

Decomposing Changes in Income Inequality into Vertical and Horizontal Redistribution and Reranking, with Applications to China and Vietnam

by

Adam Wagstaff

Development Research Group and East Asia & Pacific Region, The World Bank, Washington DC, USA

Abstract

It is acknowledged that the lack of any systematic link between growth and income inequality does not necessarily mean that economic growth is not accompanied by major changes in the underlying income distribution. This paper employs a method devised to decompose the redistributive effect of a tax to analyze the extent to which vertical redistribution associated with changing incomes over time is offset or reinforced by horizontal redistribution and reranking. The paper uses panel data from China and Vietnam over a period when both countries grew spectacularly as they transitioned from planned to market economies, and yet experienced smaller annual percentage increases in income inequality. The results suggest that substantial amounts of horizontal redistribution and reranking in both China—and to a lesser extent Vietnam—more than offset pro-poor vertical redistribution. Without the horizontal redistribution and reranking, the Gini coefficient for China might have fallen between 1989 and 1997—substantially so.

Author's contact details: The World Bank, 1818 H Street NW, Washington, D.C. 20433, USA. Tel. (202) 473-0566. Fax (202)-522 1153. Email: awagstaff@worldbank.org.

Keywords: Income inequality; vertical redistribution; horizontal redistribution; China; Vietnam.

Acknowledgements: My thanks to Will Dow for his income data from the China Health and Nutrition Survey, and to Bert Hofman, Indermit Gill, Peter Lambert, Magnus Lindelöw, Branko Milanovic and Martin Ravallion for comments on earlier drafts.

World Bank Policy Research Working Paper 3559, April 2005

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent.

I. INTRODUCTION

Summary statistics often conceal more than they reveal. Inequality measures are no exception. Much has been made, for example, of the fact that inequality has not tended to rise or fall systematically with economic growth, and the fact that increased volumes of international trade have not tended to generate higher levels of income inequality (cf. e.g. World Bank 2000, Dollar and Kraay 2004). And yet the relationships between growth and trade on the one hand and poverty and inequality on the other remain controversial. One possible explanation of this is that such statements overlook the possibility that economic growth and international trade reforms—like tax reform—result in both vertical and horizontal redistribution, and that the public may feel differently about changes in income inequality depending on how much of each type of redistribution is involved (cf. Ravallion 2004). Policymakers may feel less comfortable about economic growth if people who initially are equals experience different rates of income growth, and if a lot of people move up and down the income distribution as a result of growth. Given this, one might want to know more than the degree of vertical redistribution (e.g. how far the poor and non-poor experience similar proportionate changes in their income) and the size of any change in a summary measure of income inequality (e.g. how far the Gini coefficient changes during periods of economic growth). From a political economy perspective, too, knowing the roles of horizontal and vertical redistribution could matter: horizontal redistribution may be more likely to generate more political instability than vertical redistribution—losers may be better able to galvanize support for their cause if they can point to people who started out in similar circumstances but ended up with much higher incomes.

This paper decomposes the changes in income inequality associated with economic growth using a framework developed originally to decompose the redistribution associated with

a tax (Aronson, Johnson and Lambert 1994, Van de Ven, Creedy and Lambert 2001).¹ The change in the Gini coefficient is decomposed into three parts: a part capturing vertical redistribution (people at different points in the initial income distribution experiencing different proportionate changes in income), horizontal redistribution (initial equals experiencing inequalities in income after the growth), and a residual term capturing reranking between the two distributions. The decomposition shows that a near-zero change in the Gini index could have two quite different explanations: everyone experiencing similar proportionate changes in their income; and inequality-reducing vertical redistribution being offset by inequality-increasing horizontal redistribution and reranking. Knowing only that the Gini has not changed much without knowing which of these two explanations applies is problematic if policymakers are not indifferent between the two.

The decomposition method is applied in the paper to panel data from China and Vietnam. Both have experienced rapid income growth during a rapid transition from planned to market economy, China's per capita GDP growing by an annual average 8.6% during the 1990s and Vietnam's by 5.6%.² During these transitions, income inequality has increased in both countries (Glewwe 2003, Ravallion and Chen 2004). However, while these increases in income inequality are rightly a source of concern in both countries, it is noteworthy that income inequality has risen more slowly than per capita income in both countries: the Gini coefficient grew by 1.5% per year in China during the 1990s (Ravallion and Chen 2004) and by 1.4% per year in Vietnam between 1993 and 1998 (Glewwe 2003).³ Furthermore, these annual increases in the Gini coefficient are small by comparison to those recorded in European transition economies: of the six economies

¹ Loshkin and Ravallion (2004) use a different decomposition to decompose the changes in inequality associated with trade reform in Morocco.

² Growth calculations here and below assume exponential growth. Data for per capita GDP are at constant prices, are for period 1991-2000, and are taken from the World Bank's *World Development Indicators* database.

³ China's Gini is for household per capita income, adjusted for cost-of-living differences between rural and urban areas. Vietnam's is for household per capita consumption, adjusted for regional price differences.

reviewed by Milanovic (1999), only Slovenia recorded a smaller annual increase in its Gini coefficient during the early 1990s; in the remaining five economies the annual increase was typically considerably larger than the rates of increase recorded in China and Vietnam (Latvia's annual rate of increase was 5.4%, Bulgaria's 6.3%, and Russia's a spectacular 14.6%). Seen in this light, China's and Vietnam's recent rises in income inequality are relatively modest, and both countries are potentially good candidates for exploring the possibility that relatively small changes in the Gini coefficient at times of rapid economic growth may mask large underlying changes in the income distribution.

The paper is organized as follows: section II sets out the methods used; section III outlines the data and presents the data on changes in inequality in the two countries; section IV presents the results of the decomposition exercise; and section V contains a discussion of the results.

II. QUANTIFYING HORIZONTAL AND VERTICAL REDISTRIBUTION

Our interest is in establishing how far changes in inequality reflect (a) differential changes *within* groups of people who are equals in terms of their initial income and (b) differential changes *across* groups of initial-income equals. Let y_t be a person's income at time t ($t=0,1$). In any sample, it is unlikely there will be many individuals that have exactly the same y_0 , so it makes sense (cf. Van de Ven et al. 2001) to divide the sample into K groups of equals using a specific bandwidth, w , for period-0 income. (We explore in the empirical analysis the sensitivity of the results to the choice of w .) Everyone with a value of y_0 between zero and w gets placed into the first group of equals. Everyone with a value of y_0 between $w+1$ and $2w$ gets placed into the second group of equals. And so on.

Let G_0 be the Gini coefficient for the initial period, and G_1 the Gini for period 1. Then G_t ($t=0,1$) can be decomposed as follows (cf. Lambert and Aronson 1993):

$$(1) \quad G_t = G_{B,t} + G_{W,t} + E_t,$$

where $G_{B,t}$ and $G_{W,t}$ are respectively the within-group and between-group Ginis for period t , and E_t is a residual. $G_{B,t}$ is obtained by assigning everyone in a given group of equals the group's mean income in period t . $G_{W,t}$ is equal to a weighted sum of the K within-group Ginis:

$$(2) \quad G_{W,t} = \sum_k \mathbf{a}_{k,t} G_{k,t},$$

where $\mathbf{a}_{k,t}$ is the product of the k th group's population and income shares for period t .

Alternatively, $G_{W,t}$ can be shown to be equal to

$$(3) \quad G_{W,t} = C_t - G_{B,t},$$

where C_t is the concentration index corresponding to the concentration curve formed by ranking individuals by their period- t income within groups, and groups are ranked in ascending order of the mean period- t income. E_t , the residual, is equal to the difference

$$(4) \quad E_t = G_t - C_t,$$

which is discussed further below.

Since the groups are ordered by their period-0 income, and the bandwidths do not overlap, $G_0=C_0$ and $E_0=0$. The change in the Gini coefficient can thus be written (cf. Van de Ven et al. 2001):

$$(5) \quad \mathbf{DG} = G_1 - G_0 = (G_{B,1} - G_{B,0}) + (G_{W,1} - G_{W,0}) + E_1 \equiv V + H + R.$$

DG therefore reflects three factors: (a) changes in between-group inequality (V for vertical redistribution); (b) changes in within-group inequality (H for horizontal redistribution); and (c) the residual (E_1). The interpretation of these terms is discussed more fully below. Note for the moment their signs. V is positive if there is pro-rich (inequality-increasing) vertical redistribution, and negative if there is pro-poor (inequality-reducing) vertical redistribution. H could, in principle, be positive or negative. However, the expectation is that there will be more inequality in period-1 incomes among groups of equals than in period-0 incomes. R is nonnegative—the concentration curve underlying C_t cannot lie below the Lorenz curve underlying G_t . In the limiting case, where there are exact equals in the sample and the bandwidth approach proves unnecessary (i.e. $w=0$), $G_{w,0}=0$, $H=G_{w,1}$ is unambiguously nonnegative, and R is equal to the Atkinson-Plotnick measure of horizontal inequality.⁴

V captures the inequality change that would have occurred overall if at each value of y_0 individuals had experienced a common proportionate income change rather than a differentiated one. Differentiated income changes at given values of y_0 result in nonzero values of H and R . H captures the extent to which there is more (or less) inequality in period-1 incomes among groups of equals than in period-0 incomes. R , by contrast, captures the difference between the period-1 income ranking and the lexicographic ranking underlying C_1 , the latter being formed by lining groups of equals up by their period-1 mean incomes, and within groups by their period-1 incomes. These two rankings will differ if people who are initially classified as equals get sufficiently spread apart in the period-1 distribution that groups of equals line up differently in the period-1 distribution than in the period-0 distribution. E_1 does not capture reranking of individuals *per se*: people could line up differently in the y_0 and y_1 distributions and yet E_1 could

⁴ This is the special case considered by Aronson, Johnson and Lambert (1994). Wagstaff et al. (1999) use this to decompose the redistributive effect of personal income taxation in 12 OECD countries.

still be zero. What needs to happen for E_1 to be positive is that there needs to be sufficiently large amount of reranking and sufficiently large income changes for those involved that *entire groups of equals* change order in the move from the period-0 distribution to the period-1 distribution.⁵

Eqn (5) indicates that a small or near-zero change in the Gini coefficient could arise for a variety of reasons. It could be that V , H and R are all zero or close to zero, so that everyone—whatever their initial income—experiences a similar proportionate income change. But it could also be that inequality-reducing vertical redistribution ($V < 0$) is offset by inequality-increasing redistribution associated with differential income changes *within* groups of period-0 equals and reranking ($H+R$ equals $-V$). Policymakers and society at large may well feel quite differently about these two scenarios, and knowing the relative magnitudes of V , H and R could be useful for both normative purposes (e.g. has economic growth been equitable?) and positive purposes (e.g. why has economic growth generated less controversy in some countries than others?).

III. DATA

Operationalizing eqn (5) requires panel data. The data for China are from the 1989 and 1997 waves of the China Health and Nutrition Survey (CHNS), a survey run jointly by economists and nutritionists, with fairly complete income data.⁶ The panel consists of 2,592 households (11,422 individuals) from seven of China's 22 provinces, namely Guangxi, Guizhou,

⁵ An example may help to clarify. Consider 9 individuals, 1 through 9, ranked in ascending order of period-0 income. Individuals 1-3 are in the poorest group of period-0 equals, group A. Individuals 4-6 are in the middle group of period-0 equals, group B. And individuals 7-9 are in the richest group of period-0 equals, group C. In the period-1 income distribution, individuals 1 through 9 are ranked (in ascending order of income) 1, 6, 5, 4, 2, 3, 9, 7 and 8. It is possible that individuals 2 and 3 have gained enough income for group A to be ahead of B in the period-1 distribution, in which case the lexicographic ordering for C_1 is 6, 5, 4, 1, 2, 3, 9, 8, 7. E_1 captures the move from the second to the third ordering—i.e. the period-1 ordering to the lexicographic ordering for C_1 .

⁶ Income in the CHNS includes wage income, home gardening income (whether from sales or own consumption), farm income (in cash, in-kind and from own consumption, whether operated by the household or not, and including livestock, poultry and fish), household business income (e.g. crafts), and subsidies (including the value of food coupons). Details are downloadable from the CHNS website <http://www.cpc.unc.edu/projects/china/>.

Henan, Hubei, Hunan, Jiangsu and Shandong.⁷ The CHNS income data are already adjusted for cost-of-living differences across provinces (and within provinces between rural and urban areas) through a price index constructed by the CHNS project team. The team's information was used to deflate the 1997 income data to 1989 prices, distinguishing between different provinces, and within provinces between rural and urban areas. The deflated income data for the panel provinces imply an annual real rate of growth of per capita household income of 6.0%, somewhat lower than the 6.7% figure for China as a whole for this period reported by Ravallion and Chen (2004). The per capita household income Gini for the CHNS panel rises from 0.3954 in 1989 to 0.4191 in 1997, giving a value of *DG* of 0.0237 (Table 1).⁸ The levels of the Gini in both years are a good deal higher the national figures reported by Ravallion and Chen, though the annual percentage change in the Gini in the CHNS data (0.7%) is somewhat smaller than the annual percentage change over the period 1989-97 reported by Ravallion and Chen for China as a whole (1.2%).

Table 1: Per capita income growth and inequality changes⁹

	China 1989-97	Vietnam 1993-98
Growth of per capita income/consumption p.a.	6.0%	6.6%
Initial Gini coefficient: G_0	0.3954	0.3223
Final Gini coefficient: G_1	0.4191	0.3346
Change in Gini coefficient: <i>DG</i>	0.0237	0.0123

Note: Computed from panel data from 1989 and 1997 waves of China Health and Nutrition Survey (CHNS) and the two (and only) waves of the Vietnam Living Standards Survey (VLSS). CHNS is not nationally representative, but the 1993 wave of the VLSS was. Figures for China refer to income, but those for Vietnam refer to consumption. For further details of sampling and variable definitions, see text.

⁷ Liaoning was sampled in the CHNS in 1989, 1991 and 1993, but was dropped in the 1997 round, being replaced by Heilongjiang. Neither is therefore represented in the 1989-1997 panel.

⁸ The Gini and all the various concentration indices were computed using the convenient covariance method (cf. e.g. Jenkins 1988).

⁹ Gini coefficients are computed on household-level data, but households are weighted by household size. The Ginis therefore indicate the extent of income inequality *between individuals*.

The panel data for Vietnam are from the two waves of the Vietnam Living Standards Survey (VLSS) conducted in 1992-93 and 1997-98. The panel consists of 4302 households (20493 individuals) from 59 of Vietnam's 60 provinces. The results below are for household consumption rather than income, defined and computed in the same way in both years.¹⁰ The 1998 data have been deflated using the national CPI. The panel data imply a real annual rate of growth of per capita household consumption of 6.6%, and a rise in the Gini from 0.3223 in 1993 to 0.3346 in 1998, giving a value of DG equal to 0.0123 (Table 1). This change in the Gini is somewhat smaller than the VLSS-based figure reported by Glewwe (2003), namely 0.023. This seems likely to be due to the fact that the figure reported here is based on the households interviewed in both years, while Glewwe's is based on the full 1998 sample which includes 1,200 households interviewed in 1998 but not in 1993.

The data from the CHNS and VLSS panels are thus very consistent with a story of rapid income and consumption growth, accompanied by very modest increases in inequality. The next section uses the decomposition of section II to see how far these very slight increases in the Gini coefficient mask horizontal and vertical redistribution in the move from period 0 to period 1.

IV. DECOMPOSITION RESULTS

Tables 2 and 3 show the results for China (1989-97) and Vietnam (1993-98) for different bandwidths.¹¹ Consistent with the results of van de Ven et al. (2001), V initially increases in absolute size as w is increased, but subsequently declines as w is increased further. This reflects two opposing tendencies: an 'averaging effect', which tends to increase V as w is raised (the

¹⁰ The VLSS measure of consumption reflects food and nonfood consumption during the previous 12 months. The procedure used for both years is described in detail in the VLSS 1998 basic information document, which is downloadable from <http://www.worldbank.org/lsms/country/vn98/vn98bif.pdf>.

¹¹ These are defined in local currency units in the base year—RMB or Yuan and 1989 in the case of China, and Dong and 1993 in the case of Vietnam. In both cases, the values are per person, and are annual figures.

growth ‘function’ that transforms period-0 income into period-1 income for a given group of period-0 equals is estimated more precisely as the number of observations used increases); and an ‘appropriation effect’, which tends to decrease V as w is increased (as w is raised, increasingly disparate individuals are grouped together as equals, making for an ever-larger error in the decomposition). Van de Ven et al. argue for choosing w such that V is maximized—the point where the gains from averaging are balanced against the losses associated with appropriation. This would point to optimal bandwidths of 80 RMB in the case of China and 100 Dong in the case of Vietnam.

Table 2: Decomposition results—China 1989-97

Bandwidth (RMB)	V	H	R	$V\%$	$H\%$	$R\%$
30	-0.1912	0.0034	0.2115	-806%	14%	892%
40	-0.1960	0.0057	0.2140	-827%	24%	903%
50	-0.1982	0.0049	0.2170	-836%	21%	915%
60	-0.1973	0.0066	0.2144	-832%	28%	904%
70	-0.1977	0.0088	0.2126	-834%	37%	897%
80	-0.1989	0.0078	0.2148	-839%	33%	906%
90	-0.1974	0.0092	0.2120	-833%	39%	894%
100	-0.1985	0.0100	0.2122	-837%	42%	895%
110	-0.1983	0.0110	0.2109	-836%	46%	890%
120	-0.1972	0.0108	0.2101	-832%	46%	886%
130	-0.1962	0.0117	0.2081	-827%	49%	878%
140	-0.1963	0.0124	0.2076	-828%	52%	875%

Table 3: Decomposition results—Vietnam 1993-98

Bandwidth (Dong)	<i>V</i>	<i>H</i>	<i>R</i>	<i>V</i> %	<i>H</i> %	<i>R</i> %
30	-0.0694	0.0015	0.0802	-565%	12%	653%
40	-0.0718	0.0017	0.0824	-585%	14%	670%
50	-0.0717	0.0025	0.0814	-583%	20%	663%
60	-0.0718	0.0024	0.0816	-584%	20%	665%
70	-0.0727	0.0028	0.0821	-592%	23%	669%
80	-0.0729	0.0040	0.0811	-593%	33%	660%
90	-0.0727	0.0044	0.0806	-592%	36%	656%
100	-0.0729	0.0043	0.0809	-594%	35%	658%
110	-0.0729	0.0042	0.0810	-593%	34%	659%
120	-0.0727	0.0048	0.0802	-592%	39%	653%
130	-0.0729	0.0050	0.0802	-593%	41%	653%
140	-0.0726	0.0056	0.0793	-591%	45%	646%

Whatever the bandwidth, the signs of *V* and *H* and the overall conclusions are the same. In neither country are the small increases in income inequality due to small amounts of pro-rich vertical redistribution. Rather, they reflect two opposing forces: pro-poor (inequality-reducing) vertical redistribution; and the offsetting effects of inequality-increasing horizontal redistribution and reranking. If the only differential income growth in China and Vietnam had been *across* groups of base-period equals, income inequality would have fallen during these periods of rapid economic growth. In the case of China, the reduction in income inequality would have been considerable: at the optimal bandwidth, *V* equals -839% of *DG*. Thus in the absence of differential income growth *within* groups of base-period equals and the group reranking resulting from this, the Gini coefficient would have fallen by more than *eight times* the observed absolute rise in the Gini. In Vietnam a similar story emerges, albeit less pronounced.

V. DISCUSSION

Both China and Vietnam experienced rapid income growth during the periods studied (1989-97 and 1993-98, respectively) as they continued their transitions toward a market economy. In neither, however, did income inequality increase markedly. Section II shows that

the small rise in the Gini index in these two countries could have two alternative explanations: that everyone at a given income experienced similar proportionate income increases but those who were better off initially experienced somewhat larger proportionate increases; or that people who were initially *worse off* experienced larger proportionate increases but this pro-poor vertical redistribution was more than offset by the inequality-increasing redistribution associated with people with similar initial incomes experiencing different income increases (horizontal redistribution) and reranking. Section IV finds evidence in favor of the latter explanation. Without horizontal redistribution and reranking, the Gini coefficient for income in China might have fallen between 1989 and 1997 by as much as 21.6 points. In the event, the horizontal redistribution and reranking involved in the move from the 1989 to 1997 income distributions was so large that the Gini *increased*—by 2.4 points. A similar picture—albeit less dramatic—emerged from the Vietnam panel for 1993-98.

Do these results matter? If vertical redistribution (V), horizontal redistribution (H) and reranking (R) matter only insofar as they contribute to the change in the Gini (DG), knowing the relative magnitudes of V , H and R is immaterial. If the policymaker is simply interested in DG , she would not care whether a small value of DG derives from small values of V , H and R , or from a large negative value of V being offset by a large positive value of $H+R$. Nonzero values of H and R would be considered bad by an inequality-averse policymaker because—*and only because*—they reduce DG for a given value of V .

There is, in fact, one strand of literature that would regard nonzero values of H and R as a *good* thing, namely the literature on economic mobility. Mobility is often defined and measured in terms of reranking across income distributions at two points in time (cf. e.g. Schiller 1977, King 1983). Where w in section II can be reduced to zero because there are exact equals in the

data, R in eqn (5) reduces to the Atkinson-Plotnick measure of reranking, R_{AP} (cf. Van de Ven et al. 2001).¹² If people's rankings in the distributions of y_0 and y_1 are identical, R_{AP} is equal to zero. A policymaker eager to see mobility would therefore want to see a *nonzero* value of R . Some argue for a broader interpretation of mobility as the evolution over time of people's incomes over time. Van Kerm (2004) has recently shown that reranking is just one component of this broader interpretation of mobility, with mobility so defined being decomposable into three components: a 'growth' component (the mobility that would have occurred if all incomes had risen by the same proportion); a 'dispersion' component (the mobility that is attributable to a change in the way total income is distributed); and an 'exchange' component (the mobility caused by reranking).¹³ Dispersion-related mobility gets reflected in nonzero values of V and H , which from this broader perspective would presumably be regarded as a good thing—irrespective of whether vertical or horizontal redistribution is involved, and irrespective of whether any vertical redistribution is pro-poor or pro-rich. However broad one's view of mobility, then, it is clear that the pursuit of mobility may entail substantial amounts of inequality-increasing redistribution.

Both of these views—that it is DG that ultimately matters, or that it is mobility that ultimately matters—are hard to square with the fact that many persist in expressing reservations about economic growth and trade reforms on the grounds they are often divisive and create inequality. This despite evidence that—at least on the face of it—seems to suggest this is not typically the case. These critics often point to the ways in which people with different characteristics seem to benefit differently from economic growth, those with assets—including

¹² This is equal to G_1 minus the concentration index for y_1 , people being ranked by y_0 in the latter and by y_1 in the former.

¹³ Applying his decomposition to data for Belgium, Germany and the USA, Van Kerm finds considerable evidence of mobility broadly defined, especially in the US, and finds that the exchange component is by far the most important driver of mobility in all three countries.

skills and land—faring better than others.¹⁴ If, as is suggested by the evidence reviewed by Baulch and Hoddinott (2000), household ‘initial conditions’ matter for subsequent household income or expenditure growth, substantial amounts of H and R are likely in the move from one income distribution to another. This may well be considered, at least by some, to be inequitable. Nonzero values of H in particular could be seen as offending the principle of horizontal equity—in this context that initial equals benefit equally from economic growth. By contrast, nonzero values of R could be seen as violation of a basic requirement of vertical equity.¹⁵ People might disagree about how far unequals should benefit differently from economic growth, but a plausible basic requirement of a vertically equitable growth process would be that it preserve the initial rank order. If indeed nonzero values of H and R violate what people regard as principles of an equitable growth process, policymakers will prefer a small value of DG that derives from small values of V , H and R to one where it derives from a large negative value of V being offset by a large positive value of $H+R$.¹⁶ In which case, knowing the relative magnitudes of V , H and R associated with a given value of DG is likely to be valuable.

With regard to China and Vietnam, knowing that the relatively small—by transition economy standards—value of ΔG in the 1990s has been due to a large negative V being offset by a large positive value of $H+R$ raises a number of issues. One question is: Why? The story would appear to be one of strongly inequality-reducing policy measures being more than offset by the inequality-increasing effects of people’s incomes being increasingly linked to their

¹⁴ See, for example, Oxfam’s Policy Director’s letter to *The Economist* on June 8 2000.

¹⁵ Horizontal equity (HE) does not of itself imply the absence of reranking. It *does* require that people starting at a given percentile end up at the same percentile. However, this is consistent with everyone at, say the 10th percentile moving up the distribution to, say, the 15th percentile, and all those initially at the 15th percentile falling back to the 10th percentile. That would result in reranking of groups of initial equals but would not violate the principle of HE. Such reranking *could* be considered inequitable in the sense that unequals are not being treated accordingly (cf. King 1983). But this is really an appeal to *vertical* equity.

¹⁶ This also raises the question of whether the weighting scheme implied by the decomposition above properly captures policymakers aversion to inequality, horizontal inequity and reranking—a theme pursued by Duclos, Jalbert and Araar (Duclos, Jalbert and Araar 2003).

characteristics. In both countries, a variety of policies—especially those associated with land reform—are argued to have been especially beneficial to the poor (World Bank 2002, Ravallion and Chen 2004), and presumably had much to do with the large negative V in both countries. At the same time, it is clear that market-oriented reforms have made for a closer link in both countries between incomes and individual characteristics. For example, the rate of return to human capital appears to have increased considerably in both China and Vietnam in the transition from planned to market economy (Gallup 2003, Heckman and Li 2003). This closer link between incomes and individual characteristics has presumably had much to do with the large positive value of $H+R$.

A second question is whether more should be—or should have been—done to assist those who fare less well in the move from a planned to a market economy. In both countries social safety net issues have indeed played a big part in recent policy discussions (cf. e.g World Bank 2002).

A third question is whether the analysis of the past in this paper sheds any light on the future. One possibility is that the same pattern of changing income inequality—a large negative V being offset by a positive $R+H$ —will continue. An alternative and possibly more plausible scenario is that the inequality-reducing policy measures that have helped generate the large negative V in the past have run their course, and that future policies will be less inequality-reducing and may even be inequality-increasing (cf. World Bank 2002, Ravallion and Chen 2004). It also seems possible that the link between incomes and individual characteristics will become even stronger, as the economies of China and Vietnam become more market-oriented; the rate of return to human capital in Vietnam, for example, is still low by market-economy standards (Gallup 2003). In which case, the future may well be one of *positive* (or at least

nonnegative) values of V reinforcing relatively large (positive) values of H and R , so that the future for both China and Vietnam may be one of *rising* income inequality. This possibility, which has already been raised by others (World Bank 2002, Ravallion and Chen 2004), leads one to wonder whether, by implementing a number of one-off inequality-reducing reforms alongside market-oriented ones, China and Vietnam have simply been able to *postpone* the rise in income inequality that transition economies seem to experience in the move to a market economy (cf. Milanovic 1999).

References

- Aronson, J. R., P. Johnson and P. J. Lambert (1994). "Redistributive effect and unequal tax treatment." Economic Journal **104**: 262-270.
- Baulch, B. and J. Hoddinott (2000). "Economic Mobility and Poverty Dynamics in Developing Countries." Journal of Development Studies **36**(6): 1-24.
- Dollar, D. and A. Kraay (2004). "Trade, Growth, and Poverty." Economic Journal **114**(493): F22-49.
- Duclos, J.-Y., V. Jalbert and A. Araar (2003). "Classical Horizontal Inequity and Reranking: An Integrated Approach." Research on Economic Inequality **10**: 65-100.
- Gallup, J. (2003). The wage labor market and inequality in Vietnam. Economic Growth, Poverty and Household Welfare: Policy Lessons from Vietnam P. Glewwe, N. Agrawal and D. Dollar. Washington DC, World Bank.
- Glewwe, P. (2003). An overview of economic growth and household welfare in Vietnam in the 1990s. Economic Growth, Poverty and Household Welfare: Policy Lessons from Vietnam D. Dollar. Washington DC, World Bank.
- Heckman, J. J. and X. Li (2003). Selection Bias, Comparative Advantage and Heterogeneous Returns to Education, National Bureau of Economic Research, Inc, NBER Working Papers: 9877.
- Jenkins, S. (1988). "Calculating income distribution indices from microdata." National Tax Journal **61**: 139-142.
- King, M. A. (1983). "An index of inequality: With implications to horizontal equity and social mobility." Econometrica **51**: 99-115.
- Lambert, P. J. and J. R. Aronson (1993). "Inequality Decomposition Analysis and the Gini Coefficient Revisited." Economic Journal **103**(420): 1221-27.
- Lokshin, M. and M. Ravallion (2004). Gainers and Losers from Trade Reform in Morocco. Washington DC, World Bank. Policy Research Working Paper 3368.
- Milanovic, B. (1999). "Explaining the Increase in Inequality during Transition." Economics of Transition **7**(2): 299-341.
- Ravallion, M. (2004). "Competing concepts of inequality in the globalization debate." Brookings Trade Forum **forthcoming**.
- Ravallion, M. and S. Chen (2004). "China's (uneven) progress against poverty." Mimeo.
- Schiller, B. R. (1977). "Relative Earnings Mobility in the United States." American Economic Review **67**(5): 926-41.
- Van de Ven, J., J. Creedy and P. J. Lambert (2001). "Close Equals and Calculation of the Vertical, Horizontal and Reranking Effects of Taxation." Oxford Bulletin of Economics and Statistics **63**(3): 381-94.
- Van Kerm, P. (2004). "What Lies Behind Income Mobility? Reranking and Distributional Change in Belgium, Western Germany and the USA." Economica **71**(282): 223-39.
- Wagstaff, A., et al. (1999). "Redistributive effect, progressivity and differential tax treatment: Personal income taxes in twelve OECD countries." Journal of Public Economics **72**: 73-98.
- World Bank (2000). World Development Report 2000/2001: Attacking Poverty. Oxford, New York, Oxford University Press.
- World Bank (2002). Vietnam: Delivering on its Promise. Development Report 2003. Washington DC, World Bank. Report No. 25050-VN.

