Sources of Regional Income Disparity in Rural Vietnam: Oaxaca-Blinder Decomposition

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Abstract

This paper investigates determinants of regional income disparity in rural Vietnam, with special emphasis placed on the roles of human capital and land. We apply a decomposition method, suggested by Oaxaca and Blinder. We found that returns to assets rather than endowments, especially those of human capital, are one of the leading factors to account for income differences across regions. We also found that substantial improvements of returns to human capital in the Red River delta region are a driving force to catch up with Mekong River delta region. Unexpectedly, differences in land endowment do not strongly correlate with regional income disparity because better access to land in a region was partially offset by lower returns.

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Ⅰ Introduction

Since the initiation of *Doi Moi* in the late 1980s, Vietnam shifted from the planned to the market-based economy.   Wide dimensions of economic activities were liberalized in the course of the reform, leading to significantly higher growth rates and poverty reduction among population as a whole.   Despite such outstanding macroeconomic performance, a large number of people still suffer from poverty, especially in rural areas; throughout the 1990s, nearly 90% of the poor lived in rural areas, indicating that poverty is a predominantly rural phenomenon (MARD, 2000).   Even within rural areas, wealth has been distributed unequally.   In particular, Northern Vietnam has long lagged behind Southern Vietnam, due mainly to advanced market activities in the latter region (Vijverberg, 1998; Ogawa, 2000; van de Walle, 2000a).   Increasing attention has been also given to lowland-remote mountain region disparity within Northern Vietnam, because higher poverty incidence was pervasive among rural households in the mountain areas (Beckman, 2001).   As overall living standards improve, a need arises to more carefully promote growth with equity.

In an effort to find ways to achieving equitable growth, this paper conducts an empirical study on causes of regional income disparity in rural Vietnam. Among others, we closely explore roles of households' human capital and land endowments in the determination of differential living standards across regions. Specifically, we first investigate how differences in average endowments of human capital and land result in different living standards.   It is expected that if market is perfectly competitive and the same assets face exactly the same opportunities,

the differences in asset holdings alone will have the strong explanatory power for income differences (e.g., Adams, 1996; Ellis, 1998; Scoones, 1998; Lanjouw, 1998; UNDP, 1998; van de Walle, 2000b; de Janvry and Sadoulet, 2001). However, regional disparity would arise due to the difference in returns to assets as well. For example, average human capital endowments may be lower in a region than others, but such disadvantage can be partially mitigated and even eliminated if returns to assets are sufficiently higher. Thus, this paper next aims to identify the degree to which differential returns explain regional income differences.

Of seven regions in the country, this paper limits samples to the Northern Upland [the NU], the Red River Delta located in the north[the RRD], and the Mekong Delta located in the south [the MKD], in order to make an intensive comparison of pair-wise differences between the north and the south, and between the lowland and remote mountain regions. Major findings of this study are that returns to assets rather than endowments, especially those of human capital, are one of the leading factors to account for income differences across regions. We also found that substantial improvements of returns to human capital in RRD are a driving force to catch up with MKD. Unexpectedly, land did not strongly correlate with regional income disparity because better access to land in a region was partially offset by lower returns.

The remaining parts of this paper are organized as follows. Section 2 introduces employed data sets and proposes empirical models. Section 3 outlines

the differences in rural living standards across rural areas, while Section 4 describes the key features of households' endowments of human capital and land. Section 5 and 6 present estimation results, and Section 7 concludes the paper.

II Data

a. Data Source

Analyses in this paper are based primarily on data from Vietnam Living Standards Survey (VLSS) 1993 and 1998, which covered 4800 and 6000 households, respectively. Both VLSS surveys are considered to be nationally representative, because of their careful sampling methods (Glewwe *et al.* 2000).

As a measurement of living standards, per capita expenditure (and its logarithm) is chosen rather than income. There are several reasons for expenditure to be preferred. First, income data tend to be under-reported (for details, see Barrett and Reardon, 2000; Ellis 2000; Glewwe *et al.*, 2000). Second and more importantly, unlike developed countries, where most workers are engaged in regular employment and obtain a salary every month, many workers in developing countries are engaged in self-employment activities, including farming. So, income data tend to fluctuate over time due to unexpected shocks. On the other hand, expenditure tends to be more stable, and is considered to reflect economic conditions more accurately. Despite the overall reliability, however, expenditure data may also provide some biases if one uses them in nominal terms. Specifically, they tend to underestimate well-being in marginalized areas and

overestimate that in more favorable areas, stemming from different costs of living across regions. In this respect, the VLSS data sets contain processed data on real per capita expenditure that take spatial price differences into account. Due to that, the effect of differential living costs can be eliminated, which allows a more relevant comparison on inequality across regions.

b. Empirical Strategy

To examine the effects of asset and its returns on living standards, an income determination function is firstly specified. Letting X denote a set of household characteristics, including human capital and land, and applying a simple linear econometric specification, the model can be expressed as:

$$\ln Y_{ijt} = a + X_{ijt}\beta_{ijt} + e_{ijt}, \tag{1}$$

where $\ln Y_{ij}$ represents the log of real per capita expenditure of the j-th household in the i-th region in year t, β is a vector of coefficients to be estimated, a and e are a constant and a random error term, respectively. In this equation, i refers to one of the RRD, the NU and MKD, while t is either 1993 or 1998. Thus, by running regressions separately for each region and each year, we will obtain six different results from the three sub-samples for two years.

The above model implicitly suggests that lower average living standards in a region can be due to lower X, or lower β than in another region. To explore this explicitly, the effect of each component on total inequality can be decomposed by the decomposition method, suggested by Oaxaca (1973) and Blinder (1973). Suppose that we are interested in differential living standards between the RRD

and NU in 1993. The estimated result of equation (1) for the RRD, for example, is expressed by:

$$\ln Y_{jR93} = \hat{a}_{R93+} X_{R93} \hat{\beta}_{jR93} + \hat{e}_{jR93},$$

where R indicates the RRD, 93 is year, and j is the same as above. Since the regression function passes through the sample mean values of X and Y, and the mean of error term, e, is assumed to be zero, the equation for the RRD and also for the NU become, without presentation of year, as follows:

$$\text{RRD:} \ \ln \overline{Y}_{R,93} = \hat{a}_{R,93} + \overline{X}_{R,93} \hat{\beta}_{R,93} \quad \text{NU:} \ \ln \overline{Y}_{N,93} = \hat{a}_{N,93} + \overline{X}_{N,93} \hat{\beta}_{N,93}$$

Then, subtracting the latter from the former yields:

$$\ln \overline{Y}_R - \ln \overline{Y}_N = (\hat{a}_R - \hat{a}_N) + (\overline{X}_R \hat{\beta}_R - \overline{X}_N \hat{\beta}_N)$$

$$= (\hat{a}_R - \hat{a}_N) + \hat{\beta}_R (\overline{X}_R - \overline{X}_N) + \overline{X}_N (\hat{\beta}_R - \hat{\beta}_n)$$

$$= (\hat{a}_R - \hat{a}_N) + \hat{\beta}_N (\overline{X}_R - \overline{X}_N) + \overline{X}_R (\hat{\beta}_R - \hat{\beta}_n)$$

By taking the average, the equation can be rewritten as:

$$\ln \overline{Y}_R - \ln \overline{Y}_N = (\hat{a}_R - \hat{a}_N) + \frac{(\hat{\beta}_R + \hat{\beta}_N)}{2} (\overline{X}_R - \overline{X}_N) + \frac{(\overline{X}_R + \overline{X}_N)}{2} (\hat{\beta}_R - \hat{\beta}_N), \quad (2)$$

The left-hand side of the equation represents the rate of total differences in average per capita expenditure between the two regions, while the first, the second and the third terms of the right-hand side capture differential living standards due to the constant term, different asset holdings, and different returns to the assets between the two regions, respectively. With this equation, it is possible to identify how much of the differences are explained by differential levels of asset

holdings and returns to them between two regions.

Similarly, a partial effect of a particular asset on inequality can be also estimated as follows:

$$E_i = [\frac{\hat{b}_{iR} + \hat{b}_{iN}}{2}(\bar{x}_{iR} - \bar{x}_{iN}] + [\frac{\bar{x}_{iR} + \bar{x}_{iN}}{2}(\hat{b}_{iR} - \hat{b}_{iN})], \qquad (3)$$

where $\bar{x}_i$ denotes the mean value of i-th asset in a region and E is a partial inequality that is attributable to the asset.   As in equation (2), the first term of the right-hand side captures the effect of differences in the asset holding, and the second term reflects differences in returns to the asset between the two regions.

Analyses in this paper are based on equations (1), (2) and (3) for each year. In addition, structural changes over time are discussed by examining changes in both endowments and estimated coefficients.

Ⅲ Poverty Incidence and Average Living Standards

This section provides a general picture as to how overall living standards vary across regions and how they change in the transitional process.   As the first step to map differential living standards, poverty incidence is calculated using the standard FGT measurement as follows:

$$P_\alpha = \frac{1}{n}\sum_{i=i}^{q}[\frac{z - y_i}{z}]^\alpha ,$$

where y_i is the real PCE for the i-th person, z is the poverty line, n is the total number of sample population, and q is the number of the poor below the poverty line. When α=0 (P0), it measures the ratio of the poor in sample

households of each region, P1 is the poverty gap reflecting average distance from the poverty line, and P2 is the severity of poverty that puts heavier weights on the extremely poor.   Following the definition of the World Bank (2000), poverty line is set at 1160.363 and 1789.871 thousand *Dong* for 1993 and 1998, the values required to take 2100 kcal per day.   Table 1 presents the result.

It is shown that the incidence of poverty in the RRD and NU was considerably high in 1993.   Share of the poor in the RRD and the NU accounted for 69% and 80%, respectively.   Although the former region experienced a dramatic decrease to 29% and the latter region to 54% in 1998, these figures clearly indicate that the RRD, the lowland of the north, had lower poverty incidence than the NU, the remote mountain region of the north, in both years. Moreover, it should be noted that the gap between the two regions increased sharply from 10 to 25 percentage points over the 5 years.

Meanwhile, the MKD seemed to take advantages of advanced markets at the early stage of the transition process, reflected in lower poverty incidence than in the RRD in 1993.   At that time, the poverty incidence of the MKD accounted for 45%, which was lower by 24.3 percentage points than that of the RRD. Interestingly, share of the poor in the MKD fell only moderately to 30% in 1998 in contrast to the sharp decrease in the RRD during the period.   As a result, the relative ranking between the RRD and the MKD changed in 1998, with the higher poverty incidence for the MKD.

Similar trends hold for poverty depth and severity.   A remarkable reduction

can especially be observed in the RRD.   The rate of reduction was high in the NU, but lagged behind the RRD.   The MKD showed much lower improvements than the RRD, though absolute values of the indices there were initially not as high as the RRD.

The significant differences in economic conditions are again confirmed by the set of last columns of Table 1, which focuses on average living standards rather than poverty indices.   The mean real per capita expenditure in the NU was lower than that in the RRD in both years.   The gap was close in 1993, but became larger in 1998, which is consistent with the trend for the poverty incidence. Table 1 also illustrates that average per capita expenditure in the MKD was higher than that in the RRD in 1993, but was overtaken in 1998, suggesting that the MKD failed not only to reduce the share of the poor, but also to raise average living standards as much as in the RRD.

Ⅳ Differential Asset Endowments

To what extent are differential living standards related to the differences in asset holdings?   In order to examine this question, this section presents summary statistics of human capital and land assets in the sample, with supportive arguments.   Table 2 provides information obtained from the sample data.

a. Human Capital

As a proxy for the stock of total human capital, the number of working members and its proportion of four education categories (i.e., no education,

primary school, secondary school, and higher) were calculated. Working members are defined as the labor force, aged between 15 and 65 years old, and not attending school at the time of the interview.

Overall, education levels in the RRD seem better than the NU, with the lower ratio of no education, and the higher ratio of secondary and higher education in both 1993 and 1998. In 1993, about 5 % of working members had no education at all in the RRD, while the comparable figure for the NU was about 10%. This result indicates the presence of unequal accessibility to primary education within the north, despite the supposed equity in the former planning economy that both regions belong to. Indeed, the mountain areas of the NU tend to be marginalized from any governmental services (Beckman, 2001). As for the secondary and higher education, the RRD shows higher ratios than the NU in both years, as table shows. Although the ratios of these highly educated working members dropped in both regions from 1993 to 1998, the reduction was greater in the NU, which may have damaged the economic growth of the NU.

The average ratio of no education in the MKD was much higher, about three times in 1993 and five times in 1998, than that in the RRD. A considerable difference was also observed for secondary schooling, which stemmed from the fact that many of the residents in the MKD stopped schooling at the primary level. A similar story holds for higher education. Overall human capital endowments are thus clearly better for rural households of the RRD, in which the government had traditionally made efforts to provide public goods (Ogawa, 2000). It is worth

noting that the difference in average education levels did not simply lead to overall inequality between the two regions in 1993, when the market-based economy was just initiated in the north. An important finding here is that the RRD showed higher human capital endowments, but average living standards there were lower at that time. This probably indicates that education endowments will not play a leading role in the early stage of market integration. Instead, advantages of higher human capital endowments in the RRD seem to correlate with economic growth at the later stage.

b. Land Assets

Land assets are calculated based on cultivated land by a household, including allotted lands under land reforms and rent-in lands through private transfers. Table 2 show that rural households in the NU had markedly better access to annual cropland as well as other farm land than the RRD in both years. The gap for the former was almost 1.5 times in both years, while for the latter 1.5 times and 6 times in 1993 and 1998, respectively. The large gaps come from abundant natural resources relative to population in the NU, which allow households to cultivate large farm size (Sushil and Nguyen, 2001). This is the case for other land, too. Interestingly, better access to these land assets does not simply mean that rural households in the NU could enjoy better living standards. Given the relatively limited employment opportunities in non-farm activities, as shown in the last row of the table, farming must be an important source of income in this region. Nevertheless, as we have seen previously, the fact that the average

living standards were lower in the NU as compared to the RRD implies that advantages of land holdings may be offset by such factors as lower returns to land.

Average farm size of the MKD and RRD is also considerably different in favor of the former region, and the gap of annual cropland is even larger than that between the NU and RRD. At the same time, the presence of a skewed land distribution in the MKD is observed. In fact, large-scale but unequal landholding is a unique characteristic of farming in the MKD. On the one hand, those with large landholdings are amongst the better-off (World Band 1999b), implying that farm size is an important determinant of living standards in the MKD. On the other hand, most of those rural households without any lands seem to escape from absolute poverty, due in part to the expansion of non-farm activities. The last row of the table shows that nearly 20% of rural households were absorbed in the non-farm sector in 1993 and more than 30% of them in 1998, both of which are larger than that of the RRD. Intuitively, the development of non-farm activities in this region mitigates the unequal access to land, and, on balance, raised efficiency of labor allocation in the local economy even in 1993, when the other two regions suffered from overall poverty.

V Regression Results

So far, we have seen that endowments of human capital and land are not necessarily correlated with overall inequality across regions. The finding is consistent with the hypothesis that differences in the physical and human capital

endowments alone cannot explain regional income disparity. In this section, returns to the same endowments are estimated separately for each region in both years, based on equation (1). The regression models are specified as follows: as the dependent variable, the logarithm of real per capita expenditure (adjusted to 1998 price) was selected. Ratio of working members with no education was omitted from human capital variables to serve as a reference category. Apart from human capital and land variables, selected demographic characteristics of household members and the number of livestock are included in the regressors as controls. Additionally, commune fixed effects are included to control for heterogeneity across communes. The estimation results with commune fixed effects are shown in Table 3.

a. Return to Human Capital

According to Table 3, the number of working members is generally not significant in the RRD and the NU. Increasing the proportion of working members with primary schooling instead of non-educated ones is also not systematically advantageous to raising living standards. The contrasts arise with secondary and higher education and they seems to be one of the driving forces to differential living standards between the RRD and NU. Especially, the magnitude of higher education is much higher for the RRD than the NU. This implies that inequality of average living standards would widen even if households in the RRD and NU have the same proportions of working members with high education. Given the fact that the proportions of higher education as well as

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returns to them are much lower in the NU in 1993, it is reasonable to claim that one of the underlying causes of income gap between the RRD and NU lies in the different endowments of highly educated people between these two regions. Although the coefficient of education variables increased in the NU, the gap with the RRD further rose by 1998, which would further worsen regional income disparity between these two regions.

In the MKD, the number of working members is not associated with the increased living standards, as in the RRD. Unlike the RRD, however, the increasing ratio of working members with primary schooling is an important factor to improve living standards in the MKD. Also, the MKD shows larger coefficients for all human capital categories than the RRD, indicating that premium to human capital is higher in the south where labor markets were more developed. This would suggest that returns to human capital are sensitive to the degree of market development. Along with the expansion of non-farm activities, as discussed earlier, the higher returns to human capital should compensate for the disadvantages of less accessibility to land and lower human capital endowments in the MKD, which in turn contributed to raising average per capita expenditure there. However, the gaps of estimated coefficients on human capital variables all narrowed over time, due primarily to the sharp increase in the estimated coefficients in the RRD. Thus, it cannot be denied that human capital is increasingly important in the RRD in the later stage of transition and the substantial improvements in returns to human capital there play a role in catching

up with the living standards of the MKD.

An important empirical question is whether the transitional economy has equalized returns to human capital across major regions. So long as the liberalization of the economic activities enables people to move freely, internal migration from a worse-off to a better-off region will push pressures on returns to human capital to be equal. So far as the RRD and the NU are concerned, however, there is no clear tendency that the rate of returns to human capital became closer over the 5 years. Rather, the gap was widening. A plausible explanation for this lies in migration policies undertaken during the last two decades. Since the 1980s, the Vietnamese government has regulated rural-urban migration in order to avoid urban congestion, which in turn makes it difficult to fully relocate labors in an efficient manner (Nguyen, 1998b). Additionally, difficulties in access to land for newly established rural households might discourage farm workers to move from one rural area to another (World Bank, 1999a), except under the government resettlement programs that ensure access to land for farming. Another possibility is that due to rapid growth of the RRD with the rapid market integration, returns to human capital become significantly larger in the RRD, which outweighs the impact of the migration. These together would prevent returns to human capital from equalizing between the RRD and the NU.

b. Return to Land

Turning to returns to land, they are positive and significant for all regions in the both periods, as would be expected. Rather weak significance with lower

returns can be observed in the NU compared with the RRD. This is consistent with available statistics that show higher land productivity of the RRD (GSO, 1994; GSO, 2000a; GSO, 2000b). An increase in 1000 m2 annual cropland, for example, increased about 8% average living standards in the RRD, while it raised about 7% in the NU in 1993. The magnitude of impacts increased to 10% in the RRD in 1998, but declined to 4% in the NU. From these findings, it is clear that returns to annual cropland would have effect of offsetting advantages of better access to land for the rural households of the NU. Since the returns to land will be sensitive to the levels of input use (e.g., labor and capital), technology and environment (e.g., irrigation) in each region, the inferior returns in the NU in both periods would suggest that at least one of these components was critically unfavorable there. In fact, the average irrigation ratio of the NU has been much lower than in the RRD (Dollar and Glewwe, 1998; MARD, 2000). Moreover, table shows that the gap in returns increased over time, although available statistics do not indicate that the irrigation ratio substantially changed in favor of the RRD during the periods (GSO, 1994; GSO, 1998). Improved access to the market and physical infrastructure, which would be realized more dynamically in the RRD, would have lower costs of inputs as well as those of acquiring useful information, thereby increasing profits from land.

Similarly, the estimated coefficients of almost all land categories in the RRD are higher than those of the MKD, which is also consistent with conventional data and relevant literature (Nguyen, 1998a). For instance, a 1000 m2 rise in annual

cropland in the MKD leads to 7% and 6% increments to consumption expenditure in 1993 and 1998, respectively.   The impacts of the former were close to the RRD, but those of the latter were smaller than the RRD by 4 percentage points.   A possible difference from the case of the NU is that the irrigation ratio and level of market integration will not sufficiently explain such differential returns between the RRD and MKD in 1998, taking the similarities in production environments into account: for example, the irrigation ratio accounted for 90% in both regions in 1998 (GSO, 2000b). More likely, households in the RRD apply more labor due to limited employment opportunities, and thereby obtain higher returns to land.

In short, human capital and land assets, as well as their returns have generally compensating effects on differential living standards between regions. The upper part of Table 4 summarizes the findings of the previous tables, focusing on whether assets and returns of human capital and land favor the RRD.   Positive signs in the columns indicate that the RRD has a larger endowment of assets or higher returns to it, and "*" attached to positive (or negative) signs indicates the gap increased (or decreased) in favor of the RRD.   As shown, when average asset holdings of the RRD are larger, returns are generally lower, and vice versa.   A critical exception is the difference in the ratio of working members with high education between the RRD and NU.   Rural households in the RRD are more endowed with highly educated working members, coupled with higher returns to them, suggesting that this category must increase inequality between the regions. Additionally, one of the major differences between the case of the RRD/NU and

that of the RRD/MKD lies in the signs of returns to human capital, especially in 1998. Most of the returns to human capital variables of the RRD are higher than the NU, but lower than the MKD. Considering that the returns to human capital would be closely related to the degree of market integration, it can be said that average living standards in the NU remain lowest among the three regions, partly because the market is less developed, which in turn offers lower returns to human capital rather than higher returns as is the case with the MKD. In terms of changes, the improvement of returns to human capital and land are remarkable in the RRD. Table shows that returns to annual cropland are highest in the RRD in 1993, and that the gaps further widen in 1998. Also, all of the returns to human capital endowments improve more rapidly in the RRD than those of the NU and the MKD.

The lower part of Table 4, showing partial effect of human capital and land on inequality, which is based on equation (3), confirms these findings. Each value of the columns illustrates how much percent of living standards would differ, if differences between the regions only exist in the component of each column. For example, holding others the same, households in the RRD were able to be better-off by 2 percentage points than the NU because of higher endowments of human capital in 1993. Compared with those in endowments, changes in returns more favor the RRD. In particular, returns to human capital inevitably account for the reason why the RRD grew so rapidly relative to the other two regions. From 1993 to 1998, the differential living standards due to returns to human

capital increased from 2% to 4% between the RRD and NU, and decreased sharply from 20% to 9% between the RRD and MKD. Importantly, given the relatively good endowment of human capital, households in the RRD were able to enjoy much better living standards in the later stage of transition, which must indicate that human capital coupled with profit opportunities in the private sector is critical for development path.

VI   Decomposition Analyses

Now, I will turn to the question of how much of the differential living standards are, in aggregate, due to differences in endowments and returns, using equation (2). In the calculation, all explanatory variables used in the previous income determination function are again included. The results are shown in Table 5.

Table shows that the overall living standards in the RRD are 14% and 27% higher than for the NU in 1993 and 1998, respectively. When asset effects are controlled for, these values increase significantly. For example, if differences only exist in returns to assets, and other factors being exactly the same, households in the RRD would enjoy higher living standards by 55% and 41% than the NU in 1993 and 1998. In contrast, if differences only exist in asset holdings, these figures become 3% and 9%, respectively. These results suggest that differential returns to assets have stronger explanatory power than differential asset holding itself in accounting for inequality between the two regions.

In comparison between the RRD and MKD, table shows that overall living standards of the former region are lower by 19% and higher by 2% in 1993 and 1998, respectively.   Also, this table illustrates that improvements in return effect in the RRD play a leading role in equalizing living standards.   This is consistent with the findings of this paper that all of the returns to human capital variables as well as returns to annual cropland increased more rapidly in the RRD. Unexpectedly, the return effect is substantially favoring the RRD in each year. According to the table, the average living standards in the RRD would be higher by 19% in 1993 and by 56% in 1998 than in the MKD, controlling for the effects of different asset endowments.   Considering the positive and negative compensating effect of returns to land and human capital between the two regions (i.e., higher returns to land in the RRD and higher returns to human capital in the MKD), the large value of the return effect may partly stem from factors other than human capital and land.

VII   Conclusion

This paper investigated sources of regional income disparity in rural Vietnam, with emphasis on the effect of differences in endowments and returns to human capital and land.   Relying on micro household data, it has found that average living standards were higher in the south at the beginning of the transitional process, followed by the lowland in the north.   Later, the relative ranking of these regions changed.   In both 1993 and 1998, the mountain area in

the north showed the lowest average living standards.

In determining living standards, human capital and land have generally positive and significant effects. However, inequality in such asset ownership does not necessarily correlate with overall income inequality across regions because better endowments are generally offset by lower returns. An exception is human capital that significantly accounts for income differences between the lowland and mountain areas of the north, especially in 1998. In all likelihood, the economic liberalization increased rather than decreased gaps in returns to human capital between the two regions, due in part to restrictions on migration, and in part to the differential growth of market expansion. Decomposition analysis shows that such differences in returns play a dominant role in overall inequality between the two regions.

These findings suggest that a policy to strengthen households' asset holdings alone will not sufficiently improve inequality. Simultaneously, the government should try to make full use of existing endowments, especially those of human capital, in a poor region. The development of the market is essential for returns to human capital to increase, as the experience of the lowland of the north in the later stage of transition suggests. Facilitating labor migration is an important part of market adjustments. If the existing human capital is provided with market opportunities in various regions, it is possible for the poor regions to develop rapidly and catch up with a better-off region. Improved access to information and institutional development would facilitate the market integration, whereas

active land and labor markets would promote inter-regional migration. Effective policies to improve inequality are thus required to target the development of markets in the poor rural regions.

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Table 1:   Poverty Incidence and Average Per Capita Expenditure by Region, 1993 and 1998

	Poverty Incidence (P0)		Poverty Depth (P1)		Poverty Severity (P2)		Average Per Capita Expenditure (million Dong)	
	93	98	93	98	93	98	93	98
Red River Delta	69.0	28.9	0.208	0.055	0.081	0.017	1.626	2.571
Northern Uplands	80.1	54.2	0.277	0.140	0.123	0.050	1.413	1.950
Mekong Delta	45.3	30.0	0.137	0.058	0.054	0.018	2.078	2.477

Source: Based on VLSS 93 and 98.

Table 2: Selected Characteristics of Rural Housholds by Region, 1993 and 1998

1993	RRD		NU		MKD	
	Mean	S.D	Mean	S.D	Mean	S.D
Human Capital						
Number of Working Members	2.344	1.138	2.724	1.291	2.999	1.543
Ratio of Working Members with						
No education	0.048	0.159	0.103	0.246	0.135	0.249
Primary school	0.105	0.223	0.195	0.279	0.376	0.334
Secondary school	0.721	0.350	0.623	0.364	0.444	0.353
Higher education	0.087	0.221	0.071	0.187	0.024	0.121
Land Asset						
Annual Crop Land per capita (1000 m2)	0.557	0.346	0.852	0.812	1.323	1.702
Other Cultivated Land per Capita (1000 m2)	0.145	0.465	0.231	0.581	0.315	0.729
Occupation						
Proportion of Households in Non-farm	0.173	0.378	0.079	0.270	0.199	0.399
No. of observation	1024		608		799	

1998	RRD		NU		MKD	
	Mean	S.D	Mean	S.D	Mean	S.D
Human Capital						
Number of Working Members	2.188	1.074	2.664	1.199	3.004	1.467
Ratio of Working Members with						
No education	0.021	0.113	0.089	0.232	0.111	0.233
Primary school	0.186	0.315	0.283	0.333	0.520	0.355
Secondary school	0.670	0.392	0.583	0.388	0.333	0.343
Higher education	0.055	0.178	0.020	0.100	0.018	0.106
Land Asset						
Annual Crop Land per capita (1000m2)	0.558	0.291	0.785	0.789	1.292	1.762
Other Cultivated Land per Capita (1000m2)	0.175	0.820	0.962	2.018	0.456	0.883
Occupation						
Proportion of Households in Non-farm	0.219	0.414	0.092	0.290	0.334	0.472
No. of observation	862		672		830	

Source: Based on VLSS 93 and 98.

Table 3: Determinants of Real Log Per Capita Expenditure with Commune Fixed Effects, 1993 and 1998

1993	RRD		NU		MKD	
	coefficient	t-value	coefficient	t-value	coefficient	t-value
Human Capital						
Number of Working Members	0.0151	1.293	0.0550	4.380 ***	0.0209	1.530
Proportion of working members with						
Primary school	0.0736	1.143	0.1036	1.334	0.2643	3.999 ***
Secondary school	0.2150	3.837 ***	0.2474	3.506 ***	0.4726	7.435 ***
Higher education	0.5466	7.986 ***	0.4088	4.514 ***	0.6347	4.740 ***
Land Asset						
Annual Crop Land (m2) ×1000	0.0791	2.154 ***	0.0671	3.202 ***	0.0724	7.416 ***
Other Cultivated Land (m2) ×1000	0.1254	4.486 ***	0.0641	2.844 ***	0.0455	1.957 *
Others						
Age of household head	0.0264	5.128 ***	0.0079	1.174	0.0194	2.748 ***
Age squared	-0.0002	-4.463 ***	-0.00005	-0.621	-0.0002	-2.455 **
Household size (log)	-0.2956	-9.430 ***	-0.4533	-11.443 ***	-0.4018	-9.171 ***
Livestock	0.0292	5.453 ***	0.0254	4.223 ***	0.0033	0.632
Poultry	0.0025	3.724 ***	0.0014	2.474 ***	0.0007	1.342
cons	6.6773	59.734 ***	7.1179	50.358 **	7.1335	41.342 ***
F-Statistic for Commune Fixed Effects	*F(31, 981)*	14.367 ***	*F(18, 578)*	12.575 ***	*F(24, 763)*	4.838 ***
Adj. R-squared	0.423		0.497		0.353	
F-value	27.88		22.52		28.34	
Prob > F	0.00		0.00		0.00	
observation	1024		608		799	

1998	RRD		NU		MKD	
	coefficient	t-value	coefficient	t-value	coefficient	t-value
Human Capital						
Number of Working Members	-0.0090	-0.539	0.0066	0.509	0.0155	1.470
Proportion of working members with						
Primary school	0.0461	0.685	0.0281	0.420	0.1763	3.589 ***
Secondary school	0.2927	4.375 ***	0.2379	3.726 ***	0.3713	7.119 ***
Higher education	0.7462	8.040 ***	0.5479	4.320 ***	0.7495	6.761 ***
Land Asset						
Annual Crop Land (m2) ×1000	0.1056	2.069 ***	0.0380	2.367 **	0.0592	8.413 ***
Other Cultivated Land (m2) ×1000	0.0289	1.893 **	0.0103	1.743 *	0.0481	3.374 ***
Others						
Age of household head	0.0299	4.008 ***	0.0242	3.577 ***	0.0124	2.202 **
Age squared	-0.0003	-3.390 ***	-0.0002	-2.975 **	-0.0001	-1.564
Household size (log)	-0.3019	-7.448 ***	-0.4795	-11.781 ***	-0.4667	-13.834 ***
Livestock	0.0117	3.675 ***	0.0228	6.798 ***	0.0105	2.382 **
Poultry	0.0012	2.309 **	0.0026	3.680 ***	0.0006	0.932
cons	6.9898	39.864 ***	7.2212	46.015 ***	7.6735	55.815
F-Statistic for Commune Fixed Effects	*F(28,822)*	10.435 ***	*F(20,640)*	21.531 ***	*F(25, 793)*	7.859 ***
Adj. R-squared	0.392		0.565		0.473	
F-value	19.44		29.52		51.62	
Prob > F	0.00		0.00		0.00	
observation	862		672		830	

Note: ***, **, and * indicates that the coefficients are significant at 1, 5, and 10 % level replectively.

Table 4: Sources of Inequality between Regions, 1993 and 1998

	Between RRD and NU				Between RRD and MKD			
	93		98		93		98	
	Asset	Return	Asset	Return	Asset	Return	Asset	Return
Human Capital								
Number of Working Members	−	−	−	−*	−	−	−	−*
Proportion of working members with								
Primary School	−	−	−	+*	−	−	−	−*
Secondary School	+	−	+*	+*	+	−	+*	−*
Higher	+	+	+*	+*	+	−	+	−*
Land Asset								
Annual Crop Land	−	+	−*	+*	−	+	−*	+*
Other Land	−	+	−	+	−	+	−	−
	Between RRD and NU				**Between RRD and MKD**			
	93		98		93		98	
	Asset	Return	Asset	Return	Asset	Return	Asset	Return
Human Capital	0.02	0.02	0.04	0.05	0.09	-0.2	0.1	-0.09
Land Asset	-0.03	0.02	-0.03	0.06	-0.07	0.03	-0.07	0.04

Note: * indicates that a gap is widening/narrowing in favor of the RRD over time.

Table 5: Aggregate Effect of Asset and Return on Income Inequality

	93	98
Total Difference between RRD-NU	0.14	0.27
of which		
Constant Term	-0.44	-0.23
Endowment Difference	0.03	0.09
Return Difference	0.55	0.41
Total Difference between RRD-MKD	-0.19	0.02
of which		
Constant Term	-0.45	-0.68
Endowment Difference	0.08	0.15
Return Difference	0.19	0.56