Diversity Among Rapid Transformation: Welfare Dynamics in Rural Vietnam, 2006 to 2012*

by

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Abstract

This paper exploits a four round panel survey of more than 2000 households in 12 provinces in rural Vietnam over the 2006-12 period (the Vietnam Access to Resources Household Survey), and examines welfare dynamics over the period using different measures. The aggregate picture is one of substantial progress in living conditions over the period, but there is in fact substantial heterogeneity in this, both at the province and the household level. One poor province in the North, Lao Cai has made virtually no progress on average over this period, while many others, including some poor provinces, have advanced significantly. At the household level possession of assets is associated with a greater likelihood of getting better off as is engaging in wage work; shocks are a significant factor reducing living conditions for some households, even for some welfare indicators such as food expenditure and assets which should be relatively stable over time. Non-kinh minorities are significantly poorer in the data and also progress less over the period, notwithstanding many policy initiatives undertaken by government.

JEL Codes: D31, I31, O12, Q12

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1. Introduction

Vietnam has come a long way since the *doi moi* reform process was initiated in 1986. The past 25 years have witnessed one of the best performances in the world in terms of economic growth. Aggregate living standards have improved significantly, and the socio-economic achievements are generally assessed as impressive from a human development perspective. Wide-ranging institutional reform has been introduced, including a greater reliance on market forces in the allocation of resources and the determination of prices. A shift can also be noted from an economy dominated by the state and cooperative sectors to a situation where the private sector and foreign investment account for a relatively high proportion of GDP. In sum, even if challenges remain in completing the structural transformation of the economy, important strides have been made over a relatively short time span to further the transition from a centrally planned to a socialist oriented market economy

The undoubtedly very positive aggregate picture may still hide more diversity of experience at the individual level. In this paper we look at this question for rural Vietnam, drawing on a unique 4 wave panel data set which allows assessment of welfare dynamics at the household level. Again the aggregate story is positive: rural poverty has fallen substantially; Vietnam has made substantial progress in the production of rice, its main crop (moving from being a net importer to a net exporter) and has developed a market presence in other crops such as coffee; and has diversified increasingly into non-agricultural activities in rural areas. But how much diversity of experience underlies this, and what are the characteristics of those who have been more and less successful?

This paper investigates this question based on the descriptive and econometric analysis of the evolution of different welfare measures which can be computed from the data. We find that there is a significant variation in experience within the data set; some households advance faster than others while some actually get worse off over this period. There are important differences by geographic location, by ethnicity, by education level and by migration status, among other factors.

The remainder of this paper is structured as follows. A succinct review of the now extensive literature on analysing welfare dynamics within panel data sets is set out in section 2. The data set used is described in detail in section 3, and the extent of attrition in the data set, an inevitable challenge in using panel data is discussed in section 4. A descriptive analysis of welfare dynamics is presented in section 5, while section 6 presents an econometric analysis, modelling attrition as well as welfare change over the panel period. Section 7 concludes.

2. Measuring welfare dynamics

Panel data sets have been increasingly collected in developing countries over the past two decades, and in most instances have been the subject of poverty dynamics studies for the countries concerned. Dercon and Shapiro (2007) provide a useful review of recent findings in relation of poverty dynamics from panel datasets. A recent important collection has been the volume edited by Baulch (2011), drawing in part in studies undertaken in the Chronic Poverty Research Centre which had a major research focus on poverty dynamics. Poverty dynamics studies will generally report poverty transition matrices, summarising changes (or not) in poverty status between two or more points in time; commonly they will also seek to use discrete choice approaches to model poverty transitions or dynamic poverty status.

The limited number of waves typically available does not allow techniques which have been used in developed countries such as duration modelling approaches. Other studies have sought to integrate

qualitative and quantitative methods, in order to add a stronger dimension of both validity and explanation; an important example here was the World Bank's Moving out of Poverty Study and the studies undertaken for it; other examples include Davis and Baulch (2009), Lawson et al. (2006), among many others. In the case of Vietnam several poverty dynamics have been undertaken, including an early study by Glewwe and Nguyen (2002) and a study by Justino, Litchfield and Pham (2008) looking at the relationship between trade policy and poverty.

While these studies are very informative, in this article our focus is on understanding and modelling the full distribution, not just on transitions above and below a poverty line. There is also though a significant literature – often including some of the poverty dynamics studies above but broader than this – which seeks to model the underlying welfare variable, typically income or consumption. Fields et al. (2003) look at four countries on a comparative basis, modelling changes in per capita income within a panel as a function of household characteristics; they find changes in job to be a very important common factor. They complement this with a decomposition analysis of income changes. Jalan and Ravallion (2004) model household income as a non-linear function of income in previous waves to seek to establish if there is any convexity in the income growth process, but do not find any, and Lokshin and Ravallion find similar results for Hungary and Russia in the 1990s. This is one of a host of studies which search for evidence of non-convexity in asset accumulation processes, looking for poverty traps; these issues are discussed by Lybbert et al. (2004), Carter and Barrett (2006), Barrett et al. (2006) and a collection of articles in the *Journal of Development Studies* in July 2013, many not finding evidence of poverty traps.

Consumption dynamics has been more widely studied using panel data sets. This is of particular interest in the longer panel data sets, including the Ethiopia Rural Household Survey and the Kagera Health and Development Survey, Tanzania. One very strong finding from Kagera is the very strong positive impact of migration on consumption growth (Beegle et al., 2011; Hirvonen and de Weerdt, 2013). In modelling consumption growth in Ethiopia over the period 1989-97, controlling for heterogeneity, Dercon (2004) reports a substantial impact from rainfall shocks as well as from the previous famine in 1984.

3. Data: The Vietnam Access to Resources Household Survey (VARHS)

While poverty dynamics has been studied in Vietnam, there has been much less focus on looking at welfare dynamics more widely. In terms of data, Vietnam has had a number of national panel surveys in the past, including the Vietnam Living Standards Survey (VLSS) conducted in 1992/3 and 1997/8, and the on-going Vietnam Household Living Standards Survey (VHLSS) which has been conducted every two years since 2002. The VLSS survey included a panel of 4,303 households and was used in early studies of poverty dynamics in Vietnam (e.g. Glewwe and Nguyen, 2002; Justino et al., 2008). The VHLSS in 2002 was based on a large sample of 29,500 households, 4,092 of whom were revisited in 2004, and 2,096 again in 2006. Identifying the panel in the VHLSS samples though has often been a matter of debate (McCaig, 2009; Le and Pham, 2009, among others). The 2010 survey was then based on a new sampling frame (using the new population census), but no panel households were included.

Without doubt the VHLSS survey has made important contributions to understanding the dynamics of change in Vietnam (Baulch and Dat, 2011; Imai et al., 2010; Coello et al., 2010, among others). But it remains the case that the size of the panel data by 2006 was relatively small, and covering only four years, and not covering important recent events including food and fuel price increases and the financial crisis.

The Vietnam Access to Resources Household Survey (VARHS) was carried out in the rural areas of

12 provinces across Vietnam in 2006, 2008, 2010 and 2012, with the intention (among other things) of establishing a larger and longer term panel data set. The objectives and activities of the VARHS were defined with a view to:

- Supporting Vietnam in the efforts to reduce poverty and improve the living conditions of the rural population, with emphasis on the upland poor and vulnerable groups (ethnic minorities, the poor and women), and

- Identifying and filling existing gaps in knowledge, information and policy relevant data and research for upland areas and ethnic minorities.

The VARHS is also acting as a continued tool to support the capacity development and institution-building element of continuing collaboration between a range of Vietnamese and their international partners.

The VARHS surveys were developed in collaboration between the University of Copenhagen (UoC), on the one side, and the Central Institute for Economic Management (CIEM) of the Ministry and Planning and Investment (MPI), the Institute for Labour Science and Social Affairs (ILSSA) of the Ministry of Labour and Social Affairs (MOLISA), and the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD) of the Ministry of Agriculture and Rural Development (MARD), on the other.[1] The sampled provinces are, by region: (i) Red River Delta: Ha Tay; (ii) North East: Lao Cai and Phu Tho; (iii) North West: Lai Chau and Dien Bien; (iv) North Central Coast: Nghe Anh; (v) South Central Coast: Quang Nam and Khanh Hoa; (vi) Central Highlands: Dak Lak, Dak Nong and Lam Dong; and (vii) Mekong River Delta: Long An.[2]

The data have been used to conduct a range of analytical in-depth studies on various aspects of rural development in Vietnam and have also been published (see for example Barslund and Tarp, 2008; Markussen, Tarp, Thiep and Tuan, 2012; Markussen, Tarp and van den Broeck, 2011; Newman, Tarp and Khai, 2012; Newman, Tarp and van den Broeck, forthcoming), as well as detailed descriptive reports on the 2006, 2008, 2010 and 2012 surveys (CIEM et al. (2007, 2009, 2011, 2013). The present paper seeks to focus on the panel feature of the VARHS data, which now covers around 2050 households surveyed in all four rounds, to assess welfare dynamics in rural Vietnam over this important period of time, characterised among other things by major international shocks (the financial crisis, food and fuel price increases). As part of this it is possible to trace households that become better and worse off over the period under study and seek to understand the factors which underlie this. In doing this we also have detailed information to be able to assess sample attrition and consider its possible consequences.

 The survey collects a wide range of information on households in rural Vietnam, collecting a lot of information relating to land, agricultural and non-agricultural livelihoods, income, food consumption, consumer and producer assets, credit and savings, and social capital among other factors. Some topics such as migration were added in later rounds. The survey actually began in 4 provinces in 2002, but in that round did not collect much of the information needed to assess welfare dynamics (which was added from 2006). This paper focuses on the rounds since 2006.

There are of course different ways of assessing welfare dynamics based on this data, but three main candidates are considered here (i) food consumption, (ii) household income, and (iii) household ownership of assets. It is widely accepted in the literature (Deaton, 1997; Deaton and Grosh, 2000)

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[1] See CIEM et al. (2007, 2009, 2011) for further background information and details.

[2] Some of these households were in fact also surveyed in the first VARHS survey conducted in 2002; however the 2002 data and this extended panel are not exploited in this paper due to a variety of differences in the survey instruments.

that consumption is generally more accurately estimated than income; household income is typically derived from many different sources, some of which may not be reported, and estimation of own-account income, from both agriculture and household businesses, is often particularly difficult. Nonetheless data on household income is available and can be used as a cross check as well as a separate measure in its own right. In the case of assets, information on a wide range of different types is available in the data set. This information has been summarised here by construction of an asset index using factor analysis following the principles set out by Sahn and Stifel (2000); the precise form of index is presented in Appendix 1.

This selection of welfare measures is partly motivated by the fact that they are measures of welfare whose levels could fluctuate significantly over the lifetime of the panel, in contrast to some other measures such as the education level of the adult members of the household, which while valid measures, are likely not to change much over the timeframe of the panel.

4. Attrition in the VARHS panel

The panel data set seeks to track the same households over time, but all panel data sets are inevitably affected by the problem of attrition where households or some of their members, interviewed in a previous round of the survey cannot be interviewed in a later round. This can arise due to refusal to be interviewed, but this is very rare in the VARHS sample; it can of course be due to death; but it is much more commonly a consequence of migration of the household to a different location outside the area. Some panel surveys, such as the Indonesia Family Life Survey or the Kagera Health and Development Survey, do seek to track households, or even individual members, which move to their new locations and interview them there. These movements are a very important part of the development process, because on average it is often households that move that are able to improve their livings conditions most; for instance this was very clearly the case for the Kagera survey referred to above.

In this case revisiting entire households that moved (often outside the 12 provinces being surveyed) was not possible for budgetary reasons, but a survey was conducted to collect information from a local informant on the absent household, on why and where (in general terms) they moved, on whether they were poorer or richer than average within the community, and on what information could be collected on their current occupation and standard of living.

A total of 2,325 households were interviewed in 2006, providing sufficiently comprehensive results to be useful for the analysis. The size of the subsequent samples is reported in Table 1. Some households were dropped in the 2008 survey round because their location was judged to have become urban, and this was a rural survey. Some 54 households from the 2006 sample were dropped for this reason. These cannot be classified as cases of attrition. All remaining cases though can be considered to be instances of attrition. Among these households six communes dropped out completely though they had at most four households in 2006 and some only had one. In another 12 communes three or more households were lost, but in most of these cases around 20 households had been selected in 2006 so that the proportionate loss is not very large. In another 141 communes 1 or 2 households dropped out, while in 295 communes there was no attrition at all. The rate of attrition between one wave and the next varies between 2.3% and 3.4% and the attrition over the full 4 waves is 8.4%. This is not a substantial rate of attrition though as it is expected to be systematic clearly it needs to be taken into account in the analysis.

The absent household questionnaire is not filled in for all attrited households, but for those for whom it is completed some consistent patterns emerge. Around two thirds of households are

believed to have moved permanently, while for one third the move is thought to be temporary; and the dominant reasons given for the move are for economic reasons or to be with other family members. The largest number of moves was to another province followed by moves to another district (non-bordering) within the same province; in other words most were not local moves. A higher proportion moved to another rural area rather than an urban area. Those moving were predominantly felt to be of a similar standard of living to others in the commune or slightly poorer.

Table 1: Extent and nature of attrition in the VARHS 2006-12 panel

	sample size	Real food expenditure			t test for significance of difference
		number attrited	attrited	non-attrited	
2006 base sample	2,325				
number dropped in 2008	54				
2006 base exc. urbanised households	2,271				
06-08 panel	2,194	77	13,941	16,281	-1.23
06-08-10 panel	2,143	51	19,988	16,210	1.36
06-08-10-12 panel	2,081	62	15,111	16,243	-0.51

An analysis of baseline food expenditure of attrited households at each stage compared to those that remain in the panel (Table 1) shows no significant difference. In two of the three years attrited households have slightly lower food expenditure than those that remain. While the comparison is not the same as that in the absent household questionnaire, the attrited households may often be poorer than those that remain.

These observations amount to a preliminary investigation of whether or not there are systematic patterns of attrition in the data; this is addressed more systematically below in the econometric analysis.

5. Descriptive analysis

The average value of real food expenditure per capita among the panel households, as well as its average growth over the period, is presented in Table 2, disaggregated according to different criteria. Across the sample there is a large average growth of food expenditure at an annualised average of 9.7%; these figures are adjusted for inflation using the CPI, though of course this will still be partly influenced by the increase in the food price over the period. The average level of food expenditure is significantly lower in the provinces of the North East and North West (Lao Cai, Lai Chau and Dien Bien) than anywhere else; throughout the period levels of food expenditure tend to be highest in Long An in the south, Dak Nong in the Central Highlands, and Khanh Hoa in the south central coast, excepting a serious shock experience in 2008. The fastest growth is experienced over the period in Ha Tay and Phu Tho, provinces relatively close to the capital Hanoi.

Table 2: Changes in food expenditure in the 2006-12 VARHS panel, disaggregated by different criteria

	2006	2008	2010	2012	Annual growth 06-12
Province					
Ha Tay	14516	19358	23871	33313	14.8%
Lao Cai	13268	10559	8694	13905	0.8%
Phu Tho	15077	20204	21799	30647	12.5%
Lai Chau	9424	12555	11222	14626	7.6%
Dien Bien	10553	10397	15283	16948	8.2%
Nghe An	14548	21507	18900	27443	11.2%
Quang Nam	17895	21084	20671	27478	7.4%
Khanh Hoa	21579	16726	34900	28508	4.8%
Dak Lak	18523	22795	18270	22381	3.2%
Dak Nong	20887	24472	24643	33820	8.4%
Lam Dong	21286	14591	21919	21509	0.2%
Long An	20630	22705	25864	34219	8.8%
Educational quartile					
Lowest	11087	13519	14815	19350	9.7%
2	14942	17490	20152	26579	10.1%
3	17305	20276	23007	29342	9.2%
Highest	22078	27465	27189	38572	9.7%
Ethnicity					
Kinh	17662	21407	23223	30969	9.8%
Non-kinh	9843	11117	12111	16079	8.5%
Livelihood category					
Wage only	21943	23462	24590	33508	7.3%
Agric only	15196	20324	21089	25991	9.4%
Business only	29441	32126	32719	38921	4.8%
Wage and agric	15631	18027	19887	26832	9.4%
Agric and busine	18528	22626	24427	30959	8.9%
Agric and cpr	10282	12050	15497	21855	13.4%
Wage, agric and	17184	20951	22027	31016	10.3%
Wage, agric and	11069	13860	16651	24626	14.3%
Others	16907	19153	21989	31629	11.0%
None	18260	21891	19972	30591	9.0%
Remoteness (measure 1)					
Non-remote	16494	19895	21702	28869	9.8%
remote	15007	17807	18946	25497	9.2%
Remoteness (measure 2)					
Non-remote	16654	19946	21777	29053	9.7%
remote	14133	17296	18236	24247	9.4%
Migrant status					
No migrant	15846	19219	21134	26767	9.1%
1 or more migrant	17223	20132	20924	32651	11.2%

Presence of young male migrant					
No	15942	19316	21115	27294	9.4%
Yes	17528	20131	20905	33216	11.2%
Presence of young female migrant					
No	16043	19219	21172	27414	9.3%
Yes	17012	20926	20472	33159	11.8%
ALL	**16162**	**19428**	**21086**	**28116**	**9.7%**

The level of food expenditure is consistently twice as high among the most educated 25% of households compared to the least educated 25% of households, and consistently twice as high among households from the majority kinh group compared to the non-kinh minority. Another striking finding in the table is that households who has one or more members who migrated out of the household have significantly higher levels of food expenditure than those without a migrant; they also have a faster growth of food expenditure over the period compared to households without migrants. This suggests some important correlates of welfare and welfare change.

Households engaged in business activity tend to have the highest levels of food expenditure, generally followed by those engaged in wage work; those engaged in agriculture or agriculture and exploitation of common property resources tend to have the lowest levels, though in all categories there was significant growth over the period. Remoteness (defined by distance from the commune authority or from a tarmac road) tends to be associated with lower food consumption compared to being in less remote locations, though the difference is not striking.

A similar analysis in terms of household income (which is quite comprehensively measured in the survey) shows very similar patterns, with a 10.2% annualised average growth over the period. It shows larger differences in income levels associated with education level and in both income levels and growth associated with having a migrant in the household.

Figure 1: Kernel density plot of change in asset index, 2006 to 2012
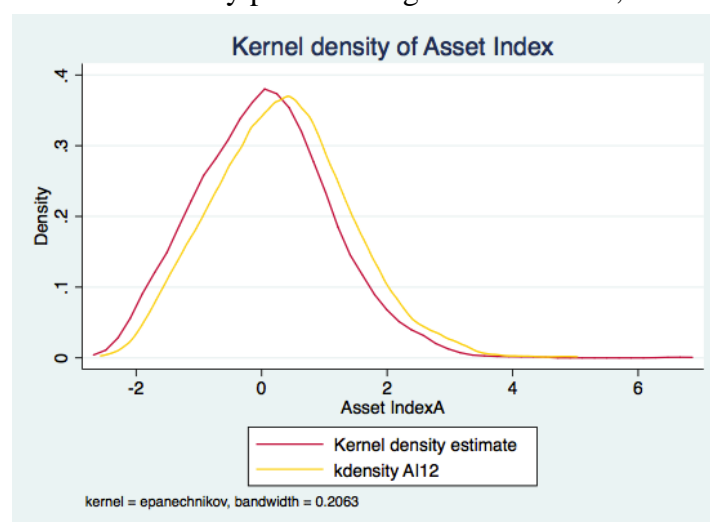
The pattern of asset ownership, summarised in terms of the average value of the asset index, is presented in Figure 1, comparing 2006 and 2012, and in more detail in Table 3. This need not show

the same pattern as food consumption or income, and there are some significant differences. For instance Long An, one of the wealthiest locations when judged by consumption or income, is in fact relatively poor in terms of asset ownership; the households reliant on business activity do not generally have higher levels of assets than households engaged in other activities. But many of the significant differences shown by consumption or income are still very apparent here: in particular the more educated, the kinh majority and the households with migrants have significantly higher asset levels than those without these categories, and the North-eastern and North-western provinces remain the poorest judged by levels of asset ownership. The analysis again here shows a pattern of significant accumulation over this period for almost all categories, and maybe here some evidence of catching up: the non-kinh minority and households without migrants have shown larger increases in their asset ownership over the period 2006-12 compared to their counterparts. But at the same time the level of assets owned has marginally declined over the period in Lao Cai province, the same province where growth in both food consumption and income was very slow over the period.

Table 3: Changes in household asset index in the 2006-12 VARHS panel, disaggregated by different criteria

	2006	2008	2010	2012	Change 06-12
Province					
Ha Tay	0.010	0.086	0.269	0.459	0.449
Lao Cai	-0.088	-0.239	-0.156	-0.131	-0.043
Phu Tho	0.472	0.406	0.545	0.627	0.155
Lai Chau	-0.756	-1.027	-0.372	-0.210	0.546
Dien Bien	-0.338	-0.767	-0.242	0.159	0.497
Nghe An	0.446	0.549	0.836	0.485	0.039
Quang Nam	0.090	0.166	-0.054	0.095	0.005
Khanh Hoa	-0.089	-0.098	-0.204	0.243	0.332
Dak Lak	0.130	0.060	0.348	0.381	0.251
Dak Nong	0.231	0.296	0.766	0.548	0.317
Lam Dong	-0.151	0.279	-0.242	0.423	0.574
Long An	-0.536	-0.572	-0.446	-0.117	0.419
Educational quartile					
Lowest	-0.870	-0.816	-0.622	-0.405	0.465
2	-0.148	-0.141	0.006	0.224	0.372
3	0.354	0.294	0.425	0.521	0.167
Highest	0.771	0.743	0.880	0.868	0.096
Livelihood category					
Wage only	-0.526	-0.213	-0.277	-0.210	0.316
Agric only	-0.077	-0.062	0.136	0.167	0.245
Business only	-0.209	-0.304	-0.114	0.110	0.319
Wage and agric	0.083	0.085	0.205	0.370	0.288
Agric and busine	0.228	0.235	0.458	0.452	0.225
Agric and cpr	-0.539	-0.636	-0.354	0.032	0.571
Wage, agric and	0.332	0.286	0.363	0.480	0.147
Wage, agric and	-0.211	-0.327	-0.174	0.109	0.321
Others	-0.346	-0.318	-0.195	0.094	0.440
None	-1.422	-1.079	-0.872	-0.995	0.426
Ethnicity					
Kinh	0.076	0.109	0.227	0.338	0.262
Non-kinh	-0.309	-0.483	-0.184	0.048	0.357
Remoteness (measure 1)					
Non-remote	0.041	0.058	0.214	0.336	0.295
remote	-0.134	-0.224	-0.081	0.095	0.229
Remoteness (measure 2)					
Non-remote	0.058	0.045	0.205	0.338	0.280
remote	-0.231	-0.208	-0.086	0.049	0.280
Migrant status					
No migrant	-0.144	-0.169	0.001	0.173	0.317
1 or more migrant	0.491	0.546	0.643	0.648	0.157
Presence of young male migrant					
No	-0.087	-0.101	0.063	0.222	0.309
Yes	0.553	0.594	0.681	0.652	0.099
Presence of young female					

migrant					
No	-0.067	-0.093	0.057	0.222	0.289
Yes	0.491	0.628	0.799	0.710	0.219
Total	0.002	-0.005	0.148	0.282	0.280

Table 4: Mobility between food expenditure and income quintiles between 2006 and 2012

5 quintiles of						
	5 quintiles of foodexp12					
foodexp06	1	2	3	4	5	Total
1	159	94	70	40	47	410
2	92	96	89	71	59	407
3	79	87	94	86	62	408
4	52	75	77	102	105	411
5	27	58	78	110	136	409
Total	409	410	408	409	409	2045

5 quintiles of						
	5 quintiles of income12					
income06	1	2	3	4	5	Total
1	176	104	56	48	23	407
2	106	117	92	64	28	407
3	60	90	108	89	63	410
4	40	66	88	105	112	411
5	28	32	65	103	182	410
Total	410	409	409	409	408	2045

5 quintiles of						
	5 quintiles of asset12					
asset06	1	2	3	4	5	Total
1	206	94	56	32	23	411
2	102	122	92	51	44	411
3	56	79	105	97	74	411
4	32	66	81	120	112	411
5	15	50	77	111	157	410
Total	411	411	411	411	410	2054

Finally, Table 4 reports on household mobility between food expenditure and income quintiles between 2006 and 2012. This table is about relative mobility and is therefore likely to be less affected by issues associated with adjusting for inflation over time. This table shows a lot of mobility. Much less than half of the households that were in the bottom or top quintile in 2006 were in the same quintile by 2012; this shows a very high degree of mobility. Some households have moved between the bottom and the top quintile (in both directions) over this period, and in general there are quite a lot of movements of more than one quintile group. Mobility is still greater in the middle quintiles and in the food expenditure table. The apparently greater movement in food expenditure quintiles than income quintiles is somewhat surprising because it might be expected that food expenditure would be more stable over time than income.

6. Econometric analysis of welfare change

In conducting a multivariate analysis of welfare change, it is important to take account of selectivity in the final panel sample data set; these are the households that were not affected by attrition. For this reason a joint analysis of attrition and welfare change between 2006 and 2012 is conducted here, based on a data set of 2,296 observations containing the 2006 households for all

characteristics (other than the 54 dropped above). A Heckman analysis is used where the first stage models sample inclusion (or non-attrition) and the second stage measures the change in welfare for all non-attrited households, as a function of 2006 characteristics.

A wide range of explanatory variables were constructed, including measures of characteristics of the household and the head, activities undertaken by the household, key household assets, receipts of transfers etc. The primary dependent variable considered here is the change in household food expenditure over the full period (sub-periods were also considered but are not presented here); but results are also presented for the change in assets and in total real per capita income over the same period. Food expenditure though is the preferred welfare measure and the discussion focuses mostly on this.

Table 5: Regression results for inclusion in pane (non-attrition)

	Coefficient	Std Error
No of active members	-0.0034	0.0574
Land area owned	1.73E-006	3.37E-006
Irrigated area owned	-2.90E-006	5.55E-006
Number of cows	-0.0159	0.0259
Number of buffaloes	-0.0370	0.0450
Number of pigs	0.0128	0.0108
If household has business	-0.0706	0.1453
Number of telephones	0.0880	0.0658
Number of motorcycles	0.1096**	0.0489
Number of bicycles	-0.0376	0.0593
Average hh education	0.0031	0.0128
If female headed	0.1243	0.1331
If household head is married	0.2543*	0.1382
Household size	0.0726	0.0585
If no-one works in household	-0.5826	0.4406
Share of wage income	-0.2190	0.3903
Share of agricultural income	-0.1606	0.3867
Share of business income	-0.0095	0.4530
If commune questionnaire not answered	-0.1616	0.4433
Number of households in commune	0.0001	0.0001
Number of poor households in commune	0.0392	0.1230
If commune is remote	0.0294	0.1235
If adequate road tom commune people's office	0.0757	0.2346
If daily market in commune	0.0354	0.0946
If bank in commune	-0.1508	0.1254
If secondary school in commune	-0.2661*	0.1431
If branch of bank for social policies in commune	0.0281	0.1098
If Bank for agriculture/rural dev't in commune	0.0741	0.1310
If farmers' union in commune	-0.2215	0.3603
If veterans; union in commune	0.3730	0.4367
If women's union in commune	-0.6174	0.5558
If rice grown in commune	0.1365	0.1444
If cash crops grown in commune	-0.2128	0.1873
If agriculture main activity in commune	0.3389***	0.1278
If commune has many enterprises with > 10 workers	-0.0729	0.0951
If more than half of commune has electricity	-0.0192	0.1739
If commune had drought in last 5 years	0.0716	0.0974
If commune had flood in last 5 years	0.0589	0.0900
If commune had pests in last 5 years	0.0228	0.0896
If commune had fire in last 5 years	-0.2510*	0.1290
If land law fully implemented in commune	0.1069	0.0925
Constant	0.8753	0.5362

The first stage model is almost exactly the same in each case, only differing marginally because of small differences in the stage 2 dependent variables, in the different cases. The results for the first stage of the food expenditure measure are presented in Table 5; these are then probit coefficients for the likelihood of inclusion in the sample, and so with the opposite sign show the influence of the different factors on attrition. A number of community level characteristics (from the VARHS community survey) are included in this model for identification purposes and so not included in the second stage. What these results highlight most strongly is that there are not many factors strongly associated with being excluded or excluded in the sample. Of all the factors included in the model only two are significant at the 5% level or above. Attrition is significantly lower (and so inclusion in

the stage 2 sample significantly higher) in communes where agriculture is the dominant activity, suggesting less mobility in such cases; households with more motorcycles are also less likely to show attrition. Some other factors are significant at the 10% level. Households where the head is married are more likely to stay in the sample, again suggesting less mobility in such cases. Mobility is slightly higher in communes with a secondary school (greater education opportunities perhaps giving more migration possibilities) and in communes that were affected by fire.

Some of the commune factors used as identifying variables do turn out to be significant. But the most striking finding here is the fact that most factors are not significantly associated with sample inclusion. This though is consistent with the descriptive analysis of attrition presented above, where attrited households do not have significantly different welfare outcomes compared to non-attrited households.

Table 6: Stage 2 regression results for changes in welfare outcomes

	Change in log food expenditure		Change in asset index		Change in total income	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Log food expenditure 2006	-0.8903***	0.0184				
Asset index 2006			-0.5956***	0.1145		
Real total income 2006					-0.9067***	0.0262
Time worked	0.0000	0.0001	0.0000	0.0001	-92.8	114.1
Household size	-0.0928***	0.0114	0.0943***	0.0175	-84074.9***	24824.4
No of active members	0.0529***	0.0138	-0.0234	0.0235	49532.5	31083.1
Land area owned	0.2740	0.0000	-0.6410	0.0000	0.5450	1.3047
Irrigated area owned	2.1100	0.0000	1.5000	0.0000	-11.2697***	2.9919
Number of cows	-0.0028	0.0081	0.0177	0.0131	23994.7	18330.9
Number of buffaloes	-0.0137	0.0158	0.0447*	0.0252	-43994.0	35767.4
Number of pigs	0.0046**	0.0021	0.0087***	0.0034	-64492.2***	4952.5
Number of chickens	-0.0003	0.0003	-0.0002	0.0005	-2002.7***	640.7
If household has business	0.0230	0.0293	-0.0265	0.0474	-144827.4**	66469.7
Number of telephones	0.0418**	0.0193	0.0110	0.0333	-9714.7	43622.7
Number of motorcycles	0.0830***	0.0178	0.0595*	0.0329	82618.9**	39787.3
Number of bicycles	0.0007	0.0130	0.0159	0.0226	7728.2	29469.3
No of pesticide sprayers	-0.0129	0.0189	0.0050	0.0313	-59058.3	42492.1
Number of cars	0.0568	0.0689	-0.1807*	0.1115	185690.0	157106.5
Number of groups	0.0639***	0.0230	-0.0863*	0.0499	134738.8***	51328.2
Number of political group	-0.0595**	0.0265	0.0093	0.0559	-86881.7	59463.9
Average hh education	0.0311***	0.0049	0.0528***	0.0097	27687.9**	10863.8
Worked in agriculture	-0.0773	0.0498	0.1342*	0.0788	-127029.2	112222.5
Worked in CPR	0.0992**	0.0430	0.0407	0.0680	22428.6	96798.4
Wage work	0.0339	0.0279	0.0423	0.0441	193218.8***	62794.2
If female headed	-0.0073	0.0366	-0.2165***	0.0554	270182.4***	81540.3
If land has redbook	0.0017	0.0193	0.0300	0.0307	51845.8	43284.5
If received private transfer	-0.0429	0.0284	-0.0390	0.0450	-61774.1	63724.4
If received public transfer	-0.0512*	0.0295	-0.0800*	0.0467	224389.9***	66182.4
If had shock	0.0255	0.0375	0.0083	0.0593	-99691.0	83959.9
If affected by floods	-0.0475	0.0521	-0.0326	0.0825	33656.5	116719.8
If affected by drought	-0.0991	0.0717	-0.1184	0.1135	116096.1	160508.3
If affected by typhoon	0.0325	0.1242	-0.03438	0.1972	-240127.5	278878.2
If affected by disease	-0.0282	0.0475	-0.0622	0.0751	-10716.5	106516.9
If member was sick	-0.0526**	0.0265	-0.0945***	0.0419	-99081.5*	59387.4
If location remote	-0.0165	0.0308	-0.1194***	0.0487	-62498.1	68961.2
If head from ethnic minority	-0.1792***	0.0680	-0.1558	0.1074	-111657.3	151387.2

Minority*education	0.0128	0.0106	0.0267*	0.0168	30541.6	23645.2
If household member left	-0.0982	0.0754	0.0029	0.1195	247882.3	169256.9
No. of young men absent	0.2090***	0.0683	0.0459	0.1083	-112605.5	153493.3
No. of young women absent	0.1847***	0.0670	0.1208	0.1064	-172431.2	150659.6
constant	9.1365***	0.2048	-0.4312	0.2686*	699053.5***	202541.7
lambda	0.0851	0.1966	0.1432	0.2994	-524770.0	441955.7
rho	0.1553		0.1646		-0.4192	
sigma	0.5478		0.8699		1251863.5	
number of obs.	2065		2079		2079	
Wald chi2(48)	3075.0300		940.1700		1613.6	
Prob > chi2	0.0000		0.0000		0.0000	

The second stage model then included the inverse Mills ratio coming from the first stage, to control for the potential non-randomness of the stage two samples. In none of the models though is this term significant suggesting that the selectivity issue is not having a major impact. This is entirely consistent with the absence of many systematic patterns of attrition.

In discussing the second stage models (Table 6), particular emphasis is placed on the first model, for the change in the logarithm of household real food expenditure per capita between 2006 and 2012. What is estimated here is effectively a growth equation, but at the household level. The change in the logarithm of food expenditure is regressed on its initial level, a series of indicators of different household assets, and other household and work characteristics, where all of these variables are defined in the base period to minimise concerns about endogeneity. The model is estimated as a fixed effects panel model, with province level fixed effects.

The food expenditure models here are well specified, with a good fit and a number of significant and plausible coefficients. The initial period value of the logarithm of food expenditure has a strongly statistically significant negative impact with a coefficient of -0.89; this result is expected in a well specified growth model. It shows convergence (or regression to the mean) and is consistent with a descriptive analysis of the correlation of the change in food expenditure with the quintile. This though does not imply that inequality in food expenditure will fall; the data in fact shows that it does not.

Household size is strongly statistically negatively associated with the growth in food expenditure, but having more household members working in the base period is positively and significantly associated with the growth in food expenditure. A number of assets are positively associated with growth in food expenditure. A higher level of education has a strongly significant positive association with food expenditure growth, with a magnitude of around 3% per annum, and the number of motorcycles and telephones in 2006 is also strongly associated with later food expenditure growth. There is also a significant positive impact of social capital, in the sense of belonging to more groups (though this is not significant when these are specifically political groups). Having more pigs is positively associated with food expenditure growth though there is no significant association for other livestock types.

Having exploited common property resources in 2006 seems to be associated with subsequent growth in food expenditure at the 5% level of significance, but other activities appear not to be significantly associated. The fact that the household experienced any shock or a specific type of shock is almost never significantly associated with the growth of food expenditure, except for cases where a household member was ill. Floods, droughts and other shocks appear not to have a

significant influence. But a household member being sick in the base period has a negative impact on subsequent food expenditure growth.

Overall, the two big impacts on food expenditure growth in this model appear to be being from an ethnic minority, which has a large negative influence of –18%, and having young former household members from 2006 who have since migrated elsewhere, which has a strong positive influence, +20% in the case of young men and 18.5% for young women. Both of these results were apparent in the descriptive analysis above. Ethnic minorities do not only have significantly lower levels of food expenditure (this also being confirmed by a similar regression for the 2012 level of the logarithm of food expenditure) but also have substantially slower growth; and this is even the case when including fixed effects to control for the very different presence of ethnic minorities in different provinces. The migration effects is also very strong; of course having members away reduces household size and so other things being equal would increase per capita expenditure, but the effect is likely to be greater than this, and indeed the absence of younger household members could have an adverse effect on household income.

A number of different specifications were run, including the 2012 value of the logarithm of food expenditure (where except for the coefficient on the lagged dependent variable the results were very similar); estimating for the change in the level of food expenditure; adding and dropping variables; estimating without fixed effects and with district level fixed effects. In general the results were very similar to those presented here, and the inverse Mills ratio was never significant. When district level fixed effects are included fewer variables remain significant, but remoteness now shows up as being important; there are though a large number of districts and for that reason the province level fixed effects results are preferred. Dropping the province level fixed effects, the negative coefficient on being from an ethnic minority gets much bigger (-34.2%), and in this case there is also a significantly positive (though smaller) offsetting effect on education interacted with being from an ethnic minority; there is some evidence, though not strong, that education may enable ethnic minorities to become better off.

Ethnicity is often interpreted as being associated with remoteness, given that ethnic groups often live in more remote location; but controlling for remoteness in the model (defined as distance to an asphalt road or the commune office) ethnicity remains significant while remoteness is not. And interactions between remoteness and ethnicity were not significant. This importance of being from an ethnic minority is one of the most striking findings of the model. While a number of policy initiative have been undertaken to seek to improve the situation of ethnic minorities this evidence suggests that a significant differential continues to exist in rural Vietnam.

The second model in Table 6 looks at the change in the household asset index between 2006 and 2012. The asset index is a constructed composite variable so perhaps harder to interpret than food expenditure; but it remains the case that increases in this indicate progress. Again the lagged value is significant and negative, but holdings of some individual household assets in 2006 (including education) still have a positive effect on subsequent growth. Here the significant factors are often quite different from food expenditure. That household size has a positive impact is not surprising as the asset index measure does not take account of household size as the food expenditure measure did. Here there are strongly significant and large negative effects of being female headed, being in a remote location and being affected by illness in 2006. Here the ethnic factor is insignificant, something supported by the descriptive results above; and having young members absent has no impact on asset holdings, as would be expected.

The third model presents results for the change in real per capita household income, which is almost

certainly the least accurately estimated of the variables. Because it can be negative logarithms cannot be used and growth rates can be misleading. Again the lagged level is significant and negative with a 0.91 coefficient; and some results are similar to those for food expenditure including negative influences of household size and positive influences of education, motorcycles and being a member of groups. Here having a wage job in 2006 has a positive influence on subsequent income growth, as does receiving a public transfer; being female headed is here associated with faster income growth (in contrast to assets). Some unexpected variables have a negative influence on income growth including irrigated area, pigs, chickens, and having a business); it seems that faster income growth is associated with having wage work or receiving a transfer rather than agriculture or business, though the former may be more accurately measured than the latter.

Reviewing the three measures, in all cases and unsurprisingly, education is important for progress; but other than that there are some differences between factors important for food expenditure, asset and income growth. This should not be surprising as each is a different measure; income is more volatile (and less accurately measured) than food expenditure, and the relationship between asset accumulation and the other two is likely to be more long term. The most robust results here though appear to be for food expenditure, and these do show some interaction between asset accumulation and subsequent growth in food expenditure. They do show a downside impact of shocks associated with illness. But in particular they show a very strong disadvantage faced by ethnic minorities (even when geographic factors are controlled for); and a strongly positive effect associated with migration of young people out of the household.

7. Conclusions

The aim of the Vietnam Access to Resources Household Survey (VARHS) is to document the wellbeing of rural households in Vietnam focusing, in particular, on access to and the use of productive resources. Many of the characteristics of the rural households surveyed over the period 2006-2012 do not change over time as one would expect given that the same households are surveyed in each year. Nevertheless, some notable differences exist. The number of surveyed households classified as poor by MOLISA has declined (CIEM, 2010). This suggests that, overall, living conditions have in general improved for the surveyed households. This is confirmed in this study based on three measures of welfare: (i) food consumption, (ii) household income, and (iii) household ownership of assets. These three measures all bear witness to the considerable progress that has taken place in Vietnam in the period under study.

However, this is not consistently the case across all areas of the country. The welfare measures often show quite a lot of volatility from one survey to another, even in indicators such as food expenditure and assets that should be thought to be quite stable. The most striking finding from the analysis of the welfare measures if the failure of Lao Cai to make significant progress over this period, a period over which most provinces, including some initially poorer ones from the north-west, advanced significantly. This is true throughout each of the two year sub-periods as well. It is clearly important to seek to understand the factors which have contributed to a failure of progress in Lao Cai over this period.

The data though also show that even in provinces where average living conditions improved a lot, the situation deteriorated for a substantial minority of households in almost every case. Thus while the aggregate story confirms the pictures from VHLSS surveys and elsewhere of significant poverty reduction in rural Vietnam, the analysis in this paper confirms that for a lot of households the situation has clearly worsened over this period. It is important to understand this diversity of

experience, and the multivariate analysis provides insights into this. Having a sufficient level of assets, including education, social capital and productive assets is associated with a greater likelihood of getting better off as does having more prime-age household members (and fewer dependents); facing shocks and being of non-kinh ethnicity are significantly associated with large reductions in food expenditure. The latter finding is particularly striking; the ethnic differential story is well known in Vietnam, but has also been the subject of many high profile policy interventions. The results in this paper suggest strikingly that being of a non-kinh ethnicity remains a substantial disadvantage in rural Vietnam. The key policy message emerging is that while much has been achieved in Vietnam in terms of growth and poverty reduction, important challenges remain to ensure inclusive progress in the years to come.

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Annex Table 1: Factor index weights for asset index

Variable	weight
years of education per capita	0.171
number of active household members	0.105
number of plots owned	0.051
total area owned	0.035
irrigated area owned	0.049
Number of cows	0.039
Number of buffalos	0.000
number of pigs	0.024
number of chickens	0.027
if household has a business	0.032
number of colour TVs	0.074
number of videos/DVDs	0.074
number of telephones	0.061
number of motorcycles	0.094
number of bicycles	0.079
number of pesticide sprayers	0.041
number of cars	0.034
number of groups attended	0.391
number of political groups	0.407
area of dwelling	0.054
if has a good lighting source	0.050
if has a toilet	0.067
if has a good drinking water source	0.042