverty line used. Approximately half of the population lived with less than US$ 1.25 per day in 1998 (World Bank 2012 10), whereas income inequality has increased simultaneously. In addition, Nguyen et al. (2007) point out that an increase in the urban–rural gap contributes to the lion's share of the overall rising inequality across the country between 1993 and 1998. Income inequality also exists persistently between the majority and minority ethnic groups (van de Walle and Gunewardena 2001). The Government tackled these issues first with the announcement of Program 135 whose concentration is a robust socioeconomic development in the areas suffering from ultimate disadvantages over three stages (1998–2005, 2006–2011, 2012–2015). The Government then set up a series of supportive programs (The Program on Hunger Eradication, Poverty Reduction, and Job Creation (SRV 2001); on Safe water and Sanitation in Rural Area 2006–2010 (SRV 2006); on Employment by 2010 (SRV 2007); Population and Family planning by 2005 (SRV 2002); Education and Training by 2010 (SRV 2008). These programs, in most cases, are deployed together at the provincial and district levels (Ministry of Planing and Investment and MoF 2014).

The different NTPs generally share the objective to help the poor by boosting economic productivity, and to narrow the income dispersion across the nation. They are implemented through three channels: (i) improvement in public services and

[4] This decline could be because of the phase gap in the policies. The governmental documents evidence expirations of the initial HEPR–JC, set for the period 2001–2005, and the first stage of Program 135 in 2005. Although the renewals of these two programs were approved in 2006, updated details of implementation and the instruction were released in the following year.

infrastructure, (ii) provision of free educational and training programs, (iii) food in-kind subsidies. Such twin purposes of poverty and inequality reduction are explicitly stated in the vast majority of pro-poor programs. For instance, the recipients benefited from Program 135 through in-kind subsidies for consumption and production, technical training supports, or fee exemption to access public services. HEPR–JC (SRV 2001) attacked poverty in multiple socioeconomic dimensions of the poor's livelihood: provision of a financial package for housing construction; establishment of a microcredit program for small new business start-ups; provision of free training courses; provision of free healthcare services and school fee exemption for children. Through NTPs, the Government pursues the ultimate goal which is declared in its political mission: "Rich people – strong nation – equitable, democratic and civilised society" (Beresford 2008; SRV n.d). It is expected that NTPs influence poverty and inequality, but an evaluation of their causal effects has not been quantitatively assessed thus far. This paper analyses the financial aspects of the six components of NTPs as a whole because of data availability.

However, pro-poor spending in Vietnam could exacerbate inequality (van de Walle 2004). In the 1990s, public expenditure intended for the most vulnerable groups might be leaked to those whose were least vulnerable. Cuong, Tung, and Westbrook (2015) explore that provinces receiving more financial package from a specific program are likely to be less benefited from other programs. This implies that targeted households with different levels of hardship within provinces have egalitarian access to NTPs. However, such disproportionate allocations could erode the proposed effects of NTPs on poverty and inequality because of non-eligible beneficiaries of NTPs. Additionally, NTPs may increase inequality since the recipients generate their income differently due to their uneven capabilities (e.g. educational background) to maximise resources provided. Less accessibility and low quality of public services for the poor remain gaps in their productivity, and in turn, cause poverty and inequality persistent (World Bank 2003 19). Furthermore, van de Walle (2004 5) claims that the National Development Programs (later amended as NTPs) tend to foster economic growth rather than provide social protections for the poor. Fritzen (2002) and Ravallion (2006) critique the NTPs for governance reasons. Various divisions and levels of the Government were in charge of program practices, but a huge gap remained in many localities. Indeed, there is insufficient assurance of nondistortion of NTPs while they are implemented by local

governments. The failure of pro-poor programs could entail a widening within-province income gap.

Although positive effects on several economic aspects of NTPs are discussed (Fan et al. 2004; Kang and Imai 2012)[5], those are insufficient to reach a consensus of poverty and inequality affected expectedly by NTPs as a whole. Research in poverty and inequality also has concerns about NTP outcomes because they were employed via various *ad hoc* schemes in the 1990s (Fritzen 2002; van de Walle 2004; Ravallion 2006). These decision-making processes seem to be applied to a large number of programs in the following decade. It is a danger as the pro-poor expenditure is continuously extended without adequate convincing evidence of its effectiveness at achieving as stated objectives.

3. Data and Methodology

3.1 Data and variable description

This research uses biennial panel data from 2002 to 2010 for approximately two thirds of 63 Vietnamese provinces and municipalities (called provinces for simplicity)[6]. In this panel, province is the unit of analysis. First, the data of NTPs are obtained from the online documents of the Ministry of Finance of Vietnam (MoF) (2005a; Minstry of Finance 2006; Minstry of Finance 2008; Minstry of Finance 2010; Minstry of Finance 2012). Provincial overall budget expenditure and its partition dedicated to NTPs are retrievable at MoF website[7]. Because of large variances in the provincial population size, we use the NTP per capita as the variable of interest instead of the annual total NTP amount.

[5] Fan et al. (2004) find a decline in the poverty rate due to the public investments in agricultural (e.g. irrigation), and rural areas (e.g. roads). Their study is, however, limited to agricultural investment. Kang and Imai (2012) assert that the substantial drop in poverty rate could result from these programs. However, they lack appraisals of the specific linkage between NTPs and poverty decline.

[6] Data are unavailable for approximately a third of provinces simply because of statistical shortage, implying that these provinces did not properly record NTPs in detail. Missing observations occur randomly among the population and over time; it may affect the interpretation if the sample does not represent the whole population. Section 5 will return this problem.

[7] At http://www.mof.gov.vn/portal/page/portal/mof_vn/1351583/2126549/2115685

Second, data of expenditure per capita, poverty, and inequality are extracted from five waves of the Vietnam Household Living Standard Survey (VHLSS) 2002–2010 to compute the mean values for provinces. VHLSS[8] is collected by the General Statistics Office of Vietnam (GSO) with technical advice from the World Bank. It contains microdata for 9000 households[9] such as demographic information, expenditure, income, educational achievements, health status, and poverty across the country. The data of provincial population and values of industrial and agricultural output products are from the online database of GSO (2015).

The Gini coefficient of expenditure is used as a proxy for income inequality. The Gini coefficient provides a unique level of inequality across a distribution. Expenditure represents a better measurement of the standard of living than income for a variety of reasons, such as income underreporting and transitory shocks to income (Deaton and Zaidi 2002 11-13; Nguyen et al. 2007; Glewwe and Dang 2011). The mean value of Gini coefficient for the whole sample is 31.8; it varies largely across provinces from 21.8 to 46.8. In addition, notwithstanding stability in inequality at the national level, the within-province disparity in income distribution presents a gradual increase over the 2000s. Starting at 30.5 in 2002, the index climbed to 32.3 in 2006, followed by a fluctuation in the later phase, and ended at 32.4 in 2010. With respect to the regional dimension, mountainous and highland provinces with high rates of minor ethnicities out of the total population suffered from greater degree of inequality than the Mekong and Red River delta located ones.

[TABLE 1.1], [TABLE 1.2]

With regard to the poverty variable, we use the GSO–WB poverty lines with inflation adjustments as announced in GSO (2011 693) to calculate the poverty incidence (%). The GSO–WB poverty lines have been constructed by a collaborative team between GSO and the World Bank based on the VHLSS data (World Bank 2012)[10]. In 2002, there was only one poverty line applied to both urban and rural areas; urban and rural poverty lines were repeatedly identified and updated afterwards. The population weights

[8] The VHLSS 2002 is an exception, surveying about 29000 households.
[9] There may be some concern about sampling error due to the problem of small sample size, but more reliable alternative data resources for estimates of these variables are unavailable at hand.
[10] See Appendix 2

between these two areas are also taken into account in our estimates of poverty incidence.

[TABLE 2]

Poverty reduced significantly from 29% to around 14% over the period 2002–2010 on average (GSO 2011 693). Our research sample is at 28.6% and 11.5%, respectively. The poverty incidence substantially varies across regions; negligible poverty ratios can be found in more urbanised provinces whereas the poor resides mainly in geographically disadvantaged areas.

The paper hypothesises that poverty and inequality are determined partially by their one-period lags denoted as $(t-1)$, meaning that they are persistent. Litchfield and Justino (2004) reveal such a characteristic in poverty in the Vietnamese economy through a comparison between two earliest waves of the living standard survey (VLSS 1992/3, 1997/8). Two other Southeast Asian countries, Thailand and the Philippines, also demonstrate an autocorrelation phenomenon in poverty, inequality, and economic growth (Kurita and Kurosaki 2011).

The main explanatory variable of interest is the natural logarithm of NTP per capita (ntp_{it}). Because the current value of NTPs depends upon the previous socioeconomic condition, it is as an endogenous variable. Additionally, time gaps exist in NTP application and effectiveness, meaning that any change in poverty incidence and inequality could result partially from the first lagged rather than the contemporary NTPs. Analyses of NTPs thus should considerate its lagged values. In this study, the causal effects of NTPs are examined carefully at both the current and one-wave lagged (*t-1*).

Additional variables (expenditure per capita, educational attainment, and industrial–agricultural output ratio) are included as a control vector. The natural log of real consumption expenditure per capita, exp_{it}, is a proxy for the living standard. Despite debates regarding directional effects on poverty and inequality, a plethora of research finds significant relationships between consumption expenditure and poverty and inequality (e.g. Ravallion 2004; Khan et al. 2014). It is argued that the previous amount

of consumption expenditure affects the current level of inequality and poverty ratio (Kurita and Kurosaki 2011).

The education variable (edu_{it}) records the average school grade of adults from the age of 15. Education is a key determinant of poverty reduction; therefore, research in poverty suggests that equal access to public educational services is a solution to poverty alleviation (e.g. Baye and Epo 2015). Yet, the contribution of education to inequality is ambiguous. Under Mincer's (1958) theory, the education–inequality nexus is not obviously unidirectional. In fact, worse-off households invest restrictedly in education, which in turn leads to lower earnings from their activities compared with the well-off. That means the poor is unlikely to catch up with the rich due to a lifelong shortage of financial resource. A consensus is that if governments distribute the educational services more equally, the education factor could mitigate the income gaps (e.g. Nguyen et al. 2007; Liu 2008). However, OECD (2014) shows an exception that, on average, Vietnamese students aged 15 outperforms those even from selected developed countries with the same tests despite the relative poverty of Vietnam. This result implies that economic conditions (e.g. income) are less likely a determinant of educational achievements. Thus, in the relation to poverty and inequality as dependent variables, our approach is to treat education as an exogenous explanatory variable.

The last regressor is the industrial–agricultural output value fraction, ia_t, which represents the level of provincial industrialisation. This variable is considered in the specific models corresponding to Kuznets (1955) inequality hypothesis expressing that the income distribution and the domination of the industrial sector in provincial economies follows the inverted-U shape; the more industrialised the economy, the less the contribution of agricultural sector to the total economic output. In the case of Vietnam, ia_t differs greatly across provinces. In several agriculture-led provinces, the ratio is less than one whereas in the most advanced areas, it is over 30. The variable ia_t is treated as an exogenous variable.

3.2 Arellano–Bond model

This present paper applies the system GMM estimator developed in Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The estimating equations are as follows:

[Equation (1)], [Equation (2)]

System GMM uses two sources of exogenous variation: (1) lagged levels of the dependent variable as instruments in difference equations, and (2) lagged differenced of the dependent variable as instruments in level equations. In addition, it exploits instruments from a variety of orders of eligible independent variables provided these do not correlate with the part of disturbance relating to the idiosyncratic shocks from heteroscedasticity in specific individuals.

We use system GMM for two reasons. First, the panel data used are dynamic and short, facts that compromise the quality of estimates of correlation coefficients when using traditional models (e.g. OLS, fixed-effects, or random-effects GLS). OLS cannot deliver efficient and consistent estimates with lagged dependent variables. In fact, a correlation between the lags of dependent variables ($Gini_{i(t-1)}, and\ p_{i(t-1)}$) with the fixed effects (v_{Gi}, v_{pi}) in Eq.(1) and Eq.(2) results in Nickel's (1981) "dynamic panel bias". Roodman (2009b) points out that overestimates for the autoregressive coefficient occurs in OLS exactly reflect the problems of this endogeneity. If the fixed-effects method is used, the fixed individual effects can be differenced out from the data. However, the estimate could be (downward) biased as a correlation between past realisation of dependent variables and idiosyncratic error terms remain in the *within* transformation (Baltagi 2005). Similarly, bias is also found when using the random-effects estimators for a dynamic panel because of the presence of lagged dependent variable (Anderson and Hsiao 1981).

System GMM, however, relaxes the exogeneity assumption and uses internal instruments exploited from the past realisations of dependent and independent variables in absolute values and in difference. Intuitively, such instruments are feasible because they closely correlate with instrumented variables but not with disturbances, provided these errors are not serially correlated. For instance, in the autoregressive form of

Eq.(1), both $Gini_{i(t-2)}$ and $\Delta Gini_{i(t-2)}$ are used in the GMM estimators for a computation of autocorrelation coefficients through two following equations:

[Equation (1.1)], [Equation (1.2)]

In Eq.(1.1) and Eq.(1.2), $Gini$ and $\Delta Gini$ at period 1 are used as instruments for period 3, respectively. Additional instruments generated from other independent variables are added in the model subject to the dynamic nature of data as discussed by Roodman (2009b).

Second, Blundell and Bond (1998) show that the difference GMM developed in Arellano and Bond (1991) which applies only the lagged levels as instrumental variables for difference equations could omit essential information in original data. In the difference GMM style, when the autocorrelation coefficient between a dependent variable and its lags in the right-hand-side approaches unity, a nexus between the instrument with lags and the levels of dependent variable becomes powerless. In contrast, system GMM maintains the efficiency and consistency even when the dependent variable is near a random walk. Blundell et al. (2000) stress that the symptoms of weakly exogenous covariates, considerable sample bias and imprecise information in the difference GMM estimators are significantly reduced in system GMM.

The one-step rather than two-step system GMM is preferred in our estimates for the causal effects of NTPs on poverty and inequality. Albeit the two-step GMM estimators increase the efficiency, it exploits many weak instruments which are created by a quadratic equation in the time dimension (Newey and Windmeijer 2009; Acemoglu et al. 2015). Roodman (2009a) further claims that the computed matrix of instruments in two-step GMM subject to all moment conditions is poor in small samples. Thus, this paper uses the one-step GMM with the assumption of independent and identical distribution in the original residuals.

Two essential internal checks are undertaken, namely autocorrelation in the idiosyncratic disturbance and over-identification of instruments. Roodman (2009b) notes two key issues regarding the validity of the autocorrelation test. First, the researchers should add all time dummies in the model to prevent contemporary

correlation across individuals. Second, it is essential to consider the number of individuals in the sample because a small sample size (20 units or less) will likely violate the central limit theorem that is invoked in this test. The instrument over-identification is tested using the Sargan/Hansen test, investigating whether the number of orthogonality conditions is greater than that of estimated parameters in the GMM procedure (Hansen 1982). Finally, a comparison of results with estimates from the corresponding OLS estimator is presented as a robustness check.

4. Empirical result

4.1 Inequality

Table 3 shows that the lags of the variable of interest (NTP) statistically significantly correlate with inequality. Unexpectedly, the Gini coefficient of expenditure within-province is likely to increase due to a rise in public funds for poverty and inequality reduction. This result reflects the fact that ineffective pro-poor targeted policies have been continuously applied in Vietnam from the 1990s regarding the inequality dimension. van de Walle (2004) claims that poor households are likely to receive less than the nonpoor in terms of absolute amount of money from the Vietnamese social transfer policies, which could be a key reason for a positive correlation between inequality and NTPs in the following decade unless the procedure of NTP allocation has been improved. Another supportive evidence of this counterintuitive relationship is found in Klump (2006), who finds that the financial resources of Program 135 were misused with respect to the participatory determination and program supervision. There is also an urban bias in social welfare distribution that shares identical purposes with NTPs. Nearly half of total spending on social welfare (social insurance, social subsidies, school fee exemption, poverty alleviation fund, NGO income) was allocated to urban areas where only about one fifth of the total population and 6% of the poor resided in 1998 (van de Walle 2004).

[TABLE 3]

The GMM estimators also present a positive relationship between expenditure per capita and inequality, meaning the country could suffer from an upward trend in inequality. This outcome seems to support Kuznets (1955) U-shaped hypothesis for an

early stage of the Vietnamese industrialising economy where advantaged groups and sectors (e.g. urban areas) gain more from the growth than others.

Improvements in knowledge and skills (proxied by the educational variable), however, could hinder the rise in inequality. This coefficient expresses the fact that the inequality level could be reduced with a higher educational achievement. Kikuchi (2007) similarly suggests a solution to inequality mitigation in Vietnam is a focus on educational investments that allow the worse-off to extend their capabilities in the labour market, in addition to increase their earnings at the same pace as the well-off does.

The results obtained by OLS estimators are robust to GMM estimates. OLS shows statistical significant relationship between inequality and the one-wave lagged NTPs ($ntp_{(t-1)}$), along with income, education, and past value of inequality with similar patterns as found in the GMM model. OLS cannot however purge the endogeneity dynamic problem arising from lagged variables; thus, it creates overestimated correlation coefficients on the lagged dependent variable in the right-hand side. One exception is that education seems to be less important in relation to inequality mitigation in OLS regression. We however do not have further instruments to make an adjustment in estimated coefficient. Education, a positive contributor to inequality reduction in both GMM and competing model, however, could be concerned in any analysis of anti-inequality policy.

4.2 Poverty

Table 4 illustrates an insignificant causal effect of NTPs on poverty. That means these programs could be implemented inappropriately. Likewise, van de Walle (2004) explore that targeted transfers have no effects on poverty while social insurance, social subsidy, and school fee exemption did not reveal any role of the safety net as their initially proposed goals in Vietnam in the 1990s. She finds that complex schemes of NTP decision with participants from different ministries getting involved. Unfortunately, this type of administrative schemes seems to remain the same over the following decade.

[TABLE 4]

This unexpected finding is consistent with Cuong (2008), who argues that the micro-credit program targeted to the poor is not really pro-poor as better-off households account for a majority of fund receivers. One important sign of inefficiency could be due to the serious corruption which creates distortions in the financial packages of NTPs. Olken (2006) claims that redistribution programs in developing countries may promote corruption whose economic deadweight losses generated outweigh benefits received by the targeted recipients.

In addition, a gap between the proposed plans and implementation of anti-poverty programs substantially decreases their influence. This mismatch is because of several reasons: administrative capacity deficiencies; benefits captured by more powerful nonpoor groups; objectives of organisations during program implementation (Matin and Hulme 2003). This also means that inequality is harm for anti-poverty strategy. Ravallion (2006) explains that poverty is persistent in the case of high inequality which leads to unfair decision-making in public spending dedicated to poverty reduction. The more unequal the distribution is the more biased anti-poverty programs will be.

Education, again, is a contributor to poverty decline. Gaining more knowledge helps the poor not only to decrease the income gap with the rich but also to improve their living standard. Over 20% of the public budget was devoted to education expenditure in 2010 (World Bank 2014b). There is also equal access to educational services between male and female. This result confirms the common wisdom that equal opportunities in the approach to public educational services could be an important driver of the positive effects of educational achievements on poverty mitigation.

The industrial–agricultural output ratio positively significantly correlates with the poverty incidence. The higher share of industrial sector in provincial economies does not guarantee a lower poverty ratio because of two reasons. First, more industrialised provinces are likely to be less targeted in terms of poverty reduction in both the number and the financial size of programs. The role of the service sector is not taken into account in this variable due to statistical limitations. In fact, low quality service activities could be the poor’s important livelihoods in a developing country; hence, the nonagricultural–agricultural output ratio could be a better indicator to explain poverty reduction.

These results are analysed in a comparison with those calculated by OLS estimators. While OLS estimates show that the correlation coefficient on the lagged poverty HCR is twice as high as the GMM results, it seems to lower the coefficients on consumption expenditure, education, and industrial–agricultural output ratio. Additionally, the fact that education does not significantly relate to poverty incidence could be a sign of model misspecification. In contrast, GMM shows a statistically significant correlation between poverty reduction and education.

4.3 Internal tests and robustness check

Regarding the Arellano–Bond autocorrelation test of the first order (AR(1)) and second order (AR(2)) autocorrelation in the idiosyncratic disturbance, the *p*-values for both AR(1) in two cases of poverty and inequality dependent variable are significant at the 1% level, meaning that the results reject the null hypothesis of no serial correlation in the first order of error terms in difference. However, the outcomes for AR(2) in both cases are not significant at the 5% level, implying that there is insufficient evidence to reject the null hypothesis of no serial correlation in the second order of the disturbance in difference. These results render a valid application of the GMM estimators to the empirical analyses. Additionally, the Sargan/Hansen over-identification test *p*-values do not provide adequate evidence to reject the null hypothesis of valid instruments, implying that the instruments generated in the system GMM approach satisfy the orthogonality conditions involved.

5. Conclusion on the NTPs, inequality, and poverty

The empirical exercise shows that the NTPs have had limited effectiveness. Inequality is likely to widen when NTPs increase, *ceteris paribus*. There is not adequate evidence to support the link between NTPs and poverty reduction. We argue that these results could arise from implicit effects of NTPs on poverty through the third factor (i.e. productivity), which also highly relates to the explained variable. A reason for this argument is that NTPs include various components that also favour economic growth (van de Walle 2004). The ambiguous impacts of NTPs could also be the result of governance issues. Corruption circumvents the original direction of NTPs (e.g. Olken 2006), while multiple decision-makers are costly and make NTPs more complex but less observable (e.g. Klump 2006). These findings suggest that the Government should

make the NTPs more transparent, that financial support goes correctly to the poor households and communities.

As education could be useful with respect to poverty and inequality reduction, the Government needs to concentrate on improving the capacity of the educational system and consider it as a vital pillar of NTP. A concern is that inequality in education between urban and rural areas, and between the rich and the poor (World Bank 2008) could depreciate the positive effect of educational achievements on poverty and inequality mitigation. Therefore, lowering inequality in educational access is also useful.

A limitation in data availability may influence the research results. Missing provinces are mainly due to less specifically reported documents. NTPs include several programs that barely relate to poverty and inequality but these provinces only reported as a whole. With an improvement in data resources, future research could focus on the effects of separate components (e.g. Program 153, HEPR–JC) which produce a better interpretation of aggregated and disaggregated impacts of NTPs. The time dimension of the data is also a restriction when only five waves are observed.

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Appendices

Appendix 1: Descriptive statistics of selected indicators

Year	2002	2004	2006	2008	2010
Observations	**42**	**47**	**49**	**47**	**43**
Poverty headcount ratio (%)					
Mean	28.56	19.53	17.25	13.79	11.52
SD	17.18	15.38	15.40	12.39	10.80
Min	0	0	0	0	0
Max	73.66	64.70	67.65	53.92	44.11
Expenditure per capita (million VND/year)					
Mean	3.46	4.32	5.71	7.31	12.77
SD	1.48	1.75	2.00	2.22	3.56
Min	1.82	1.94	2.6	4.09	7.98
Max	9.55	10.64	12.79	15.48	24.4
National pro-poor targeted expenditure (thousand VND/head)					
Mean	50.48	68.85	95.52	127.58	218
SD	43.55	67.49	102.17	110.82	232.32
Min	7.1	6.29	6.47	13.57	21.46
Max	203.63	324.64	508.02	451.24	967.77
Average schooling years of adults aged 15 and over					
Mean	5.66	5.95	6.15	6.27	6.26
SD	1.14	1.18	1.89	1.17	1.06
Min	2.68	2.93	3.08	3.14	3.12
Max	8.27	8.18	8.35	7.9	8.28
Ratio between industrial and agricultural output value within-province					
Mean	2.54	2.93	3.6	3.8	6.27
SD	6.01	7.11	8.71	9.35	13.88
Min	0.09	0.09	0.13	0.17	0.35
Max	33.82	40.63	49.6	57.34	75.66

Appendix 2: Poverty lines (thousand VND) and poverty incidence (%) over the period 2002 – 2010.

Year	2002	2004	2006	2008	2010
Official rural GSO-WB line	160	170	200	290	400
Official urban GSO-WB line		220	260	370	500
Official poverty rate	28.9	18.1	15.5	13.4	14.2

Source: The General Statistics Office of Vietnam (GSO) (2009, p.618) for poverty indicators 2002; (2011, p.693) for years 2004 – 2010.

Equations

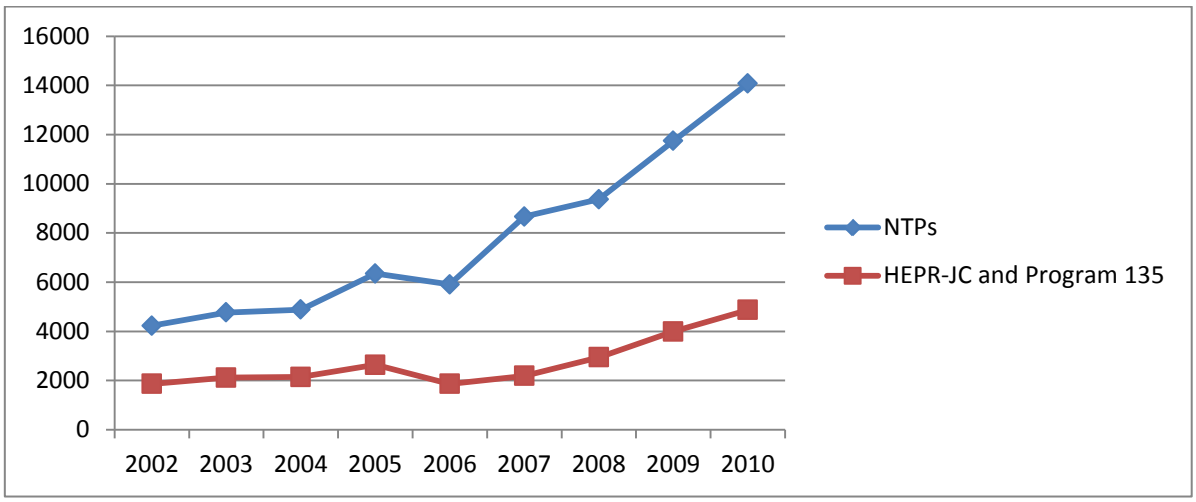
$$Gini_{it} = \alpha_{11}Gini_{i(t-1)} + \alpha_{12}ntp_{it} + \alpha_{13}ntp_{i(t-1)} + \alpha_{14}exp_{it} + \alpha_{15}exp_{i(t-1)} + \alpha_{16}ia_{it} + \quad + \alpha_{17}edu_{it} + timedummies + v_{Gi} + \epsilon_{Git} \quad (1)$$

$$p_{it} = \beta_{11}p_{i(t-1)} + \beta_{12}ntp_{it} + \beta_{13}ntp_{i(t-1)} + \beta_{14}exp_{it} + \beta_{15}exp_{i(t-1)} + \beta_{16}ia_t + + \beta_{17}edu_i + timedummies + v_{pi} + \epsilon_{pit} \quad (2)$$

$$\Delta Gini_{it} = \alpha_{11}\Delta Gini_{i(t-1)} + \Delta\epsilon_{Git} \ (1.1)$$

$$\Delta Gini_{it} = (\alpha_{11} - 1)Gini_{i(t-1)} + \mu_i + \epsilon_{Git} \ (1.2)$$

Figure 1: Budget expenditure on the targeted programs over the 2000s (billion VND)



Source: MoF online data

Table 1: Within-province inequality[11] in Vietnam over the period 2002–2010

Table 1.1: Inequality at the national level

Year	Mean Gini	SD	Min	Max	Observations
2002	30.5	3.22	21.8	37.8	42
2004	31.8	3.98	25.0	39.6	47
2006	32.3	4.32	23.8	41.7	49
2008	32.1	4.34	25.9	46.8	47
2010	32.4	4.79	23.9	42.1	43
Whole sample	**31.8**	**4.19**	**21.8**	**46.8**	**228**

[11] Inequality measured by the Gini coefficient of household expenditure per capita is calculated using Araar and Duclos' (2013) 'Distributive Analysis Stata Package' version 2.3. This Stata package is suggested for measurements of poverty and inequality (e.g. Haughton and Khandker 2009).

Table 1.2: Inequality at regional level

Year	Mean Gini	SD	Min	Max	Observations
Red River Delta	28.5	4.22	21.8	38.7	38
North East and West	34.1	4.21	27.2	42.7	59
North Central	32.0	2.27	28.0	36.9	14
South Central	30.3	2.83	25.9	38.0	25
Central Highland	36.9	4.10	31.9	46.8	13
Southeast	32.0	3.20	27.1	40.5	33
Mekong Delta	31.0	2.77	26.6	39.2	46
Whole sample	**31.8**	**3.37**	**21.8**	**46.8**	**228**

Source: VHLSS 2002–2010, authors' calculation.

Table 2: Variable description

Variable	Description
p_{it}	Average HCR (%) of province *i*, being subject to the national poverty lines adjusted by the inflation rate at wave t
Gini	Gini index of consumption expenditure per capita within province *i* at wave *t*, varying in the 0-100 scale
ntp_{it}	Natural logarithm of average NTPs spending per capita in thousand VND of province *i* at time *t*
exp_{it}	Natural logarithm of average annual expenditure per capita in million VND of province i at time *t*
edu_{it}	Average school grades completed by adults aged 15 or over in province i at time *t*
ia_{it}	Ratio of production output value between industrial and agricultural sector in province *i* at time *t*.

Table 3: Determinants of within-province inequality

Dependent variable: Gini	OLS	system GMM
$Gini_{(t-1)}$	0.475***	0.338***
	(0.057)	(.114)
ntp_t	-0.003	0.857
	(0.449)	(1.21)
$ntp_{(t-1)}$	1.417***	1. 358**
	(0.498)	(.582)
exp_t	9.373***	8.92**
	(2.811)	(3.68)
$exp_{(t-1)}$	-6.626**	-3.629
	(2.989)	(4.06)
ia_t	0.024	-0.019
	(0.050)	(.062)
edu_t	-0.626**	-0.839**
	(0.266)	(.370)
2010	(.)	(.)
2008	-0.411	7.433
	(1.880)	(13.32)
2006	-0.788	8.825
	(1.103)	(11.82)
2004	0.120	10.61
	(0.657)	(10.82)
2002		11.18
		(9.89)
constant	12.257***	
	(3.509)	

Source: MoF online data of budget spending; VHLSS 2002-2010; GSO's Statistical Yearbooks (various years); Own calculation

Note: SE in the bracket; * $p<.1$, ** $p<.05$, *** $p<.01$
Adjusted R2 (OLS) = 0.462; Observations = 159.
For system GMM, Instruments =37; Sargan/Hansen *p*-value =.576/.313; *p*-value of test of AR(1) = .043; for AR(2)=.104

Table 4: Determinants of within-province poverty incidence

Poverty HCR (p_t)	OLS	system GMM
$p_{(t-1)}$	0.666***	.392***
	(0.074)	(.110)
ntp_t	-1.667**	-.559
	(0.788)	(1.78)
$ntp_{(t-1)}$	3.506***	2.862
	(1.080)	(1.72)
exp_t	-23.533***	-26.615***
	(5.064)	(5.74)
$exp_{(t-1)}$	3.472	-3.008
	(5.297)	(6.786)
ia_t	0. 400***	.586***
	(0.092)	(.152)
edu_t	-0. 633	-2. 100***
	(0.441)	(.677)
2010	(.)	(.)
2008	0. 238	67.42***
	(3. 383)	(22.19)
2006	-1.063	63.61***
	(2.000)	(19.25)
2004	-6.085***	59.41***
	(1.342)	(17.42)
2002		56.44***
		(15.58)
constant	35.624***	
	(6.689)	

Source: MoF online data of budget spending; VHLSS 2002–2010; GSO's Statistical Yearbooks (various years); Own calculation

Note: SE in the bracket; * p<.1, ** p<.05, *** p<.01. For OLS, Adjusted R^2 =0.92, N=159. For system GMM, Instruments=37; Sargan/Hansen p-value =.508/.833; p-value of test of AR(1) = .002; for AR(2)=.309