Determinants of households' income mobility and poverty dynamics in Egypt

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ABSTRACT

Rapid economic growth in Egypt over 2005-2008 followed by deceleration over 2008-2009 produced considerable distributional changes. This paper investigates household income mobility in these two sub-periods, following mostly the approach by Woolard and Klasen (2004) and Field et al (2002 and 2003) applied to South Africa panel data. The paper finds that different groups of households were affected differently by growth and inflation and then by deceleration of the economy and remittances. Among key events which affect households' movements into and out of poverty demographic changes play a major role, followed by changes in private transfers. Labor market events linked to longer-term factors are only weakly influencing these movements. Our findings suggest very high instability of incomes and short-term fluctuations around households' income trajectories. A significant part of the pro-poor dynamics measured with panel data represents simple corrections of the short-term idiosyncratic shocks. At the same time, we find evidence of poverty traps which explain chronic poverty persistence and worsening extreme poverty in Egypt despite robust and sustained growth. 0These results appear robust to measurement errors.

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Introduction

Egypt achieved rapid growth during 2005-2008, with GDP growth rate averaging 7 percent per year, decelerating to still a high level of growth of about 5 percent in 2009 on the wake of global financial crisis. This was a period of several shocks: inflation was galloping and as a consequence of the food and financial crisis the economy started to shed labour noticeably. Despite a good economic performance overall, there was a discontent of the population with the distribution and a sense that the rich were appropriating all benefits of growth, letting the poor bear the brunt of adjustment to the global turmoil. To what extent these perceptions reflected the economic realities? Were the poor left behind? This work aims to present an assessment of the households' income mobility over this complex and turbulent period and investigate the main factors behind it, with a particular focus on the role of labour market versus the role of demographic events.

We follow the approach of Woolard and Klasen (2004) and Field et al (2002 and 2003) applied to South Africa panel data. This choice is justified by the nature of data we are working on (given a short panel a proper analysis of income dynamics with lagged incomes used as instruments is not an option– see e.g. Ravallion on Russia and Lokshin and Ravallion and Jalan on China) and by the nature of policy demands (issues of consumption smoothing which were extremely relevant in transition economies and produced a large literature based on the Russian panel, RLMS – see van Notten, Jovanovic, Skoufias etc. - are not discussed now in Egypt). It is also based on similarities that we observe between Egypt and South Africa in terms of data collection and use. Work by Woolard , Klasen and Fields not only responded to very important policy questions on the extent and causes of income mobility, vulnerability and poverty traps, it also validated the data and provided encouragement to continue the panel (KIDS). This is the aim we would also like to achieve in Egypt.

This is the first time when three rounds of panel data are used in Egypt. Earlier work by IFPRI relied on the first small-scale unofficial panel survey (only 300 households) in Egypt conducted in 1997-1999. Results are published in Lawrence Haddad and Akhter U. Ahmed (2002). Marotta et al. (2010) use two rounds of the new panel conducted by CAPMAS to investigate whether growth between 2005 and 2008 was pro-poor. This work extends that panel to the third round. This study will analyze the new wave of the panel, 2008-2009 and compare a period of high and reasonably sustained growth with a period of economic turbulence, high volatility in terms of inflation and economic slowdown. Our study also differs from any previous attempts to look at mobility and poverty transitions in Egypt by considering consumption *and* income. All poverty measurement in Egypt relied exclusively on consumption and here we introduce and validate income indicators.

Our analysis is based on the new Household Income, Expenditure and Consumption Panel Survey (HIECPS) conducted by CAPMAS (Egypt's national statistical agency) to trace household consumption and living standards over 2005-2009. The survey is the first large scale data collection in Egypt to monitor the situation of same households over extended period of time, and our paper presents its panel component.

A reason to study mobility is related to the government's policies to reduce poverty and vulnerability. Despite recent growth poverty remains a serious problem in Egypt. Our previous work with the same data demonstrated that despite robust economic growth, the risk of extreme poverty (inability to meet basic food needs) increased by almost 20 percent between February 2005 and 2008, affecting at the time about 6 percent of the population in Egypt – more than at any observation point since 1990. Vulnerability is even a greater concern. Almost 20 percent of the population remained near-poor (their consumption is only slightly above the so-called lower poverty line, but below the upper poverty line) throughout the period of economic expansion (2005-2008). As the country entered a period of economic slowdown following the financial crisis, the situation has worsened, and extreme poverty, poverty and near poverty significantly increased. The government responded rapidly to economic slowdown by putting together a stimulus package that affected the prospect of job creation. To address the inflation shock that followed

the food-price crisis in the first half of 2008, the Government widened the coverage of ration cards, which provide access to subsidized food, to another 15 million Egyptians (covering now 63 million beneficiaries), and increased quotas of subsidized items. To what extent it was helpful to reduce poverty risks is extremely relevant question that we are trying to address here.

Our analysis is also motivated by findings reported in Marotta, El- Laithy and Yemtsov (2010, forthcoming in JDS). This work shows how growth in Egypt was univocally pro-poor from a panel perspective (that is poorer households in 2005 had the highest growth rates over 2005-2008), even though inequality increased and extreme poverty worsened. At the same time, many near poor fell into poverty despite rapid growth. This combination raises questions about why so many poor moved out of poverty and to what extent their movement was permanent or not (i.e. representing a simple churning up and down around the poverty line). To shed light on these questions we need to focus on key events that are associated with the mobility of households on the income ladder and then use regression framework to assess the role of short-term and medium-term factors driving the observed movements. We care also about the measurement error that is plaguing any work on panels. From that perspective the work by Woolard and Klasen (2004) and Field et al (2002 and 2003) offers all key elements.

The paper is structured as follows. Section 1 presents the data and the procedures adopted to clean the data. Section 2 will give a brief overview of the economic growth, inequality and poverty in Egypt during 2005-2009, breaking it down to two sub-periods, 2005-2008 and 2008-2009, representing waves of the panel, while section 3 reviews what we know about the link between mobility in and out of poverty in Egypt and employment. Section 4 will analyse the extent of households' income mobility in Egypt separating fast growth episode (2005-2008) from slower growth with accelerating inflation (2008-2009). Sections 5 and 6 will then analyse both in univariate and multivariate settings the main determinants of such mobility, first focusing on main events that pull households over the poverty lines and then running a regression model to assess the relative importance of these factors. Section 7 concludes.

1. The data: The Household Income, Expenditures and Consumption Survey.

Living standards in Egypt are monitored with the high-quality large household survey: the "Household Income, Expenditures and Consumption Surveys" (HIECS). Conducted every five years since 1995, these surveys have been the main (and the only official) source for poverty and inequality data in Egypt. To overcome problems with such an infrequent data collection, in late 2007, the authorities decided to re-visit in 2008 the households interviewed in the February during HIECS 2004/05, applying the same questionnaire. The new Household Income, Expenditure and Consumption Panel Survey (HIECPS) 2005-2008 therefore is a panel, the first in Egypt, and allows an unprecedented comparability in the analysis of living standards.

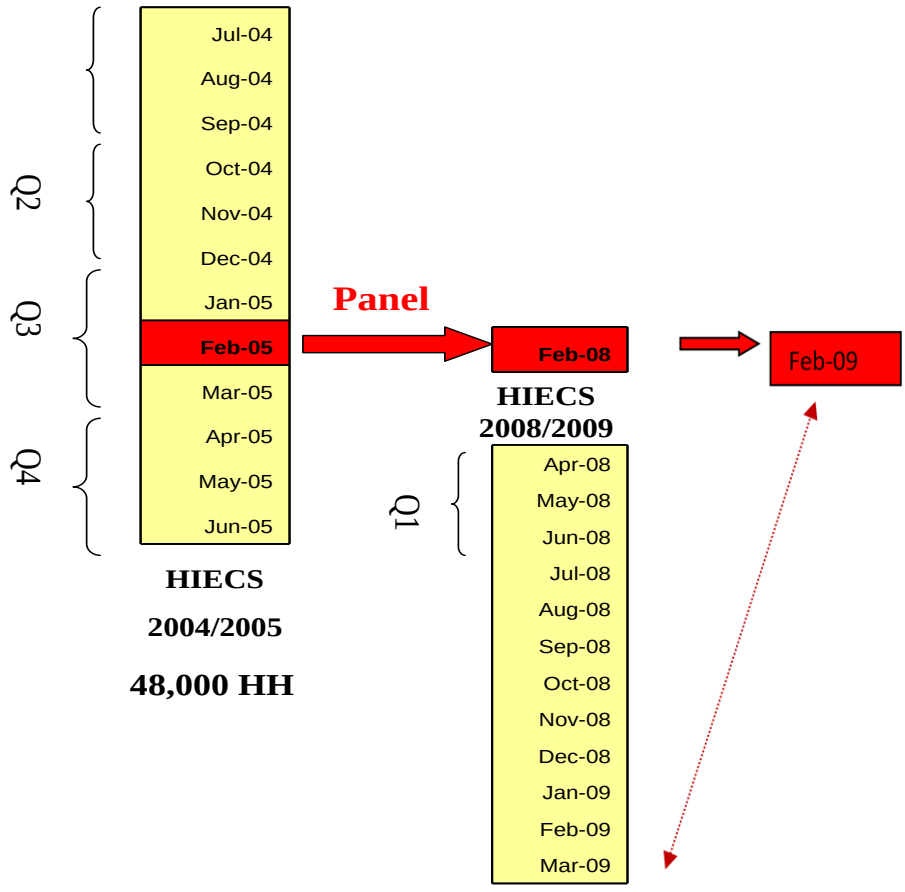
The Sample: HIECPS is a one-month subsample of the households from the full 12-months survey, HIECS 2004/05. The sample of HIECS 2004/05 was based on the 1996 Population Census's updated sample frames of 1,200 area sampling units (PSUs) distributed between urban and rural areas of all governorates. The area sample consists of a number of neighbouring census blocks containing 1,500 households (see CAPMAS), of which 40 are randomly selected for the survey. Thus, the sample is a stratified multistage random sample, nationally and regionally (at the governorate level) representative (all 12 monthly samples of the survey spanning part of 2004 and 2005 are independent). In theory each monthly sample is independent and hence nationally representative. In practice, however, monthly samples are not treated independently, but data collection goes over a quarter, with often filed work for a given month fully completed during a subsequent month in the same quarter. Due to the large sample size of the main survey (48,000 households), even a one-month sub-sample of 4,000 households in principle is large enough to provide representative data at least for main socio-economic groups. This is of course conditional upon: (i) whether February 2005 sample is not systematically different from other months of

the first quarter of 2005[2], and (ii) whether attrition between 2005 and 2008 was not excessively large to undermine the sample properties.

The data used here is panel sample of the full HIECS 2004/05, containing the same (matched) households. The monthly sample of HIECS 2004/05 included about 4,000 addresses drawn randomly in two-stage stratified sample. The number of PSUs was 100 with 40 households on average per PSU. Large PSU size gives rise to significant design effects due to inter-cluster correlations. This makes standard errors larger that in a comparable sample from other countries. Since panel structure where no replacement is allowed means that three samples of 2005, 2008 and 2009 are not fully independent, it is also important to make corrections to standard errors calculated based on standard assumptions.

Out of target sample of about 4,000 CAPMAS has 3,903 valid addresses from February 2005 round. Once they were revisited in 2008, 3,690 participated in the survey, of which 3,553 households were the same (panel) households as interviewed in 2005 and 137 were new households (at the old addresses); 213 households were not found or refused to be re-interviewed in 2008. In 2009, going to the same sample of 2005, CAPMAS interviewers collected data from 3,643 households, of which 3,448 HH were from the panel of addresses as in 2008 and 2005 (but among them 42 HH were new in the old addresses), forming a balanced panel of same households that were interviewed continuously of 3,406 (figure 1).

Figure 1: panel and Main Cross-Section conducted by CAPMAS



[2] One of the characteristics of the sample selection method of CAPMAS's stratified, multistage sample design for 2004/05 is that all PSUs are not represented in each quarter, though the sample in each quarter is nationally representative. The quarterly samples are in turn subdivided into monthly samples, which may happen to be biased.

Correcting for panel attrition. Any panel data suffer from the problem of attrition and aging. Attrition happens when a household that participated in the first round declined to comply with the survey in the subsequent rounds of data collection. Aging occurs when over time panel sample, which by design misses new household formation, loses representativeness. The attrition between 2005 and 2008 was systematic but not large (Table 1), while it was judged that aging over the three-year period was not serious, with limited migration and residential mobility rates observed in Egypt (World Bank 2002). The 2008-2009 wave had even smaller attrition with similar type of profile (urban more educated households had a slightly higher chance to drop out).

Table 1. Structure of the full sample, panel and attrition by region in February sample

Region	Full 2005 sample	Panel sample	Attrition
Metropolitan	18.7	18.5	24.1
Lower Urban	11.7	11.3	21.9
Lower Rural	30.2	31.0	11.0
Upper Urban	10.0	9.7	18.3
Upper Rural	27.3	27.4	24.1
Frontier Urban	1.0	1.0	0.7
Frontier Rural	1.1	1.1	0.0
Total	100.0	100.0	100.0

Source: own estimates based on HIECPS data 2005-2008.

Following the methodology discussed in Kalton and Brick (2000) and in Fitzerald, Gottschak and Moffitt (1998), a simple model corrected for disparities in two stages was applied: first, correcting for differences between the one-month sample and the quarterly (representative) sample; and second, correcting for attrition within the monthly sample of the chosen survey month. At the first stage, probit regression was estimated, with the aim of evaluating the probability *Pi* that the household is participating in February 2008 and then in February 2009 – comparing it to the full sample of the first quarter of 2005.

$$P_i = f\,(region, household\ structure, household\ head\ characteristic, housing\ structure) \quad (1)$$

The regressors used in the probit function included region, household size, number of children, household head's gender, age, education and economic activity, and house type and connectivity to sewerage. The inverse of the predicted probability was used in the weighting of the population.

An additional correction for attrition within February sample was done using the same probit set up. [3] The inverse of the predicted probability of attrition was used to adjust the sampling weight in the February 2008 data. The final weights brought the February panel samples of 2008 and 2009 to the full quarterly sample of 2005. In addition, the field implementation resulted in variations, such as changing some definitions or coding conventions in 2008 compared to 2005, or move from 30-days diary of consumption to 15-days diary in 2009. These factors were investigated and changes made to 2008 and 2009 to make them consistent and comparable; some part of consumption data for 2009 is imputed and for that reason most of this paper which emphasizes continuity over 2005-2009 relies on income data (using fully comparable consumption between 2005 and 2008 as a robustness checks and 2008-2009 consumption for illustrations). Despite these concerns, we conclude that the story we are telling is similar for income and consumption, so lack of strict comparability of consumption between 2008 and 2009 should not be over emphasized.

[3] In this multivariate framework the regional dummies were the most powerful factor determining attrition. Other factors, such as education or age, were also significant, but less so. Overall, the fit was acceptable, and the very low attrition rate of about 5 percent was judged to be sufficient to deal with the bias. Regression results are available on request.

Main living standards indicator. There is the question of the appropriate income concept for mobility analyses, in particular the choice between income and expenditures. The case for income is that this is the only way one can analyse sources of mobility (particularly in order to distinguish between demographic and economic events) which is an important part of our analysis here. Moreover in some contexts income might actually be more accurately reported than expenditures in cases where consumption instrument is overly complex and undergoes changes over time- as was the case in Egypt. Income data were collected with the same forms in all waves of the panel during the last visit to household. In choosing income as main welfare measure for this paper we are fully aware that expenditures are typically a better guide to longer-term well-being of the household (or its 'permanent income') as household will exercise some consumption smoothing and use savings and dissavings to deal with erratic incomes (Deaton, 1997). Moreover expenditures might, in most cases, be more accurately captured, particularly among the poor who have relatively constant and well-known expenditures on relatively few items while their incomes can be very erratic und unpredictable (Ravallion, 1992, Deaton, 1997, Klasen, 2000). In fact in our previous analysis of 2005-2008 dynamics we relied exclusively on consumption.[4] If we are interested in mobility in these longer-term incomes, expenditures are clearly preferred. Here we focus our attention on identification of sources for short-term shocks and recovery from such shocks. For this purpose income is a more suitable indicator. However, since we have access to income and expenditure data we will use both, thereby also pointing to the differences between them which give some indication on the importance of transitory income shocks as well as measurement error issues.

Our unit of analysis is the household and the income variable used is disposable equivalized net income (we use the lower poverty line which varies depending on the region and demographic composition as a deflator). Actual consumption expenditures includes all money spending on consumer goods and services (durables included), and non-monetary parts, such as imputed rents, own production and in-kind transfers received by households. Income includes wages and salaries, cash and in-kind transfers plus income from assets and from agriculture activities as well as from self employment (both farm and off-farm). Transfer and credit expenditure are also included.

Poverty lines. Details of poverty line methodology used in Egypt are described in World Bank (2002), World Bank (2007) and in El-Laithy et al. (2003). Poverty lines are based on valuing (in local prices) the cost of minimum caloric intake, and on using the actual consumption patterns (via regression techniques) to estimate the non-food minimum associated with just meeting the food requirement. The "lower poverty line" used here represents the cost of the minimum subsistence basket comprising food and non-food goods and services assessed using the households whose total expenditures are barely sufficient to cover their food needs (this implies that all non-food items they consume are absolute necessities).

Correction for inflation. Egypt has experienced rapid and instable inflation between 2005 2009. It is therefore important to rely on real values for comparisons over time. The CPI index disaggregated by regions and into food and non-food component was used. The second way was to use the poverty lines for each household re-estimated in actual prices as deflators (consumption is then measured in terms of poverty baskets a household can purchase in the current month, see El Laithy et al.(2003), for methodology).

Cleaning the measurement error. This is done by using a regression of household welfare (measured as consumption or income divided by household specific poverty line) on household size, demographic structure, education and age of household head, female headship, housing assets and location (see World Bank 2009 and El Laithy et al. 2010, forthcoming in World Bank Policy Research Working Papers). We then assess our mobility using these predicted levels of consumption (and income). Clearly, we are thereby throwing away quite a lot of true mobility but this approach should give us sense of the maximum

[4] This was indeed the main living standard indicators used for the Poverty Assessment made by the World Bank in 2007 and for the most recent report "Economic growth, poverty and inequality" (World Bank 2009).

extent to which measurement error may affect expenditures (as also stated in Woorland and Klasen 2002).

2. Economic growth, inequality and poverty in Egypt over 2005-09

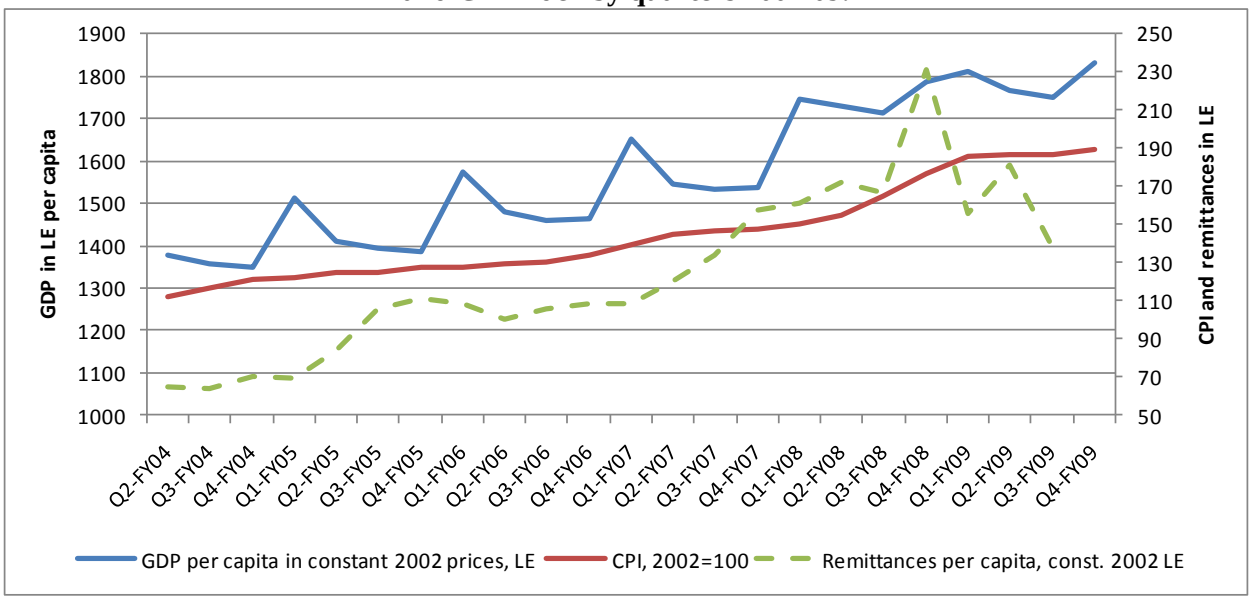
Egypt witnessed rapid and sustained economic growth during 2005-08, with some slow down in 2009. This episode followed a period of economic turmoil (large depreciation of national currency) and slow, at times almost zero, growth in per capita consumption in late 1990s-early 2000s. In contrast, real GDP annual growth averaged 7 percent between 2005 and 2008, leading to an accelerated growth in total final household consumption expenditure. In per capita terms, private consumption grew at an average rate of almost 4 percent per year in this period.

As a consequence of the adverse international environment and the so called triple F-crisis (food, fuel and finance) between 2008 and 2009 Egypt faced a serious slowdown in growth during 2009. Real GDP growth declined from 7% in 2008 to 4.7 % in 2009. In the meantime, inflation accelerated to 20% annually in August 2008 due to increased commodity prices, a high level even for a high inflation country as Egypt. Unemployment rose from 8.4% to 9.4%, and there was 7 percent reduction in employment in manufacturing in the first quarter of 2009 and 15 percent drop in restaurants and hotels sectors – both on front line in terms of exposure to global trends..

Figure 2 shows quarterly data on GDP per capita in real terms and CPI index. Several key economic features are clearly visible. First, Egypt was growing indeed very rapidly- in real 2002 pounds GDP per capita between wave 1 (February 2005, Q3 FY05) and wave 2 (February 2008) of our panel went from 1,400 LE to 1,700 LE. It slowed down during 2008-2009, and in the third wave real GDP per capita was only slightly above its February 2008 level, at 1,750 LE. Second, Egypt had serious seasonality in the economy with the first FY quarter (July-September) in each year characterized by highest output. That seasonal see-saw evolution was visibly affected by the crisis, and the first quarter of FY09 (July-September 2008) has not exhibited a usual spike. Third, inflation was significant and very instable – close to 1 percent per quarter during most of 2005-2006 accelerating to 4 percent per quarter in 2007 and running into 7 -8 percent during Spring and Summer 2008, decelerating in the last period. Finally, the period 2005-2009 witness a rapid growth in remittances (doubling in real terms), their amount remained peaked at 12% of household incomes in Spring of 2008, but then they fell very abruptly.

Several other economic developments are worth a mention here. Inflation over the period was very uneven: prices of food and other basic goods and services increased much faster than other prices. Real GDP per capita is measured using GDP deflator which can deviate from CPI measuring the cost of living. Indeed, it was the case during the entire period, and not only over 2008, despite the underlying food crisis impact on the price level in 2008. Moreover, food component within the CPI was growing much faster than CPI over the entire 2005-2009, affecting strongly the relative cost of poverty basket composed mainly of food. The cost of the minimum food basket increased between 2005 and 2008 by 47 percent (food part of the poverty line), far more than the overall increase in the CPI (31 percent over the three years). Between February 2008 and February 2009 the food basket cost grew by 15 percent and CPI by 13 percent.

Figure 2 GDP and remittances per capita, in constant Egyptian pounds (LE) and CPI index by quarters 2004-09.



Source: CAPMAS. Note: Egyptian FY coincides with US FY quarters; that is February 2005 (first wave) is Q3 FY05, February 2008 (second wave) is Q3 FY08, and third wave February 2009 is Q3 FY09

Our panel is in the unique position of observing changes between the period before the crisis hit and the time considered as the tail of the crisis. The HIECPS data on average consumption for 2005-2009 shows a picture that is similar to what is observed in macro data. Households' real average per capita consumption[5] increased by 12.3 percent between 2005 and 2008 (3.9 percent per year) (details are reported in World Bank 2009) while over 2008-2009 there was a slight fall in the real per capita consumption and income (using CPI price indices- details in forthcoming Word Bank 2010).

3. Poverty and household mobility

Growth in real average household welfare over 2005-2009 translated into poverty reduction, but not at the same rate for everyone. Table 2 presents assessment of poverty changes based on lower poverty line (see World Bank (2007)). The poverty headcount (in terms of expenditures) moved from about 22 percent in 2005 to about 19 percent in 2008. We replicate the headcount in terms of income where "income poor" is defined as an household whose total incomes are below the lower poverty line.

[5] Using CPI index to deflate nominal figures.

Table 2.a. Poverty headcount 2005-2008(in terms of expenditures)

		2008		
		Not poor	poor	Total
2005	Not poor	69.2	9.2	78.4
	Poor	11.9	9.7	21.6
	Total	81.1	18.9	100

Source: authors' calculations based on HIECS panel data

Table 2.b. Poverty headcount 2005-2008 (in terms of incomes)

		2008		
		not income poor	income poor	Total
2005	not income poor	75.11	8.40	85.31
	income poor	10.18	6.31	16.49
	Total	85.3	14.7	100

Source: authors' calculations based on HIECS panel

In line with the overall economic developments (Figure 2) if we look at our sample in 2008-2009, we see a reversed trend in terms of poverty reduction, as expected. Data are presented only in terms of income (see table 3 below)

Table 3. Poverty headcount 2008-2009(in terms of income)

		2009		
		not income poor	Income poor	Total
2008	not income poor	76.39	8.85	85.24
	income poor	5.4	9.36	14.76
	Total	81.79	18.21	100

Source: authors' calculations on HIECS panel data

3.1 Factors of poverty dynamics: what we know about the role of employment

Data from the new panel have been used already to show that having access to income-generating activity is an important factor to avoid poverty (World Bank 2009 and El Laithy et al. 2010)**.** Looking at poverty risks and composition of poverty by employment status over 2005-2008, we demonstrated that there was a significant reduction of poverty risk for the employed. But we were also puzzled by little change in the

employment rate (which stayed at 30 percent) and lack of strong relationship between employment and poverty mobility at the household level. [6]

Slow creation of new jobs during the fast-growth period means that employment and movements out of poverty were not tightly linked. All groups defined by their labor market status experienced similar degree of mobility out of poverty and vulnerability to fall into poverty. Even when we look at the household as a whole, and link movements in welfare with the changes in the employment rate at the household level, we find that having a job is a necessary but not sufficient condition to avoid poverty. In the HIECPS there are households who fell into poverty despite more members becoming employed. Among those who moved "out of poverty," the share of households with increasing employment is only slightly higher compared to those who were "chronic poor".

The panel data also suggest that the quality of the jobs deteriorated over 2005-2008, and we used that to put forward a hypothesis that the lack of association between jobs and poverty is explained by this phenomenon. What makes a difference for welfare of a household is not a job of any kind, but a job with sufficiently high productivity and regularity of income. These properties can be called "quality of jobs." The survey collected data about the "type of job," differentiating between permanent and different temporary jobs. We found that share of employed in permanent jobs decreased from 89 percent in 2005 to 82 percent in 2008[7] and that lower quality of jobs is associated with higher poverty risk.

Working in sporadic jobs also implies high exposure to risks of falling welfare. Occasional and seasonal jobs generate a volatile stream of income for households and can make them more exposed to changes in the economy and therefore more vulnerable to poverty. But at the same time such informal jobs may represent entry points for the poor in the labor markets.

Low quality of jobs could help explain why, in spite of the positive vector of poverty reduction, so many households were found still vulnerable to poverty. The poor quality of the jobs, particularly those held by women, and the high dependency ratio could explain this result. Increased instability of jobs, especially in some growing sectors, is a cause of high exposure to the risk of sharp falls in consumption/income. Remittances have not been analyzed in the context of CAPMAS panel, but some recent work by Egyptian academics (Assaad 2009) demonstrated their rather weak impact on poverty. This was explained by their concentration among the middle class households. Even though this may be a factor that does not directly affect the poor, in our analysis we look at the experience of near-poor, for whom changes in this source of income can play a significant role as factor of upward or downward dynamics.

We will see later if these insights are confirmed in a multivariate analysis setting.

4. The extent of household income mobility

[6] Other sources of data also show that employment over 2005-2008 lagged behind population growth. According to the data from the CAPMAS Labor Force Sample Survey (LFSS), Egypt created 3 million jobs over the period, adding almost 6 percent to the total employment each year. This helped to reduce unemployment rate from 9.5 percent in 2005 to 8.8 percent in 2007/2008. But this is not a big change, and unemployment was stubbornly high due to rapid growth in the working-age population. Indeed, every year in Egypt over one million new potential workers join the labor force; the employment growth during 2005-2008 was barely enough to absorb these new entrants. So what we observe as a stagnant employment share is not due to "aging" of the panel (panels do not include newly formed "younger" households with younger members) as a factor explaining these comparatively poor labor-market outcomes in our data.

[7] Even though there are differences in the definitions, this change in the quality of jobs is confirmed by LFSS data: indeed, among 3 million new employed over this period, one-half had jobs characterized as "sporadic". LFSS also estimates that the share of provisional jobs tripled between 2003 and 2007. The increase in the prevalence of these jobs was particularly pronounced in the agricultural sector and in construction.

There are several ways in which the changes in households' position in the distribution can be summarized. Following Woolard and Klasen (2004), we start by reporting the rigidity indices, more specifically Shorrock's rigidity index using the Gini coefficient -for our various income concepts -to get a feel for the data and the changes over time (Shorrocks 1998, Fileds and Ok 1999, Cowell and Schluter, 1998). The Shorrocks rigidity index is one of the so-called "single-stage indices", which consider the entire distribution in both years and examine mobility using that entire distribution. They have the advantage of using all available information inherent in the actual distributions and thus give the most comprehensive assessment of mobility. They have the disadvantage, however, of being particularly sensitive to measurement error which is a particular problem when data from only two waves are available, as happens to be the case here. The Shorrocks index, which is the least sensitive to the measurement error, is also the best index for international comparisons. This index compares the Gini of the average consumption between the periods with the weighted average of the Gini in each period. It is defined as:

$$R = \frac{G(x+y)}{(\mu_x G_x + \mu_y G_y)/(\mu_x + \mu_y)}$$

where G_x refers to the Gini in the first period, G_y is second period. G(x+y) is a Gini of consumption averaged across two period; μ refers to mean consumption with the same notation.
In the panel data for Egypt these elements are as follows:

Table 4 Rigidity index 2005-2008 using Gini coefficients

		Gini 2005	Gini 2008	Shorrocks
Income	Raw data	0.331	0.346	0.926
	Predicted	0.224	0.228	0.946
Consumption	Raw data	0.306	0.319	0.931
	Predicted	0.209	0.223	0.934

Source: authors' calculations on HIECS panel data

It is important to note from table 4 that there is a difference between inequality and rigidity measured with actual data and cleaned data. Obviously, an extreme approach which removes all "noise" not explained by regressions is producing extremely compressed distributions. Rigidity indices of over 0.9 observed for raw and cleaned data are not pointing to excessive mobility. This compares to 0.95 in EU, 0.9 in Spain, 0.86 in South Africa, 0.83 in Russia (Jovanovic, 2001) – all for 3-year transitions; Hyat (2001) reports values between 0.78 and 0.8 for 2-year panels for Pakistan in late 1980s. The lower the index, the less stability there is; if it is equal to one, there is no mobility, and all stay at the same rank. Based on this data Egypt is not characterized by excessively high mobility. Compared to South Africa, for instance, Egypt represents a much more stable distribution. Moreover, while the various adjustments for presumed measurement error do affect the Gini coefficients considerably, particularly in the case of using predicted consumption, the rigidity index is scarcely affected by any of these adjustments. This seems to suggest that to the extent there is measurement error in the data, it seems to be positively correlated across time and thus only has a muted impact on mobility, which was also, for example, found for longitudinal earnings data in the US (Bound et al, 2001).

While these statistics already tell us quite a lot, we want to unpack mobility beyond this one measure and thus turn to transition matrices for a more disaggregated look. The most commonly used tool to present mobility is the transition matrix. All sample is divided into n equally sized income classes (e.g. deciles).

The matrix shows the distribution of each decile in 2005 by their position in 2008. The mobility matrix for Egypt panel is given in Tables 5 and 6.

Table 5 a. Mobility matrix using consumption expenditures

		2008 welfare (consumption)					
		1	2	3	4	5	Total
	1	**49.92**	23.99	16.21	7.15	2.73	100.00
	2	25.61	**28.75**	24.05	15.41	6.18	100.00
2005	3	16.70	26.18	**25.10**	22.54	9.48	100.00
	4	7.03	17.32	23.50	**30.84**	21.30	100.00
	5	2.43	4.74	11.35	23.25	**58.23**	100.00
	Total	20.34	20.20	20.04	19.84	19.58	100.00

Table 5b. Mobility matrix using predicted consumption expenditures

quintiles of pred_rcons	5 quintiles of pred_rconsl_08					
l_05	1	2	3	4	5	Total
1	59.32	21.03	10.72	6.04	2.89	100.00
2	18.60	41.13	26.31	9.83	4.14	100.00
3	7.93	25.88	37.32	23.63	5.24	100.00
4	4.15	9.99	24.50	38.59	22.77	100.00
5	0.72	1.82	5.69	23.55	68.22	100.00
Total	18.15	19.97	20.91	20.33	20.64	100.00

Mobility matrix is a two stage index. These indices first allocate individuals to income groups (either exogenously fixed income groups or endogenously determined ones like quintiles) and then examines mobility between these groups. This mobility matrix can be compared to several other examples spanning similar number of years. For example, Jovanovic (2002) reports mobility matrices for Russia, Fields *et al*. (2003) for Spain, Indonesia and South Africa, and Luttmer (2000) for Poland, Russia and Hungary. Most importantly, they compare "cleaned" mobility with the raw mobility observed in the original data.

The mobility matrices on predicted values (both consumption expenditures and income) show less mobility, as expected. The matrices for both income and consumption are remarkably similar. It can be seen that 56% (in terms of income, 58% if we look at expenditures) of households who were in the richest quintile in 2005 remained there in 2008 and another 23% moved down just one quintile. Likewise, 45% (for incomes, and 50% in terms of expenditures) of those who began in the poorest quintile were still there 3 years later and another 25% (24%) had moved up just one quintile. It is immediately evident that there is less mobility in the top and bottom quintile than in the middle of the distribution. This is, however, unsurprising given that the bottom (top) quintile can only stay in the same quintile or move up (down); also, furthermore the income range that make up the quintile is much larger for the richest quintile where the right-hand tail is particularly large which is the reason why persistence in that group is particularly high.

Table 6a. Mobility matrix using income

	Income quintiles 2008					
Income quintiles 2005	1	2	3	4	5	Total

1	**44.99**	24.85	17.62	7.95	4.59	100.00
2	27.42	**29.31**	21.10	14.47	7.70	100.00
3	15.62	22.69	**24.48**	26.51	10.71	100.00
4	9.30	16.33	26.09	**26.33**	21.94	100.00
5	3.69	6.35	10.90	23.51	**55.56**	100.00
Total	20.21	19.91	20.04	19.75	20.10	100.00

Table 6b. Mobility matrix using predicted income

5 quantiles of pred_adeqinc_08						
5 quantiles of pred_adeqinc_05	1	2	3	4	5	Total
1	58.14	24.62	9.25	4.13	3.86	100.00
2	25.00	45.56	20.21	6.02	3.21	100.00
3	7.79	20.68	43.02	21.91	6.60	100.00
4	2.24	6.48	24.85	47.56	18.88	100.00
5	0.95	2.27	4.24	21.90	70.63	100.00
Total	18.84	19.94	20.32	20.29	20.62	100.00

Looking at the rigidity index for 2008-2009 (table 7 below), we see a higher rigidity than in the case of 2005-2008. In theory this should not come as a surprise, considering that this wave of the panel is looking at changes over only one year instead of three. However, considering the turbulence experienced by the economy we would have expected a certain degree of mobility observed in the panel. A possible interpretation could be that most of the changes happened in the period that is not observed by the panel, or, alternatively, that as mentioned by previous studies (World Bank 2009), Egypt has always shown a lag in the time the economy is touched by international economic slowdown. In this case, early 2009 might not have captured the full effect of the crisis.

Table 7 Rigidity index 2008-2009 using Gini coefficients

2008-2009		Gini 2008	Gini 2009	Shorrocks
Income	Raw data	0.339	0.329	0.947
	Predicted	0.218	0.215	0.962

Source: authors' calculations on HIECS panel data

The mobility matrix (table 8) using income data confirms the relatively lower degree of mobility in between the two years.

Table 8. Mobility matrix 2008-2009 using income

quintiles income 2008		quintiles income 2009				
	1st the poorest	1	2	3	4	5
	1	60.65	24.8	10.17	3.89	0.49
	2	25.57	36.01	23.93	11.38	3.10
	3	11.44	23.31	29.93	26.06	9.26
	4	3.88	13.47	25.08	35.57	22.00
	5	1.41	4.21	11.12	22.10	61.16
	5th the richest					

5. The determinants of welfare changes: univariate analysis

5.1 Welfare changes over 2005-2008

Following Klasen and Woolard and based on the descriptive statistics presented above, we can affirm that changes in an individual's well-being arise through changes in household income (or expenditures) or "economic events" and/or changes in household composition, which can be referred to as demographic events. This distinction between welfare changes as the result of *economic events* and *demographic events* is often not considered but is of considerable relevance from a policy point of view. Table 9 considers an overview of what is the biggest contributing "event" associated with a movement into and out of poverty.

Table 9 Main events associated with poverty dynamics 2005-2008

	into poverty hh	2005-2008 percentage	out of poverty Hh	2005-2008 Percentage
change in demographics	**197**	76%	**29**	10%
change income	**61**	24%	**257**	90%
change transfers	*4*	2%	***101***	35%
change employment	*17*	7%	*39*	14%
change individual earnings	*40*	16%	*146*	51%
	258	100%	**286**	100%

Source: authors' calculation on HIECS data

Table 9 shows that a staggering 76% of households that fell into poverty did so because of a change in demographic composition, and only 10% of household that came out of poverty did so because of a change in the household demographics – for example by shedding members. The first number is way above what is observed by Woolard and Klasen, while the second is very much below (they report 27 % of cases falling into poverty is linked to change in demographics, and 23 percent of movements out). Structurally it is important that our results are in line with what is reported in other panel studies of similar time dimension which find that demography plays a way bigger role as a factor for getting into poverty than getting out (Jenkins and Riggs, 2001)

For 7% of households a change in the number of members having a job is associated with falling into poverty (for 14 % a change of employment or unemployment share was associated with coming out of poverty). A change in earnings is the most significant single factor associated with the household moving out of poverty – contrary to South Africa results, but very much in line with other countries evidence. This factor is closely followed by transfers and employment.

5.2 Welfare changes over 2008-2009

Table 10 below shows the main events associated with movements of households in and out of poverty for the period 2008-2009. The configuration changes dramatically. This is not a surprise given that there is very little overlap- only 18 households made a transition in both periods. The picture is different from the previous period (2005-2008) in that we see much less impact due to demographic events and an increased importance of the role of employment.

Table 10 Main events associated with poverty dynamics 2008-2009

	into poverty	2008-2009	out of poverty	2008-2009
	Hh	percentage	Hh	percentage
change in demographics	**101**	39%	**21**	13%
change income	**158**	61%	**141**	87%
change transfers	*27*	10%	*87*	54%
change employment	*96*	37%	*21*	13%
change individual earnings	*35*	14%	*33*	20%
	259	100%	**162**	100%

Source: authors' calculations on HIECS panel data

In this case 39% (vs 13%) of households that fell (got out of) into poverty did so because of a change in demographic composition. Note that the small role of this factor for upward mobility is very similar to 2005-08 period. Even though demographics remained as the main factor of falling into poverty, it is now closely followed by 37% of households where a change in the number of members having a job is associated with falling into poverty (and in 13% of the cases with coming out of it). This is not a surprise given that the initial response to the crisis was associated with shedding labor. Now transfers play the main role as an uplifting factor (over one half of the cases). Change in earnings was no longer the significant single factor associated with the households' movement out of poverty.

This high turbulence suggests that we should be looking at the periods separately. Most likely, short-term factors are preponderant drivers of observed dynamics and we should take this into consideration. We will now expand the analysis looking at the whole spectrum of incomes, beyond poverty transitions.

6. Modelling Determinants of Welfare Change: Multivariate Analysis

Based on the approach by Woolard and Klasen (2004), a model of the following form was used:

$$\Delta ln\,(Ei/PLi)=f(Ai, \Delta Ai, Ri, \Delta Ri) \qquad (1)$$

Where

- Ei = real income/consumption of household i
- PLi = Lower Poverty Line for household i
- Ai = physical and human assets of household i
- Ri = a set of characteristics which summarize the economic and demographic environment in which i operates and thus determines the returns to those assets a household possesses

Please note that the term on the left-hand side can be considered as an "adult equivalent" welfare measure (or change in) as the poverty lines contained embedded equivalence scales. Tables 11 and 12 show the variables used in the model and their mean and standard deviation

The regression was estimated separately for urban and rural households and allowed for further segmentation through the use of dummy variables for the gender of the household head.

The first-difference variables include changes in human assets as well as demographic composition and employment changes as they might reasonably be seen as exogenous to the dependent variable. The initial income variable in the regression is a lagged endogenous variable which, given plausible assumptions about the correlation of errors (e.g. positive correlation of errors over time in the reporting of incomes/expenditures) will lead to biased estimates of the coefficients (e.g. Greene, 2000; Fields et al. 2002; Forbes, 2000). As reported above, another main concern about panel data is the risk of reversion to the mean. To address these issues, we are using instrumental variable techniques to predict initial incomes. Instrumental variables approach implies a regression of households welfare on households' characteristics to predict households consumption/income in 2005 and 2008 (and subsequently for 2008 and 2009) (Woolard and Klasen in 2002, see Bound, Brown, and Mathiowetz, 2001 in Handbook of Econometrics). Results of regression used to assess mobility where predicted values are replacing actual observations[8].

[8] Results are available upon request.

Table 11 Means and standard deviations of the variables used in the model for 2005-2008

	Total sample	
	Mean	std dev
Income variables		
change ln (adult equivalent income)	0.074	0.019
ln adult equivalent income 2005	0.487	0.030
change ln (adult equivalent consumption)	0.097	0.019
ln adult equivalent consumption 2005	0.346	0.028
Human Capital variables		
Household size	5.320	0.073
share of children in the hh	0.347	0.005
share of female adults in hh	0.277	0.003
share of male adults in hh	0.298	0.004
average educational level in the hh	2.562	0.027
age of hh head	46.513	0.333
Segmentation variables		
Female headed hh	0.101	0.006
Physical capital variables		
Home ownership	0.812	0.018
Labor market variables		
share of persons in the hh with jobs	0.370	0.007
share of unemployed persons in hh	0.022	0.002
Change variables between 2005 and 2008		
change in hh size	-0.118	0.053
change sex hh head	0.070	0.005
change in share children in hh	-0.031	0.003
change share female adults	0.007	0.002
change share male adults	-0.002	0.003
change average education	0.047	0.008
change share employed persons in hh	-0.007	0.007
change share unemployed persons in hh	0.005	0.002
Total observations	3553	
number of strata/psu	6/101	

Sample clustering

Table 12 Means and standard deviations of the variables used in the model for 2008-2009

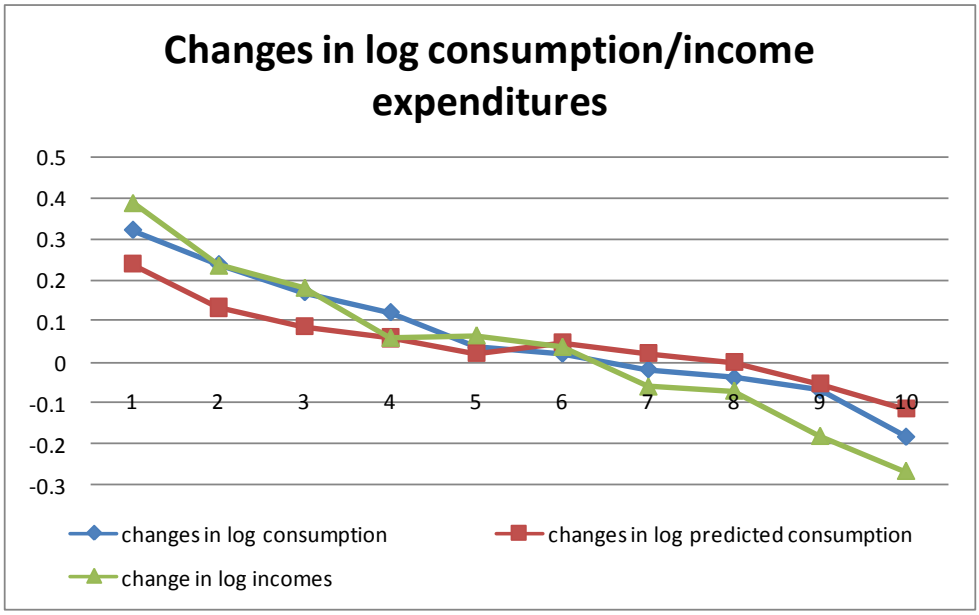
	Total sample	
	Mean	std dev
Income variables		
change ln (adult equivalent income)	-0.073	0.015
ln adult equivalent income 2008	0.552	0.027
Human Capital variables		
Household size	5.216	0.072
share of children in the hh	0.318	0.005
share of female adults in hh	0.283	0.003
share of male adults in hh	0.297	0.004
average educational level in the hh	2.604	0.027
age of hh head	47.904	0.362
Segmentation variables		
Female headed hh	0.110	0.008
Physical capital variables		
Home ownership	0.820	0.017
Labor market variables		
share of persons in the hh with jobs	0.365	0.008
share of unemployed persons in hh	0.027	0.002
Change variables between 2008 and 2009		
change in hh size	-0.034	0.028
change sex hh head	0.067	0.005
change in share children in hh	-0.023	0.004
change share female adults	-0.020	0.003
change share male adults	-0.016	0.004
change average education	0.067	0.013
change share employed persons in hh	0.018	0.006
change share unemployed persons in hh	-0.005	0.002
Total observations	3340	
number of strata/psu	6/101	

Multivariate analysis, 2005-2008

Table 13 presents the results for the income expenditures change regressions and table 14 presents the same model run separately for rural and urban households. The models both fit at reasonable (yet not very high) level. Many of the initial conditions variables as well as of the change variables have a significant impact on income change. The 2005 income coefficient is negative, suggesting a strong tendency towards the mean (or convergence of adult equivalent incomes). Thus the higher adult equivalent income was in 2005, the more likely the household was to experience a drop in welfare over the three year period. This appears to be consistent with typical findings about measurement error which also tend to produce regression towards the mean (Bound et al, 2001). We examine this issue further by replicating the regressions on predicted values (see figure 3). Findings are fairly consistent with the actual values so it is not unreasonable to think that, to the extent the model fits the data, it does reasonably free from large

measurement errors. Instead what we observe is a recovery process from temporary shocks that affected the position of household in the initial observation point.

Figure 3. Weak convergence of both income and consumption expenditures (by 2005 deciles)



Source: authors' calculations on HIECS data

While interpreting reported in table 13 and 14 it is important to keep in mind that our income variable is log of household income divided by its household-specific poverty line. It is equal to zero when the household is exactly at the poverty line, and other factors kick in that determine household mobility into and out of poverty (initial conditions, demography and income events). With that observation in mind we can see already emerging several important implications for household income dynamics.

Among the human capital and household composition variables, we find that large initial household sizes reduce adult equivalent income in urban and rural areas. This suggests a demographic poverty trap with large households having greater difficulty in improving their economic position. Household composition affects mobility similarly in rural and urban areas. High *initial* education and *change* in education significantly improves upward mobility in both urban and rural areas. This represents evidence of a second poverty trap, this time associated with education. While improving education is a way out of poverty, those who started with low education will have an additional hurdle to overcome.

Table 13 Determinants of change in ln adult equivalent income

Number of strata = 6	**Number of obs = 3553**	
Number of PSUs = 101	**Population size = 50048.964**	
Design df = 95		
F(20, 76) = 32.00		
Prob > F = 0.0000		
R-squared = 0.2954		
	total sample	
	coeff	std error
Income variables		
ln adult equivalent **income** 2005	**-0.478*** **	0.040
Human Capital variables		
Household size	**-0.052*** **	0.012
share of children in the hh	-0.064	0.073
share of female adults in hh	**-0.298*** **	0.070
share of male adults in hh	-0.227**	0.072
average educational level in the hh	**0.200*** **	0.020
age of hh head	0.005	0.007
Segmentation variables		
Female headed hh	-0.040	0.027
Physical capital variables		
Home ownership	-0.006	0.034
Labor market variables		
share of persons in the hh with jobs	-0.072	0.065
share of unemployed persons in hh	**-0.458** **	0.157
Change variables between 2005 and 2008		
change in hh size	**-0.072*** **	0.009
change sex hh head	0.040	0.027
change in share children in hh	0.052	0.076
change share female adults	**-0.222** **	0.065
change share male adults	**-0.385*** **	0.078
change average education	**0.138*** **	0.022
change share unemployed persons in hh	**-0.373** **	0.111
change share employed persons in hh	**0.267*** **	0.051
constant	0.163	0.145
Total observations	3553	

Table 14. Determinants of change in ln adult equivalent income-urban and rural areas

urban		rural	
Number of strata = 4	Number of obs = 1479	Number of strata = 3	Number of obs = 2150
Number of PSUs = 44	Population size = 21805.201	Number of PSUs = 59	Population size = 28984.59
	Subpop. no. of obs = 1439		Subpop. no. of obs = 2114
	Subpop. size = 21531.612		Subpop. size = 28517.352
	Design df = 40		Design df = 56
	F(20, 21) = 19.57		F(20, 37) = 18.92
	Prob > F = 0.0000		Prob > F = 0.0000
	R-squared = 0.3308		R-squared = 0.3061

	urban		rural	
Income variables				
ln adult equivalent income 2005	coeff	std error	coeff	std error
Human Capital variables				
Household size	-0.064***	0.013	-0.045**	0.016
share of children in the hh	-0.052	0.122	-0.08	0.102
share of female adults in hh	-0.449***	0.108	-0.149	0.100
share of male adults in hh	**-0.265****	0.084	**-0.307****	0.113
average educational level in the hh	0.208***	0.029	0.174***	0.027
Segmentation variables				
Female headed hh	0.023	0.040	-0.053*	0.029
Physical capital variables				
Home ownership	0.056	0.041	-0.004	0.061
Labor market variables				
share of persons in the hh with jobs	-0.035	0.090	0.056	0.098
share of unemployed persons in hh	**-0.498*****	0.171	-0.358	0.314
Change variables between 2005 and 2008				
change in hh size	**-0.082*****	0.010	**-0.064*****	0.013
change sex hh head	**0.089***	0.042	**0.025**	0.034
change in share children in hh	-0.033	0.101	0.094	0.110
change share female adults	-0.368**	0.102	-0.073	0.080
change share male adults	-0.316**	0.091	-0.458***	0.115
change average education	0.126***	0.033	0.126	0.029
change share employed persons in hh	**0.294*****	0.071	**0.296*****	0.076
change share unemployed persons in hh	**-0.408****	0.124	-0.270	0.228

Source: authors' calculations on HIECS panel data

Turning to the segmentation variables, it appears that female headed households are not significantly different from male-headed households. A change from a female-headed to a male-headed household is associated with an increase in consumption or income in both urban and rural areas, but this change is not significant. The age of the household head was also not significant.

The unemployment variables came in very strongly, with large and significant coefficients. Both the initial state variables and the change variables were important predictors of change in welfare. While the change variables are eminently plausible, the initial conditions variables are more worrying. They suggest that households with large numbers of unemployed are finding it more difficult to improve their incomes subsequently. The initial number of people employed however, does not seem to affect changes in welfare particularly, or at least not to the same extent of the level of unemployment. This is consistent with our initial assessment coming from a descriptive approach and basic tabulations of the panel data from our previous work (World Bank 2009) in terms of employment status and job characteristics. It also indicates a high presence of informal jobs within the households, or anyway low-quality or low-paying activities.

This is further confirmed by the fact that levels of employment do not seem to be significant both in urban and in rural areas. These results are fairly consistent if we use consumption as a welfare measure instead of household income (table 15 and 16). More generally, when we look at consumption as a welfare measure, there is a similarly strong negative effect of initial expenditures, suggesting strong regression towards the mean. This indicates that expenditures vary not by much less than incomes over time, suggesting that households are not able to smooth consumption very successfully. Moreover, we also find the poverty traps associated with having a large household, being poorly educated, and having few employed people in the household in the initial period hold in both cases. These results were also consistent with predicted data (results available on request).

Table 15. Determinants of change in ln adult equivalent consumption

Survey: Linear regression		
Number of strata = 6 Number of obs = 3553		
Number of PSUs = 101 Population size = 50049		
Design df = 95		
F(17, 79) = 26.24		
Prob > F = 0.0000		
R-squared = 0.2762		
total sample		
	coeff	std error
Expenditures variable		
ln adult equivalent consumption 2005	**-0.435*** **	0.044
Human Capital variables		
Household size	**-0.051*** **	0.009
share of children in the hh	-0.023	0.059
share of female adults in hh	**-0.216*** **	0.059
share of male adults in hh	-0.193**	0.063
average educational level in the hh	**0.169*** **	0.021
Segmentation variables		
Female headed hh	-0.034	0.023
Physical capital variables		
Home ownership	-0.021	0.035
Labor market variables		
share of persons in the hh with jobs	**-0.144***	0.059
share of unemployed persons in hh	**-0.499****	0.143
Change variables between 2005 and 2008		
change in hh size	**-0.073****	0.008
change sex hh head	0.040	0.025
change in share children in hh	-0.025	0.063
change share female adults	-0.150	0.060
change share male adults	**-0.412*** **	0.070
change share employed persons in hh	0.097*	0.045
change share unemployed persons in hh	**-0.332****	0.105
constant	0.241*	0.094

Source: authors' calculations on HIECS panel data

To conclude, several types of poverty traps (as defined by Woolard and Klasen in their work) emerges separately in this multivariate framework, this too consistent with the South Africa findings. Many households might be subject to all these traps at the same time as they have a large household, poor average education, and a high share of unemployed in 2005 (but not always a low share of employed, which might relate to the quality of jobs available or obtained). Conversely, the great importance and significance of the change variables point to the possibility of poor households to escape poverty. The most important factors that help are improvements in education and employment, and a reduced number of households' members.

Table 16. Determinants of change in ln adult equivalent consumption-urban and rural areas

Number of strata =	4	Number of obs =	1479	Number of strata =	3	Number of obs =	2150
Number of PSUs =	44	Population size =	21805.201	Number of PSUs =	59	Population size =	28984.6
		Subpop. no. of obs =	1439			Subpop. no. of obs =	2114
		Subpop. size =	21531.612			Subpop. size =	28517.352
		Design df =	40			Design df =	56
		F(17, 24) =	20.85			F(17, 40) =	18.53
		Prob > F =	0.0000			Prob > F =	0.0000
		R-squared =	0.2976			R-squared =	0.3143

	urban		rural	
	coeff	std error	coeff	std error
Income variables				
ln adult equivalent consumption 2005	**-0.441*** **	0.054	**-0.543*** **	0.064
Human Capital variables				
Household size	**-0.069*** **	0.011	**-0.042** **	0.014
share of children in the hh	0.113	0.081	-0.006	0.08
share of female adults in hh	-0.249**	0.078	-0.086	0.086
share of male adults in hh	-0.117	0.094	-0.231**	0.077
average educational level in the hh	**0.201*** **	0.029	**0.122*** **	0.025
Segmentation variables				
Female headed hh	0.01	0.04	-0.037	0.025
Physical capital variables				
Home ownership	0.042	0.042	0.003	0.069
Labor market variables				
share of persons in the hh with jobs	-0.167*	0.082	0.001	0.084
share of unemployed persons in hh	-0.335*	0.146	-0.402*	0.211
Change variables between 2005 and 2008				
change in hh size	**-0.088*** **	0.009	**-0.064*** **	0.011
change sex hh head	0.065	0.045	0.038	0.029
change in share children in hh	-0.074	0.072	-0.024	0.092
change share female adults	-0.072	0.091	-0.007	0.064
change share male adults	-0.157*	0.078	-0.391***	0.098
change average education	**0.123** **	0.149	**0.096** **	0.027
change share employed persons in hh	0.136*	0.056	0.171**	0.062
change share unemployed persons in hh	**-0.335***	0.146	-0.104	0.136

Source: authors' calculations on HIECS panel data

Multivariate analysis, 2008-2009

Results for the multivariate analysis in the second panel period (which was run again on both income and consumption and on predicted values) confirmed the evidence of poverty traps found in the previous panel. Demographic factors are still important, in particular household size, even though there is no evidence of the segmentation variable against female members of head of households (table 17)

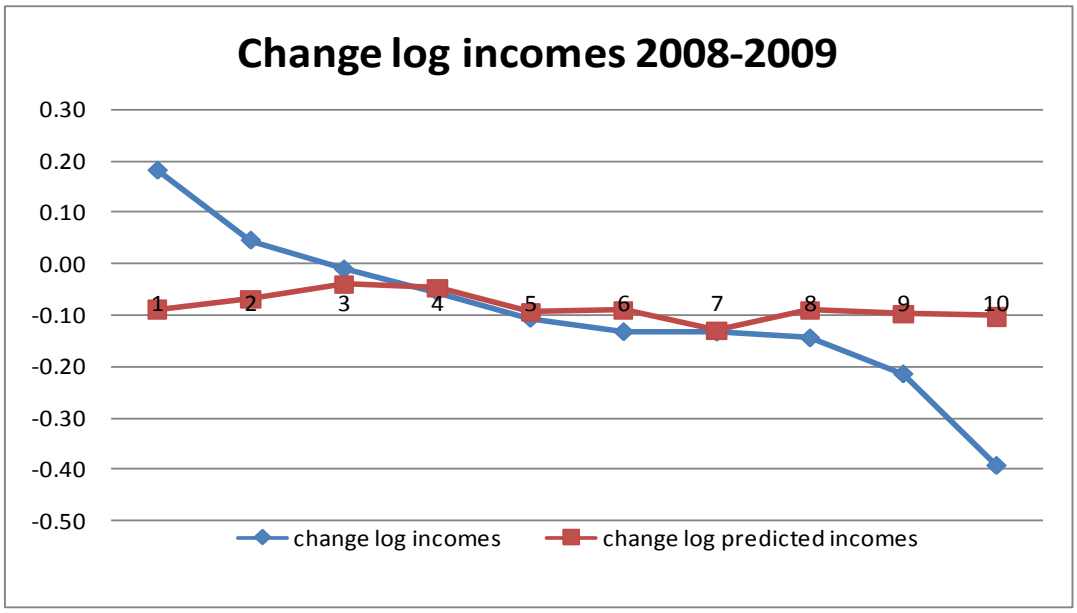
Table 17. Determinants of change in ln adult equivalent income 2008-2009

Number of strata = 6	Number of obs = 3340	
Number of PSUs = 100	Population size = 31659.931	
	Design df = 95	
	F(20, 75) = 22.86	
	Prob > F = 0.0000	
	R-squared = 0.3155	
	coeff	std error
Income variables		
ln adult equivalent **income** 2008	**-0.416*** **	0.026
Human Capital variables		
Household size	**-0.046*** **	0.007
share of children in the hh	0.017	0.109
share of female adults in hh	-0.134*	0.067
share of male adults in hh	**-0.258*** **	0.063
average educational level in the hh	**0.167*** **	0.022
age of hh head	0.008	0.005
Segmentation variables		
Female headed hh	0.007	0.025
Physical capital variables		
Home ownership	-0.003	0.021
Labor market variables		
share of persons in the hh with jobs	0.078	0.054
share of unemployed persons in hh	-0.362**	0.109
Change variables between 2005 and 2008		
change in hh size	**-0.087*** **	0.011
change sex hh head	-0.008	0.027
change in share children in hh	-0.114*	0.050
change share female adults	*-0.137**	0.056
change share male adults	-0.099**	0.054
change average education	**0.059** **	0.024
change share employed persons in hh	**0.245*** **	0.053
change share unemployed persons in hh	**-0.363*** **	0.095
Total observations	3340	
Number of strata/psu	6/101	

Source: authors' calculations on HIECS panel data

The initial level of education is still very important as it is the initial level of family members without a job. It is noticeable however that while in the period of growth 2005-2008 there was evidence of weak convergence, meaning a more pro-poor growth process (if not necessarily an equalizing process), in 2008-2009 the effect of the slowdown has affected negatively most of the distribution, which shows a declining welfare from almost all deciles (see figure 4).

Figure 4. Slowdown of income (by 2008 deciles)-real and predicted



Source: from authors' calculations on HIECS data

Table 18. Determinants of change in ln adult equivalent income 2008-2009 for urban and rural areas

urban			**rural**		
Number of strata = 4	Number of obs = 1373		Number of strata = 3	Number of obs = 2042	
Number of PSUs = 44	Population size =20036.514		Number of PSUs = 59	Population size = 27669.229	
	Subpop. no. of obs = 1333			Subpop. no. of obs = 2007	
	Subpop. size = 13893.132			Subpop. size = 27204.997	
	Design df = 40			Design df = 56	
	F(20, 21) = 15.31			F(20, 36) = 13.44	
	Prob > F = 0.0000			Prob > F = 0.0000	
	R-squared = 0.3539			R-squared = 0.3296	

	urban		**rural**	
Income variables	coeff	std error	coeff	std error
ln adult equivalent income 2008	**-0.425*** **	0.034	**-0.469*** **	0.038
Human Capital variables				
Household size	**-0.058*** **	0.010	**-0.043*** **	0.008
share of children in the hh	0 .099	0.119	-0.021	0.088
share of female adults in hh	-0.040	0.086	-0.233*	0.095
share of male adults in hh	-0.191	0.025	-0.039**	0.090
average educational level in the hh	**0.174*** **	0.021	**0.141*** **	0.021
Segmentation variables				
Female headed hh	0.048	0.040	-0.016	0.028
Physical capital variables				
Home ownership	0.062*	0.025	-0.012	0.031
Labor market variables				
share of persons in the hh with jobs	0.020	0.068	0.244**	0.066
share of unemployed persons in hh	-0.431**	0.137	-0.375*	0.191
Change variables 2008-2009				
change in hh size	**-0.124*** **	0.015	**-0.066*** **	0.013
change sex hh head	-0.022	0.046	0.009	0.030
change in share children in hh	-0.119*	0.069	-0.125*	0.065
change share female adults	-0.126	0.078	-0.163*	0.068
change share male adults	-0.190*	0.082	-0.004	0.071
change average education	**0.099*** **	0.029	0.002	0.022
change share employed persons in hh	0.301**	0.087	**0.299*** **	0.066
change share employed persons in hh	-0.419**	0.097	-0.375*	0.191

7. Concluding remarks

In this paper we analyzed the determinants of household income mobility in Egypt between 2005 and 2009. Following the approach by Woolard and Klasen (2004), we look at income mobility both in a univariate and multivariate setting. We found Egypt had a fair degree of mobility but not too high by developing countries standard (higher however than many industrialized countries). We find that the patterns of mobility into and out of poverty are dramatically different between 2005-2008 and 2008-2009 reflecting a change in the economic environment.

Our analysis of events associated with a risk to fall into poverty change in demographics (increase in the household size or dependency rate) play a prominent role. This is fairly robust factor of negative income dynamics that can be identified and addressed by the safety net programs. Private transfers on the other hand play a major role as a springboard out of poverty. The environment of economic crisis with losses of employment affected strongly the flow into poverty over 2008-2009. On the other hand larger role of earnings rather than employment in other periods and other transitions suggest the dominant role of quality of jobs rather than employment per se for reducing poverty in Egypt.

Among the main determinants of income mobility, demographic factors such as household size seemed to be important and they could be considered as an evidence of poverty trap (it appears more difficult for large households to escape poverty). The average level of education in the households results also important, both in levels and in terms of changes. The role of labour market came also very strongly in the results, with both changes in employment and unemployment having the expected sign and high significance. However, while the level of unemployment seems also important (together with changes in it), the level of employment seems less important, underlying the presence of low quality jobs held by many household members. The results were similar between the two periods of time (2005 and 2008 and 2008-2009) with the main difference appearing only in the dynamics of changes, with the first period, of economic growth showing evidence of weak convergence to the mean and the second period of economic slowdown which seemed to have affected (negatively) all the parts of the distribution pretty much in the same way.

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