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# The Pathways out of Poverty in Rural Indonesia – an empirical assessment

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**PRELIMINARY DRAFT! NOT FOR CIRCULATION OR QUOTATION!**

## Summary

Since most poor live in rural areas, primarily engaged in low productivity farm activity, the pathway out of poverty must be strongly connected to productivity increases, whether they are realised in farming, rural non-farm enterprises or via urban migration. By utilizing the IFLS panel dataset for 1993 and 2000 from Indonesia, this paper shows, using empirical techniques, which pathways out of poverty were most successful in Indonesia's past. Our findings suggest that the increased engagement of rural farmers in rural non-farm enterprises is a key way to alleviate rural poverty.

## Acknowledgements

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## 1. INTRODUCTION

In light of the Millennium Development Goals, an increasing debate in development economics has focused on the measures necessary to achieve rapid poverty reduction. Whilst the past is not necessarily always a good guide to the future, knowing a bit more about the pathways through which poverty has been reduced in the past may give some useful insights into the approaches which may prove most effective in the future. It remains a fact that most poor live in rural areas and are primarily engaged in low productivity farm activity. Hence, the main pathway out of poverty must be strongly connected to productivity increases of the rural poor, whether they are realised in farming, rural non-farm enterprises or by urban migration. Indonesia gives for a particular interesting case study for multiple reasons. Firstly, it experienced high and sustained economic growth; secondly, it is large enough to display spatial and sectoral diversity, and thirdly, it has rather extensive micro-panel-datasets (IFLS, 1993 & 2000) which allows a detailed investigation.

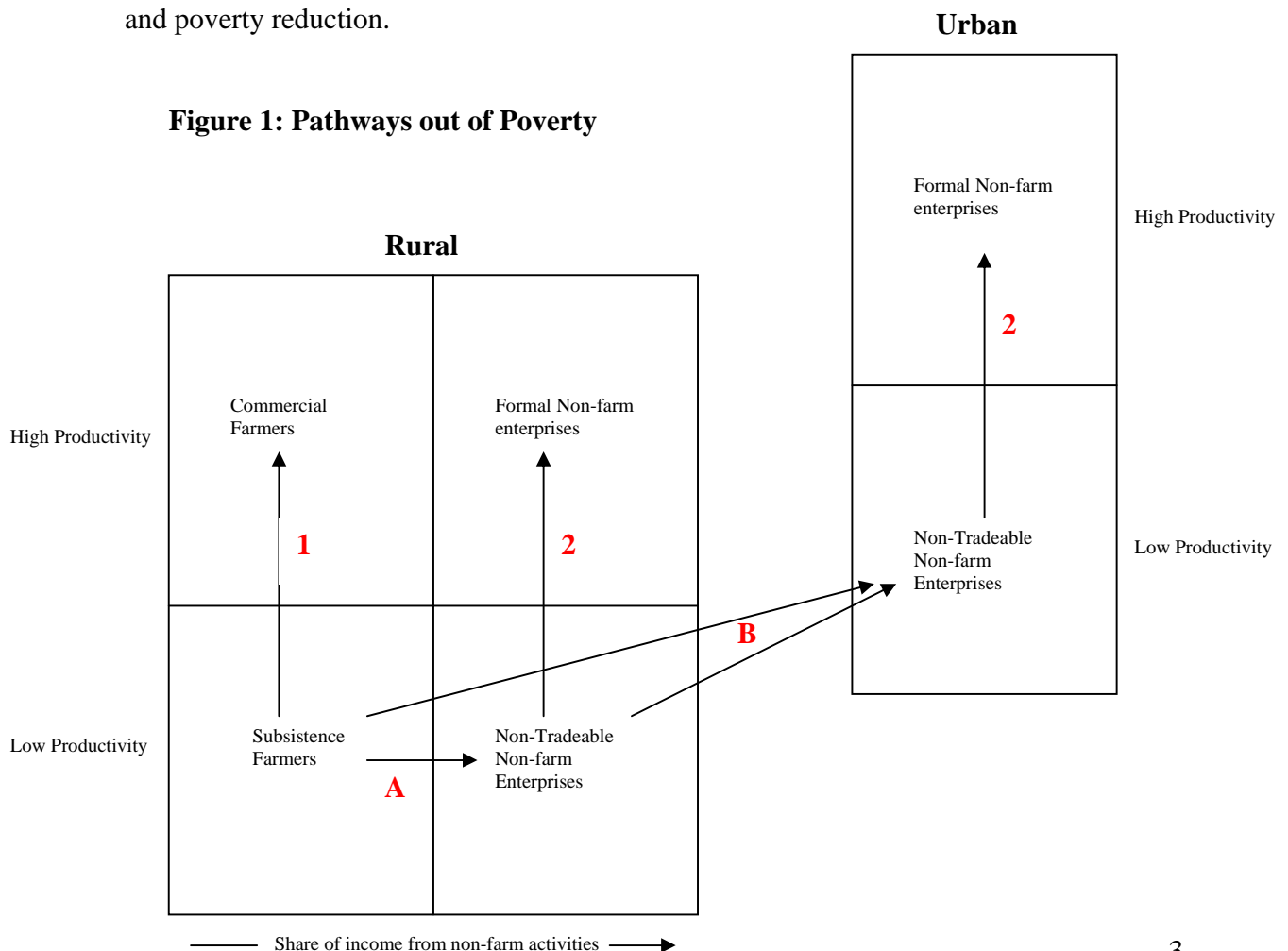
There has been a growing literature over the past ten years that focuses on the role of non-farm enterprises as engines of rural development and income growth. The main discussion in this literature centres on the question if non-farm enterprises are merely an insurance activity for poor local farmers against crop failure or whether they are, or potentially can be - given the absence of certain constraints, a source of dynamics, facilitating growth and poverty alleviation, in particular, in rural areas. In turn, this literature is strongly connected to the considerable efforts of recent years to understand the nature of pro-poor growth which inevitably must encompass the rural poor and their potential pathways out of poverty (theoretical: Johnston and Mellor, 1961; Mellor, 1996; Foster and Rosenzweig, 2004; empirical: Lanjouw and Lanjouw, 2001; Datt and Ravallion 1996, 1998, 2002, etc.).

This paper contributes to this discussion by empirically assessing the individual income development and poverty in Indonesia over time, employment sector and space utilising mainly the Indonesian IFLS panel datasets 1993 and 2000, as well as SUSENAS data. The paper is structured as follows, section 2 will describe the conceptual background and reviews some of the existing theoretical and empirical literature, section

3 consists of descriptive statistics, aggregate macro and micro evidence. Section 4 analyses the IFLS panel data and discusses the results, before we conclude and draw some policy implications in the final section.

## 2. CONCEPTUAL BACKGROUND AND REVIEW OF THE LITERATURE

Since the early works of Lewis one of the main questions in development economics has remained the nature of “structural transformation” and the dynamic growth path a developing economy must engage to enter a phase of sustained growth and thus rapid poverty reduction. Various elaborate models have been developed which describe the nature and the dynamics of such a rapid development process from all conceivable emphasizes and points of view. However, a very simple framework that identifies two key pathways out of poverty and the two associated “transitions”, as laid out in figure 1, is implicitly common to all models concerning “structural transformation” and poverty reduction.



There are arguably two paths out of poverty, firstly, the move from subsistence farming to commercial farming. This includes both intensification through raising productivity of food crops, as well as diversification into higher value crops whether food or non-food. This also includes those who exit poverty by gaining better paid employment on such commercial farms (Pathway 1). Secondly, the increase of the productivity and profitability of non-farm enterprises or benefiting from others doing so by finding better paid more formal employment in such enterprises (Pathway 2).

Moreover, there are also two “transition phases” which individuals may go through to reach the second route out of poverty. Firstly, a shift out of subsistence agriculture towards petty trading and manufacturing as well as local non-tradeable service provision (Transition Path A). Alternatively, rural-urban migration – which can come both from households currently engaged in subsistence agriculture and those currently engaged in petty trade, manufacturing and services (Transition Path B).

## LITERATURE REVIEW

Given the complex nature of the development process we believe that this simplification of development dynamics allows us to identify the key drivers behind poverty reduction which is an interesting academic exercises in itself, but most importantly inherently useful for policy makers. All of the pathways described above have received extensive attention in the literature either theoretically, empirically or both. Due to the limited space we will focus on few articles which highlight the role of agriculture and rural non-farm enterprises in the Asian pro-poor growth context.

There does seem to be widespread agreement in the literature on the basic linkages connecting agriculture and overall economic growth that were first articulated to a general economics audience by Lewis (1954) and Johnston-Mellor (1961). At a conceptual level, these linkages have long been part of the core of modern development theory and practice (Timmer, 1988; 2002; Tiffin, 2004). Establishing the empirical value of these linkages in different settings has been a cottage industry since the early 1970s (Byerlee, 1973; Mellor and Lele, 1973; King and Byerlee, 1978; Hazell and Roell, 1983;

Haggblade, Hammer and Hazell; 1991, Hazell and Haggblade, 1993; Timmer, 1997; Delgado, Hopkins and Kelly, 1998; Fan, Hazell and Thorat, 2000; Fan, Zhang and Zhang, 2002; Fan, Thorat and Rao, 2004). Virtually all of these studies conclude that the “agriculture multiplier” is significantly greater than one, especially in relatively closed, “non-tradable” economies of the sort found in rural Africa, where the multiplier is often between 2 and 3. But even in the more open economies of Asia, where border prices can be reasonably stable in the face of significant changes in domestic agricultural output, the agriculture multiplier is close to 2 in the early stages of agricultural modernization when productivity gains are the fastest. Because economic growth usually has a direct impact on poverty, any contribution agriculture makes to speeding overall economic growth through these large multipliers will, in most circumstances, also directly contribute to reducing poverty (Dollar and Kraay, 2002; World Bank, 2004a).

An additional set of linkages makes growth originating in the agricultural sector tend to be more “pro-poor” than it would be if the source of growth came from the industrial or service sectors (Mellor, 1976; Ravallion and Datt, 1996; Ravallion and Chen, 2004; Timmer, 2002). New agricultural technologies that improve farm productivity strengthen this connection. Separate reviews by Thirtle, et al. (2004) and by Majid (2004) confirm the strong empirical link between higher agricultural productivity and poverty reduction. One explanation for more rapid and pro-poor economic growth of agricultural productivity gains as compared to urban bias is provided by Mellor’s model of agricultural growth, rural employment and poverty reduction that emphasizes the role of the rural non-tradable sector in pulling underemployed workers out of agriculture into the non-agricultural rural economy. The Mellor model explicitly integrates manufactured export performance (the source of much dynamism in East Asia’s economies since the 1960s) and the non-tradable sector in the rural economy (which includes a wide array of local agro-processing) to explain subsequent reductions in poverty. This model, drawing on Mellor’s earlier work in India (Mellor, 1976) and more recently in Egypt (Mellor, 2000), explains why countries with substantial agricultural sectors that experienced rapid growth from labour-intensive manufactured exports had such good records of overall economic growth and poverty reduction.

Understanding of the determinants of poverty and the mechanisms for reducing it in a sustainable fashion has undergone a quiet revolution in the past decade. Part of this understanding is the recognition that economic growth is the main vehicle for reducing poverty, but for this to work the distribution of income must not deteriorate too sharply. In many circumstances, growth in the agricultural sector has been an important ingredient in the formula that connects economic growth to the poor (Ravallion and Huppi, 1991; Ravallion and Datt, 1996; Ravallion and Chen, 2004; Sumarto and Suryahadi, 2003; Fan, Zhang and Zhang, 2004; Fan, Thorat and Rao, 2004; Timmer, 1997, 2004b).

Furthermore, with more open trade possibilities, low prices for staple cereals in world markets, and population growth slowing, the size and relevance of these linkages are no longer so clear. Agriculture must be dynamic and profitable if it is to help reduce rural poverty, and growing staple cereals has not been a source of dynamism in rural economies for two decades. A profitable agriculture with rising productivity will now depend on diversification into crops and livestock with better demand prospects than for cereals, and into production for the agri-business sector, which can add value through processing and enhanced consumer appeal.

## CONNECTING THE RURAL ECONOMY TO POVERTY REDUCTION: THE ASIAN EXPERIENCE

A close reading of the four Asian country studies for the pro-poor growth project (World Bank, 2005) suggests three fundamentally different, and inconsistent, stories about the role of agriculture in pro-poor growth. First, the Indian case study by Besley, Burgess and Esteve-Volart (BBEV)(2004) argues on the basis of an enormously rich data set and very sophisticated econometrics that agriculture has played a minimal role at best in India's reduction of poverty. This result directly contradicts earlier, and seminal, findings by Ravallion and Datt (1996, 1998 & 2002). The Bangladesh case study (B. Sen, Mujeri and Shahabuddin, 2004) and Vietnam case study (Bonschab and Klump, 2004) each argue that agriculture played a large and crucial role in poverty reduction, but for highly idiosyncratic reasons based on unique initial conditions and domestic institutions.

Agriculture was important to pro-poor growth in both countries, but that role cannot be generalized to other countries.

The Indonesian case study (Timmer, 2005) argues that conscious policy stimulus to agriculture was the key to the country's 30-year record of rapid, pro-poor growth (from 1967 to 1997), and that the model of smallholder agricultural development used by Indonesia is quite general. The Indonesian model is explicitly set in the broader historical literature on the role of agriculture and economic development that has been generated by successful countries not burdened with highly skewed land distributions as a starting point for their development (Johnston and Mellor, 1961; Hayami and Ruttan, 1985, Timmer, 1988, 2002).

Finally, to add to the confusion, Ravallion and Chen (2004) report that nearly all of the remarkable reduction in poverty in China between 1980 and 2001 was the result of agricultural growth specifically and diversified rural economic growth more broadly. They can find very little impact from growth in urban industrial and service sectors on reductions in the headcount poverty index (or the poverty gap or squared poverty gap).

Thus, the key question is, "what would the Asian poverty record look like if these countries had ignored their agricultural sectors?" Posing the counterfactual in this fashion is rather sobering, for it suggests that the "agriculture does not matter" results are missing an important part of the historical story. The very ambitious analysis by Smith and Urey (2002) of the relationship between agricultural growth and poverty reduction in India since 1950 shows very clearly the important investments and policy attention to reaching India's rural poor through institutional and technical change in agriculture. This attention before the Green Revolution established an environment in which the new technologies could have widespread impact on both the rural and urban poor.

Finally, asking about the role of agriculture in pro-poor growth seems to be asking the question in too narrow a fashion. All four of the country studies, and the Ravallion-Chen study of China, note (sometimes just in passing) that the rural non-farm economy has been (or in the case of Vietnam, could be) an important mechanism for connecting the poor to economic growth. It is here that the linkages among agricultural growth per se, overall economic growth, and the connection of the poor to that growth, become



crucial, for most of these linkages are likely to be transmitted via the rural non-farm economy (and via changes in food prices for economies that are not totally open to world markets or which might be “large” actors in those markets, such as the countries in Asia under review). The World Bank review of the Bangladesh rural non-farm sector (World Bank, 2004b) has an especially clear framework for understanding these linkages, and measuring their empirical relevance in Bangladesh. A similar review is underway in Indonesia.

It is clear that rural non-farm enterprises are particularly pro-poor, as they tend to use factors of production at their real opportunity costs to the economy, so they are often labour intensive in nature, reducing underemployment, help smooth income seasonally and bid up local wages. Additionally, small and medium enterprises generate more employment per unit of capital than big firms; in general, wages in the non-farm sector are higher than in agriculture, so the low productivity residual activities do not seem to dominate this sector. Furthermore, they often produce low quality goods that are consumed by the poor, which benefit by obtaining local goods at lower prices, rather than expensive imports. Although the distributional impact of non-farm employment is not entirely clear, the non-farm sector seems to be mostly inequality reducing, as it might be the only possibility for low skilled workers to increase their incomes (Lanjouw and Lanjouw, 2001).

A reader from outside Asia, seeking lessons for Latin America or Africa from these five countries, would be excused for being totally confused. Gains in food crop production, stimulated by government investments, subsidies to inputs, and guaranteed output prices, were the initial basis for pro-poor growth in all these countries. But now those same policy instruments are counterproductive both for growth and the poor. Agriculture needs to restructure into a diversified and commercialized sector that will have little direct impact on the poor, even through food prices. At this stage, especially in India and Indonesia, agriculture’s main impact on poverty is more likely to come through its support for a dynamic rural non-farm economy, which will be a bridge for the rural poor to cross on their way to jobs in the formal economy.

This role does not show up in the econometric tests of agriculture’s contribution to poverty reduction, for two reasons. First, this “new” agriculture is still largely nascent,

and hence does not appear in the statistical record very clearly. Second, the impact will be through the linkages and multipliers that have been hard to conceptualize, model and estimate, because they depend so crucially on local conditions and institutional context. That does not mean that the role of agriculture in pro-poor growth has diminished to the point of being irrelevant. It does mean that agriculture's role must be understood in the context of multi-sectoral and general equilibrium frameworks, not through a sectoral lens alone.

The CGE model developed by Foster and Rosenzweig (2004) attempts to do this. It models the rural economy as a three-sector economy encompassing agriculture, non-farm non-tradable goods and services and non-farm tradable goods. Income growth is realised in two main ways: either by the increase in agricultural productivity due to technological change or by increasing urban or world demand for manufactured goods produced in rural areas. So both sources of productivity growth, agriculture and increased non-farm activities, can raise income and alleviate poverty. The main prediction of the model is that increased demand for manufactured goods can be the most pro-poor change, as it both raises income and reduces local and spatial inequality. Empirically they also show, using panel data from India, those regions with the slowest growth in agricultural high yielding varieties experienced the greatest increase in the rural non-farm tradable sector. This is because capital is mobile and seeks low wage opportunities in the agriculturally poorer regions. In other words, those rural areas, which did not manage to raise incomes due to agricultural productivity increases, found their productivity growth in the non-farm sector.

Datt and Ravallion (1998) report rather different, but compatible, results. They confirm empirically that the main source of poverty reduction in Indian states was agricultural productivity growth or divergence from the trend non-farm output growth. Moreover, the initial endowment with human and physical infrastructure is found to be a crucial precondition for the long run impact on poverty reduction in India, as they can be seen as a prerequisite for the success of non-farm enterprises. Their findings would suggest that a policy focus on agricultural productivity growth should alleviate poverty across the board as long as non-farm enterprise constraints from infrastructure and human capital are mitigated. However, it might be harder to raise agricultural productivity

growth in certain regions of the world than it is to alleviate the constraints facing non-farm enterprises. The Rural Investment Climate Assessment of the World Bank in Indonesia is currently investigating those possible constraints.

In summary, the literature suggests that the rural economy is far from being passive and stagnant, merely producing primary products for the rest of the economy. In most developing countries rural non-farm output accounts for roughly half of rural income. Despite the fact that some non-farm activity is surely of the low-productivity insurance type (and important to the poor for that reason), it is equally clear that the rural non-farm sector often enjoys greater potential for growth in income than the agricultural counterpart. This is especially true for rural regions that enjoy high levels of physical infrastructure and human capital, as such regions can reach higher productivity levels due to effective demand for their goods and services. We argue that this rise in productivity in the non-farm sector is a key factor in alleviating poverty, as is clear in the case of Indonesia.

### **3. EVIDENCE ABOUT PATHWAYS OUT OF POVERTY**

Figure 1 presents an empirical challenge. To understand what have been the most important paths out of poverty it would be useful to know how many people there are in each of the cells of the diagram and how many of them managed to move from one cell to the other, and by how much they improved their welfare, given their personal characteristics. Leaving aside the distinction between low and high productivity for the moment, Table 1 shows the numbers of people working in agriculture and outside of agriculture utilising the SUSENAS<sup>4</sup> surveys in 1982, 1993 and 2002 as a very crude estimate using the biggest dataset available.

The macro evidence of the SUSENAS survey suggests a remarkable movement out of agriculture over the last twenty years. The share of workers in agriculture dropped from 54% in 1982 to 45% in 2002. Moreover, there has been an even more marked fall in the share of workers in rural non-agriculture; the major growth has been in the share of workers working outside agriculture in urban areas which has more than doubled in 20

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<sup>4</sup> SUSENAS is the national household survey conducted by the Indonesian Government

years. This suggests that migration to urban areas may have been as important as shifts between sectors as a driver of changes in the structure of employment. However, it is not quite clear how many of the former rural centres have been reclassified as Urban as results of the administrative reforms, but presumably the most likely candidates are vibrant rural non-farm centres. Hence, it is likely that there is an upward bias in “urban migration” as some of the alleged migration is due to urban reclassification of former rural areas.

**Table 1. Employment<sup>5</sup> in Agriculture and Non Agriculture**

	1982		1993		2002	
	N (000)	%	N (000)	%	N (000)	%
Agriculture	30,487	54.24	39,137	49.88	39,035	44.92
Non Agriculture	25,724	45.76	39,329	50.12	47,874	55.08
Rural	15,939	28.36	18,992	24.20	16,785	19.31
Urban	9,785	17.41	20,337	25.92	31,088	35.77
All sector	56,211	100	78,466	100	86,909	100

Source: Susenas, 1982, 1993, 2002

Note: exclude Aceh, Maluku, North Maluku and Papua

Moreover, Table 1 presents the aggregate numbers of people working in agriculture and non-agriculture in rural and urban areas – it does not directly tell us about the numbers of people moving from agricultural to non-agriculture. Although these figures are suggestive about the pathways which may be the most important, they are not definitive since all that is shown is the net position rather than the actual flows themselves. Unfortunately, the SUSENAS surveys prior to 2004 did not have a panel element so it is impossible to observe directly the number of workers shifting sector. Furthermore, the lack of a panel element does not allow us to identifying the key characteristics that allowed individuals to increase their welfare by shifting sectors. In other words, the aggregate evidence tells us nothing about the micro-economic determinants, - most notably education, location, etc. - of sectoral employment shifts and

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<sup>5</sup> Employment is defined as self employed without help, self employed with help of householders/temporary workers, self employed with help of regular workers, employees and family workers with age 10 years and over (definition until 1997). Definition of employment since 1998 is the same as above, but persons 15 years and above.

implied welfare gains. For more definitive results on this panel data is needed which is explored below.

## DATA

To explore the microeconomic determinants of exiting poverty requires a panel data set over a reasonable length of time. Fortunately, the Indonesia Family Life Survey (IFLS) was first conducted in 1993 (IFLS1) and then again in 1997 (IFLS2), 1998 (IFLS2+) and finally in 2000 (IFLS3). For IFLS1, 7,224 households were interviewed with data collected on 22,000 individuals in those households. This sample represents about 83% of Indonesian population in 13 provinces. In 1993, IFLS did a face to face interview with the household head, the spouse, a sample of their children and a sample of other household members. In 1997, 94% of IFLS1 households were re-interviewed consisting of all 1993 “main” respondents and all 1993 household members born before 1967. In 2000, IFLS managed to re-contact 95.3% of IFLS1 households interviewing: all 1993 “main” respondents, all 1993 household members born before 1967 and a sample of other 1993 household members. The sample size in 2000 was 10,400 households and 39,000 individuals.

The IFLS collects data at two levels:

1. Information collected at the individual and household levels consisting of:
  - a. consumption, income and assets
  - b. education, migration, and labour market outcomes
  - c. marriage, fertility and contraceptive use
  - d. health status, use of health care and health insurance
  - e. relationships among co resident and non co resident family members
  - f. processes underlying household decision-making
  - g. transfers among family members and inter-generational mobility
  - h. participation in community activities
2. Detailed information from the communities in which IFLS households are located including:
  - a. physical and social environment
  - b. infrastructure
  - c. employment opportunities
  - d. food prices
  - e. access to health and educational facilities

- f. the quality and prices of services available at health and educational facilities

Unfortunately, the 1997 data on sectoral employment and migration were not published – thus for our analysis we will use only data from 1993 and 2000.

Our overall aim is to understand the determinants of movements out of poverty considering sectoral and location shifts. For this reason, the panel used for our analysis consists of the individuals who were between the ages of 15 and 55 in 1993 and were working. For these individuals we have an estimate of their income<sup>6</sup>, individual, household and community characteristics, as well as whether they shifted sector of employment and whether they moved location. This sample selection and the connected methodology chosen is the only feasible way to track individuals, their characteristics, and their associated income level over time; and thus to answer the question at hand: namely, what kind of individuals with what characteristics, used which pathway to increase their income. There are two main caveats associated with this choice; firstly the sample used for analysis does not account for the unemployed as well as newcomers to the labour market, i.e. individuals which entered the labour force after 1993. Secondly, the subsequent regressions are focused on individual earnings of main household members. Poverty is clearly a phenomenon that is experienced at the household level since in most household there is some pooling of resources within the household. However, other studies show that most poverty transitions occur due to changes in income of key household members. Thus, keeping those caveats in mind and given the data available and the question asked, we deem our sample choice the most reasonable. This restricted sample of earners in 1993 between 15 and 55 is the underlying sample for all the subsequent analysis.

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<sup>6</sup> The IFLS collected data on individual income. This is calculated as the sum of gross profit, net profit, and wages. Combining these attributes too much income to individuals since, for some households, multiple members will contribute towards the profits from a household enterprise. We therefore tested for the possible biases which this might impact. In addition calculations were done using individual income sources (wages, net profits, gross profits) to test the robustness of the results. The main findings were not altered substantially, the results are available on request.

## POVERTY LINE

The poverty line used for all the analysis below is derived from the 2002 BPS poverty line.<sup>7</sup> For 1993 BPS also calculated a poverty line, but they use a methodology which is rather different than that used for the calculation of the 2002 poverty line.<sup>8</sup> To ensure that the poverty line in 1993 represents the same purchasing power as that in 2000, the easiest approach would be to take the 2002 poverty line and deflate it using the provincial consumer price index (CPI) published by BPS. However, the published CPI uses a set of weights for its subindices which are heavily weighted in favour of wealthy consumers in urban areas.<sup>9</sup> This provides a bias in the CPI which is particularly inappropriate for the analysis that we wish to do. In particular, since food prices rose more quickly than other prices over the period and the poor have a much higher share of their expenditure on food than the better off, the published CPI understates the inflation experienced by the poor over this period. When this downwards biased CPI is used as a deflator for the poverty line, it produces a poverty line that is too high in 1993 and implausibly high measured levels of poverty. For this reason we re-weighted the individual commodity group indices from the CPI published for each province using the expenditure shares for each commodity group of the bottom quintile in 1996. All subsequently reported real figures are deflated utilising the method described above.

## DESCRIPTIVE ANALYSIS

Table 2 shows some of the key variables from the panel for 1993 and 2000.<sup>10</sup> Firstly the mean real income among our sample rose between 1993 and 2000, but only by around 3.5%. However, as is often the case with income data, the mean is distorted by high outliers. We therefore calculate median real income too. This is a little more than half mean income in both years and grew by only 12.5% over the 7 year period.

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<sup>7</sup> This uses a variant of the Bidani and Ravallion (??year) methodology for calculating poverty lines – see ?? for details.

<sup>8</sup> The BPS methodology for the calculation of the poverty line changed in 1996.

<sup>9</sup> For example, the CPI share on food is 34% [check??] – the food share of the bottom quintile is 66%. A detailed account of this problem is to be found in Grimm and Günther (2006)

<sup>10</sup> Table A1 in Appendix 1 provides a detailed listing of the all the variables used in the analysis as well as their definitions. Tables A2 and A3 in Appendix 2 provide summary statistics for all variables.

**Table 2: Descriptive Statistics for IFLS 1993 and 2000 Sample**

Variable N=4797	Mean in 1993	Median in 1993	Mean in 2000	Median in 2000
Real income	194,658.6	95904	201,686***	107916
Age	37,11	36	45,03***	44
Years of Schooling	5,91	6	6,40***	6
Household Size	4,83	5	5,83***	6
Urban	0,35		0,42	
Non-farm	0,68		0,66	

Note: Sample is individuals between the age of 15-55 in 1993 and earning income in 1993. Means in 2000 marked by \*\*\* denotes statistic significantly different mean to 1993 sample at the 1% significance level. All summary statistics calculated using individual probability weights for 1993 and 2000 respectively

Secondly, the number of years of education also rose from 5.9 to 6.4 over the seven years of the panel, suggesting that some of the younger members of the panel continued education between 1993 and 2000. Demographic changes are also clearly illustrated: the average household size increases by one over the period of the panel with a shift towards more adults in the typical household as the children grow up.

Many of the panel respondents have also moved to urban areas. In 1993 35% of respondents lived in urban areas – in 2000, 42% did – a striking change in only 7 years. Finally, the overall share of respondents working outside agriculture has remained almost unchanged at around two-thirds over the period<sup>11</sup>. However, individual sectors have seen significant change most notably the share of respondents in manufacturing declined from 15.5% to 10.7%, whilst those working in social services rose from 14.8% to 19.6%, reflecting the impact of the crisis and the growing informal service economy.

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<sup>11</sup> The larger proportion of people living in urban areas compared to Table 1 SUSENAS figures is about 10%, but at least partly plausible given that the IFLS dataset excludes the most rural provinces and that our restricted sample does not include people which don't declare any earnings, however, the suspicion of an urban bias in the IFLS dataset or a rural bias in the SUSENAS can not be completely dismissed. Furthermore the constant share of people in non-farm enterprises as compared to increasing and lower share of non-farm employment in the SUSENAS dataset is again partly plausible mentioned for the reasons above and the plausibility that the younger Indonesians are moving more into the non-farm enterprise sector, but are excluded from our IFLS sample.



## INCOME GROWTH

Table 1 above inferred the rates of sectoral growth and migration from the aggregate data. However, with the IFLS panel it is possible to directly calculate income growth for individuals who were working in particular sectors or regions. Table 3 shows the median income growth for individuals according to whether they lived in rural or urban areas and whether they worked in agriculture or outside of agriculture for 1993 and 2000. Table 3 shows an intriguing story of how income and income growth is associated with sectoral transition and rural-urban migration. Firstly, when one examines the incomes of each group in 1993, the dramatic impact of both urban location and work outside of agriculture is evident: agricultural workers earn around half the income of those working outside agriculture in both rural and urban areas; similarly rural workers (whether farm or non-farm) earn little more than half the income of workers in the same sector in urban areas.

Consider how the typical worker in each group fared. The vast majority of rural farm workers in 1993 continued to be rural farm workers in 2000 and saw their real incomes decline by 12%. Almost all of those who moved out of farming in rural areas did so by moving to non-farm activities in rural areas; these individuals saw their real incomes rise by more than a quarter. So few of these individuals moved to urban areas that we do not place any confidence on the income growth figures for these transitions. However, we note that real income fell by 8% between 1993 and 2000 for this, the poorest category of worker, with only those that shifted out of agriculture managing to increase their incomes significantly.

Workers who were already working outside agriculture in rural areas in 1993 were already much better off than their agricultural counterparts. Around 70% of these workers stayed in the same sector, seeing their incomes rise by 10% over the period. However, more than a fifth of these workers fell back into the agricultural sector and experience a sharp reduction in their real incomes as a result. By contrast a small number managed to obtain non-farm work in urban areas – in fact these workers did not fare particularly well, their incomes fell by 10%, but it is worth noting that those that managed to migrate to non-farm jobs in urban areas started out with incomes 60% higher than the

median income for rural non-farm workers in 1993. The handful of individuals who found work in the agricultural sector in urban areas saw their incomes collapse, but again we treat this result with caution given the very small number of individuals involved.

Urban agricultural workers are the smallest category in our sample. Almost half of these workers stayed in the same sector and managed to maintain their real incomes, thereby doing considerably better than rural agricultural workers over the same period. Over a quarter managed to obtain work outside agriculture still within the urban area thereby raising their incomes further. More than a fifth moved back into rural areas, but doing so was associated with substantial declines in income regardless of whether they went into farming or non-farming activities. Intriguingly it tended to be the better off urban farmers who moved back to rural areas.

Finally, the majority of the richest group, urban non-farm workers, stayed in this category and experienced a 7% fall in their real incomes, probably associated with the economic crisis of the late 1990s. An unlucky 5% of this group shifted to urban agricultural activities and saw their income fall by 39%. A further 5% shifted back into rural areas whilst staying in non-agricultural activities – this group saw its income rise by 25%. (A handful of others shifted back into rural agriculture – by coincidence all of these individuals report zero income in 2000, but once again we interpret this result with caution given the small numbers involved.)

Overall how should we interpret these results? Three themes appear to emerge. Firstly, for the poorest who are mostly employed in rural agriculture, getting out of agriculture was key to increasing their incomes. Only a handful of these individuals were able to migrate to urban areas – but almost a fifth escaped from agriculture and in doing so substantially increased their incomes. Conversely, for those that had already escaped agriculture, moving back into agriculture was a sign of distress – all shifts back into agriculture from non-agricultural employment were associated with major income collapses.

Secondly, most of those who migrated to non-farm jobs in urban areas were already doing non-agricultural jobs in rural areas and tended to be amongst the better off non-farm rural workers. But only 6% of rural non-farm workers managed to move to urban areas – whilst almost a quarter fell back into agriculture.

Thirdly, movements from urban non-farm employment to rural non-farm employment appear not to be associated with distress. This suggests that these better off workers may move back to rural areas voluntarily for the purpose of investment in their home areas.

## POVERTY TRANSITION

The income growth table shows what happened to incomes. But this does not necessarily translate into movements in and out of poverty. To evaluate this Table 4 shows a detailed poverty transition matrix between 1993 and 2000, disaggregated by rural and urban as well as agricultural and non-agriculture. The poverty of individuals is of course determined by the level of welfare of their whole households. We therefore determine the poverty status of individuals who were aged between 15 and 55 in 1993 and were earning income by whether the per capita expenditure of their households fell above or below the poverty line.<sup>12</sup>

Consider first those individuals who were working in rural agriculture in 1993 and came from poor households. Over 80% of these individuals stay working in rural agriculture, but more than half of the households from which they come still managed to exit from poverty. The remaining fifth or so moved out of rural agriculture and, more often than not out of poverty too.

Individuals from poor rural households who worked off-farm in 1993 were substantially more mobile. A little less than a fifth stayed poor in rural non-agricultural activities, whilst a further 18.5% stayed poor but shifted to agriculture, but 14% managed to exit poverty through this route. However, two-fifths moved out of poverty whilst staying in rural non-farm activities. Although more of these individuals moved to urban areas than individuals who were working in agriculture, it was still fewer than 10% of this group who moved to urban areas, and only half of those that did so exited poverty.

Around half of the urban agricultural poor stayed poor – most of them continuing to work in urban agriculture. But 21% exited poverty whilst continuing to work in urban agriculture. Of the 30% who shift to non-agricultural activities in urban areas, more than

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<sup>12</sup> The definition of the poverty line is mentioned in the section above

half exited poverty. The poor in urban non-agricultural jobs showed much less sectoral and geographical mobility – with 90% staying in the same sector and in urban areas. Half of these individuals exited poverty.

One can also look at Table 4 from the perspective of the vulnerability of falling into poverty. Individuals working in rural agriculture who came from non-poor households had a roughly one-in-five chance of falling into poverty. Almost all of those who did so, staying working in the same sector. Again those in non-agricultural pursuits in rural areas exhibited more sectoral mobility, but with a rather lower probability (14.5%) of falling into poverty. One intriguing finding is that there appears to be a high degree of sectoral movement in and out of agriculture amongst the non-poor in rural areas with around a fifth of the non-poor in rural agriculture moving into non-agricultural activities and a similar share moving in the opposite direction. This sectoral switching also occurs for the poor working outside agriculture, 32% of whom switch back into agriculture, but not for the poor working in agriculture who are much less likely to switch out of agriculture. This points to constraints for the poor in exiting agriculture. It also suggests that agriculture may be a “fall-back” option for those working in non-agricultural jobs in rural areas.

The non-poor in urban agriculture were the most sectorally mobile group. Only 41% stayed in urban agricultural work. Around a fifth fell into poverty – most often in the same sector and location. But a quarter stayed out of poverty by shifting to non-agricultural jobs in urban areas, whilst a further fifth moved back to agriculture in rural areas without falling into poverty. By contrast, the non-poor working in non-agricultural employment were the least mobile group. Over three-quarters stayed in the same location and sector; of the 13% that did fall into poverty, the vast majority did so without changing sector or urban location.

It is useful to stand back and consider the key lessons from these results. We emphasize four:

1. Most of the rural agricultural poor who exit poverty do so whilst staying in rural agriculture. Moving out of agriculture is hard – moving to urban areas for this group is extremely rare.

2. For the poor, rural non-agricultural activities are a transitory stepping stone – either out of poverty in rural areas (for the majority), or back to agricultural poverty (for a sizeable minority). Urban migration plays a role, but a minor one.
3. Non-agricultural activities in urban areas are by far the most stable, perhaps because the earnings are so much higher in urban areas that the poor prefer to stay in the hope of a good job; or perhaps because it is difficult for poor urban workers to move or return to rural areas.
4. Over this period, the chances of exiting from rural poverty were actually higher than the chances of exiting urban poverty. However, the chances of falling back into poverty were much higher (20%) for those involved in agricultural work than those in non-agricultural jobs (around 13.6%).

Many of the transition paths described above are strongly determined by the individual characteristics of workers which are not considered above. The following section explores the importance of these characteristics (as well as the characteristics of the families from which they come) on income growth and movements out of poverty.

#### **4. MICRO DATA ANALYSIS**

##### **LEVELS OF INCOME AND POVERTY IN 1993 AND 2000**

In order to identify the determinants of income mobility it is crucial to follow individuals and their earnings over time, which can be only accomplished by utilising a panel dataset. However, before we turn to a micro-growth regression framework we will follow the most common methodology and regress log real personal income using OLS on multiple explanatory variables to identify the determinants of the level of real income in 1993 and 2000 respectively. Despite the well known methodological limitations of endogeneity, omitted variable bias and/or unobserved heterogeneity, etc. we deem the OLS level regression still highly informative to gain a better understanding of the correlates, if not determinants, of real income levels. Table 5 shows the results of log real

income in 1993 and 2000 regressed on a combination of individual, household, geographic and employment characteristics.

This is followed by a logit regression in which the probability of being poor or non-poor is determined by the same characteristics which determined personal income. As mentioned above, our sample is restricted to individuals who were aged between 15 and 55 in 1993 and earned an income; their poverty status is determined by whether the per capita expenditure of their households fell above or below the poverty line. The poverty line used was the BPS provincial rural and urban poverty lines for 2002 deflated to 1996 prices. Table 5 shows OLS regressions of log real income on a set of explanatory variables for both years.

Several variables are strongly associated with log real income and behave as expected considering the theoretical background. Real income increases with age but with a declining rate. A person who was one year older in 1993 received on average 6.59 percent more income and 10.3 percent in 2000 (although this later results is in part due to the aging of the panel). Male income is an astonishing 44% higher than female income in 1993 even when age and education are taking into account. (Again this gap widens as the panel ages as younger women marry and have children reducing their individual income.) Years of schooling, as expected, has a strong effect with each additional year of schooling raising the level of real income by 8.7 percent in 1993.

Household level variables also have an impact. Workers who were part of a large household gain on average 6.1 percent more income in 1993 for each additional family member. But having a larger number of children below the age of 5 seems to lower real income. This effect almost cancels the positive effect of household size suggesting that any advantage of having a larger household is lost once one takes small children into account. Interestingly the number of men in a household effects average real income negatively – having more adult males living in the same household may be an indication of poverty (reflected in low individual income) even if their presence in the household boosts household income.

Geographical variables have an extremely strong impact on income. Individuals in urban areas in 1993 earned on average 24 percent more than similar workers in rural

areas<sup>13</sup>, but this differential had fallen to 5.6 percent by 2000. This is consistent with the results from Table 3 showing that rural income growth was faster than urban income growth over this period, primarily because of the economic crisis in 1998. There are also wide variations between incomes in different provinces. Relative to Jakarta, incomes are lower in all provinces with the most pronounced income gaps in 1993 occurring in DiYogyakarta, South Sulawesi, Lampung, Central Java, and East Java. This changed dramatically in 2000 as Jakarta was badly hit by the crisis, reducing the income disparity between it and the other provinces.

Economic and sectoral variables also have an influence. Deriving income predominantly from wages does appear to raise income slightly, but the effect turns negative and is usually not statistically insignificant in 2000. Working more hours also increases income – but the effect is rather small. By contrast there are large sectoral differences in income. Working primarily in the non-farm sector boosts real income in 1993 by 44.8 percent relative to agricultural activities, although this advantage declined to 26.5 percent in 2000. If one looks at the specific sectors of employment there are large disparities relative to agriculture - Finance (72%), Mining Quarry (72%), and Social Services (60%) display particularly large differentials. These differences were substantially reduced between 1993 and 2000 due to the poor performance of many of these sectors relative to agriculture over this period.

It is not surprising that the logit poverty regressions confirm and strengthen our OLS regression results as can be seen in table 6 below. Even though we determine the poverty status by being per capita household expenditure poor and not individual earning poor these two concepts are strongly linked in particular if the sample is restricted to income earners. Hence, as we expect, being older and more educated reduces on average the chance of being poor. Unsurprisingly, now household size clearly displays a positive probability of being poor as does the number of children below the age of five. Being male increases the probability of being poor, which is consistent with the results above, as most females in Indonesia might earn individually less than males even after controlling for characteristics, but they are often the secondary earner in the household,

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<sup>13</sup> This difference is likely to be overstated since real income is deflated by provincial CPI which is based upon the prices in the provinces main city.

thus their probability of being household expenditure poor is most likely lower, given that the sample is restricted to earners. Interestingly this positive probability disappeared until 2000 suggesting that either males managed to increase their earning situation considerably or that women lost out comparably.

Living in urban areas increase the probability of being poor in both 1993 and 2000, but the higher coefficient on the 2000 urban dummy suggests that the probability of being poor has increased for those living in urban areas. However, these results have to be interpreted to some extent in combination with the sectoral employment variable which reduces the probability of poverty considerably with respect to agriculture in particular in the 1993 sample. A further conformation of our results above, which suggested a weaker but improving income position of the provinces with respect to Jakarta, is that the probability of being poor increases in the provinces, but that this probability declined between 1993 and 2000.

The level regressions above confirm many of the expected and hypothesized links from the literature between personal, household, sectoral and regional characteristics as determinants of income and poverty. However, they can't tell us much about the dynamics of income and poverty for which we need micro-growth models or difference regressions which utilize panel datasets to identify the determinants of income and poverty change.

## MICRO GROWTH OR DIFFERENCE REGRESSIONS

The above estimation looks at the determinants of income levels. But what are the determinants of income change? We estimate a difference regression on initial characteristics and changes in those characteristics. In particular we are interested to see if the change of sector has an important impact upon income growth.

First to notice is that log real income has a negative coefficient implying a faster growth rate for the initially poorer or in other words conditional income convergence, after controlling for all the other characteristics, which is a common finding in the literature. Even more interesting is that we even find absolute convergence of income as shown in table 8 regression (3) below implying declining income inequality, as the



coefficient on initial log real income is negative and highly significant implying that the initial poorer, no matter what their characteristics, had subsequent higher income growth<sup>14</sup>.

In table 7 the inclusion of an interaction term of migration and initial income (PmoveIniY, KmoveIniY, KmoveIniY) lowers the initial income coefficient only slightly in regressions (2) and (4). Furthermore, older (3.8% average higher growth rate per year but declining with rising age, - negative age2 coefficient) and male workers (44%) experienced significantly higher average income growth than female and younger workers. People with higher working hours in 1993 experienced higher subsequent income growth, probably reflecting a more formal occupation. Interestingly, the negative coefficient of the change of working hours suggest that people who increased their working hours suffered from lower income growth. One possible interpretation is that people with particularly strong income decline tried to compensate by working over-proportionally to cushion their income loss. Being educated in 1993 also contributed positively to the subsequent income growth. The variable years of schooling is highly significant and robust, suggesting that schooling raised subsequent income increases (around 6% higher average income growth rate per extra year of schooling) no matter what the sectoral employment of the individual.

Taking a closer look at the household characteristics it seems to be the case that individuals of larger households which have many children and male members seem to experience subsequent less income growth which often should outweigh the positive impact of having a larger household in general. As suggested above this might reflect the fact that having more adult males and more small children living in the same household may be an indication of poverty and reflects low individual income level, but also lower subsequent income change.

Obviously, it is important to control for regional variation especially in such a diverse country setting as Indonesia. However, the coefficients on the regional dummies only display regional specific effects after controlling for all other variables, in particular

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<sup>14</sup> This confirms also G Fields et al (2003) results concerning declining inequality for Indonesia between 1993 – 1997. Considering that the rich lost disproportionately more of their income than the poor than the trend in decreasing inequality should have continued (keeping in mind that losing 10% of their income might be more devastating for the poor than 20% income loss for the rich).

initial income. Hence, they are the measure of our ignorance, as they display the regional variation unexplained by the model specification. As most provincial dummies display negative coefficients in the regressions above it is reasonable to assume that the general provincial economic framework, infrastructure and institutions are weaker as compared to Jakarta so that subsequent individual income change is lower in the provinces compared to the capital, after controlling for all the other factors. However, if one looks at table 8, in which we regress only regional dummies on individual income change, we see positive coefficients on all provincial dummies implying that the individuals living in these provinces experienced on average higher income growth than their counterparts in Jakarta which was comparably hard hit by the crisis. However, once we control for initial income level all the coefficients on the regional dummies turn negative as the income convergence is now captured in the initial income term as we showed already above that the income level was on average much lower in the provinces as compared to the capital in particular in 1993.

Another hypothesis we wanted to test for was that people which migrate do so to better themselves in terms of income. The variables provincial move dummy, kabupaten move dummy and kecamatan move dummy in table 7 above take the value one if the individual migrated to a different province, kabupaten or kecamatan over the given time period respectively. The results of the dummies are statistically insignificant in specifications (1). However, once we interact initial income with the migration dummy in specifications (2) a very interesting pattern emerges. People who move province and kecamatan better themselves significantly, but only if they were initially less well off. The negative coefficients on the migration initial income interaction dummy suggest that rich people moved provinces or location in responses to crisis, but that the poor migrate to increase their income. This supports some theoretical beliefs that labour is mobile and seeks higher income opportunities, but this preposition seems to hold mostly for the poor, the overwhelming proportion of rich people migrate probably as a response to a income decline not to better themselves. Furthermore, there seems to be two distinct effects of close proxy (kecamatan) and long range (provincial) migration. People who migrate in close proximity most likely know how and what they are earning at their destination and manage to experience on average higher income growth. Where as provincial migration

could possibly be of a less informed economic opportunity seeking type. However, to test this hypothesis is beyond the scope of this paper.

In order to analyse the impact of sectoral occupation choice on subsequent income change we have to look at the variables stay non-farm or move to agriculture for those originally earning income in 1993 in the non-farm sector. Alternatively, the variable move to non-farm is for those who were engaged in agriculture in 1993 and moved to the non-farm sector; the omitted variable being those individuals remaining in agriculture. Those who were engaged in non-farm activities in 1993 and stayed in the non-farm sector experienced higher than average income growth, even after controlling for personal characteristics, in the subsequent period, as compared to individuals engaged and remaining in agriculture. Moreover, individuals who moved from the non-farm sector to agriculture did not seem to experience significantly different income growth compared to those remaining in agriculture. Interestingly, Individuals who attempted to move from agriculture to the non-farm sector seem to have experienced comparable income growth to those remaining in agriculture, keeping in mind that the regression already controls for individual characteristics, as for example more educated individuals<sup>15</sup> attempt to move into the non-farm sectors which experience on average a higher income growth rate. However, and probably unsurprisingly, it is clear that those who move to the non-farm sector experience a slight general disadvantage after controlling for personal characteristics as those already established in non-farm employment.

## POVERTY DYNAMICS

The micro-growth regression above gives us the determinants of income growth, but it tells us nothing specific about poverty dynamics yet. In order to determine what factors increase the likelihood of exiting or falling into poverty we need to run logit regressions on restricted samples. First we restrict the sample to people classified poor in 1993 and run a logit on the binary variable leaving poverty or remaining poor<sup>16</sup> which

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<sup>15</sup> Median years of schooling equals 5 years for those who moved into the non-farm sector as compared to 3 years for those remaining in agriculture

<sup>16</sup> Being poor is defined as above as being poor if the individual's household expenditure per capita is below the poverty line

indicated to us how likely it is that a person exits poverty, given certain characteristics. Our second sample is of people considered non-poor in 1993, where the binary variable here is entering poverty or remaining non-poor which indicates how likely it is that a person falls into poverty. Before we turn to this more informative analysis we want to establish using a first naïve model, in which we run a logit regression on exiting poverty based on the pathways described in figure 1 above, which pathways out of poverty were most successful in general, without any consideration for individual or other characteristics. The results are shown in table 9 below.

The coefficients in table 9 correspond directly to the pathways out of poverty highlighted in figure 1 above. Regression (1) controls for initial conditions and regression (2) is the true naïve model. It shows that poor people<sup>17</sup> who were staying in the non-farm sector and moved to the non-farm sector increased their probability to exit poverty considerably (pathway 2 and A) compared to those who stayed in agriculture (pathway 1). Interestingly, staying in an urban area at least negated the positive impact of remaining in the non-farm sector<sup>18</sup> implying that poor urban dwellers in the non-farm sector had an equally good chance of escaping poverty as did the rural poor remaining in agriculture. The urban move dummy is not significant, which again is probably due to the general greater impact of the crisis on the urban centres. Interestingly, the rural move dummy suggests a tendency for urban dwellers that moved back to the countryside to escape poverty with a higher probability compared to those remaining in rural agriculture<sup>19</sup>. Moreover, rural poor individuals who moved to the non-farm sector or remained in the non-farm sector had a disproportionately higher chance of escaping poverty between 1993 and 2000 than their poor counterparts remaining in rural agriculture or urban non-farm income earners.

The naïve model above suggest which pathway out of poverty displayed the highest probability to escape poverty, namely the rural non-farm sector, but it tells us nothing about the characteristics of those who managed to take advantage of these higher probabilities. Hence, we must run a logit regression of exiting poverty on personal

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<sup>17</sup> Poor people corresponds to those who earned income in 1993, but were household expenditure poor

<sup>18</sup> this two variables must probably be looked at jointly as almost all urban dwellers are engaged in nonfarm activities

<sup>19</sup> This corresponds well to the income transition matrixs which suggest that urban non-farm earners moving to rural non-farm enterprises had rather high income growth rates

characteristics and other determinants to identify the comparable “winners” who had the best chances to escape poverty. Table 10 below shows the results of two different logit regression with two different specifications per regression. Regressions (1) and (2) identifies the determinants which increased or decreased the individual’s probability of exiting poverty given that the individual was poor in 1993 and regressions (3) and (4) shows the determinants which correspond to the probabilities of falling into poverty given that the individual was non-poor in 1993.

Table 10 confirms many of the hypothesized determinants of poverty mobility and strengthens our results above. Unsurprisingly, it is clear that being an earner in a larger or growing household reduces the relative probability of exiting and increases the chance of entering poverty respectively.<sup>20</sup> Two things are particularly noteworthy concerning the household characteristics variables. Firstly, households which have a child over the period are more likely to exit poverty. This most likely reflects some reverse causality, namely, only parents who better themselves somewhat are deciding to have children<sup>21</sup>. Hence, adding another child to a household is a sign of affluence and thus it increases the probability of exiting poverty or decreases the chance of entering poverty. However, this result has to be interpreted with care and jointly with changes in the household size in general<sup>22</sup>, which almost mitigates the positive coefficient. Secondly, above we have seen that the number of men in a household is negatively correlated with the level of income and individual income growth. However, looking at the people in poverty and their respective household earnings it seems clear that having and adding more men in a household increases the poor household chance to exit poverty thus having many men in a given household might reflect low individual income level in general and less individual income increases, but it serves clearly as an informal safety net to improve household income by pooling the individual income of many, if poor, male earners. Moreover, having many males within a given non-poor household seems to be a sign of poverty vulnerability as it clearly increases the chances of the poor household to enter poverty.

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<sup>20</sup> Considering that poverty status is being determined by per capita household expenditure

<sup>21</sup> Given the possibility of even very simple birth controls

<sup>22</sup> Even though not all change in hh size will be due to new children

Furthermore, initial income is, as expected, clearly associated with increased or decreased probability of leaving or entering poverty respectively. The negative coefficient on the increase of working hours in regression (1) confirms our results above that individual that are facing reduced income are trying to mitigate their income loss by expending their working hours. Hence, increasing working hours is another sign of a poverty coping strategy and has a negative associated probability of exiting poverty. Furthermore, wage earners have seen a higher probability of entering poverty (coefficient on wage income dummy regression (2)) after controlling for all other characteristics implying that formerly non-poor formal employees had a higher likelihood of entering poverty.

Another interesting finding is that urban households had a harder time exiting poverty than their rural counterparts and a greater likelihood of entering poverty. This is to some degree associated with the idiosyncratic impact of the Asian crisis on the urban centres. However, this variable has to be interpreted with some care, as many other variables, namely initial income, years of schooling and non-farm enterprises, are stronger associated with urban locations and of opposite sign. Thus, controlling for all other things, urban dwellers had a lower probability of escaping poverty, but obviously their initial endowment mitigated this disadvantage tremendously. In particular, years of schooling has the hypothesized strong impact on poverty dynamics. Especially the impact of increased education increases the likelihood of exiting poverty and vice versa is strong and very robust, even after controlling for all possible other characteristics.

Turning to the spatial determinants of poverty it is interesting to note that none of the regional dummies has a statistically significant probability associated with exiting poverty. However, there are various provinces which have an associated high positive likelihood of entering poverty even after taking the impact of the other determinants into account. This suggests that certain provinces have been particularly vulnerable to poverty compared to Jakarta in the period 1993 to 2000, namely all of Java (except central java), large part of Sumatra, Bali and West Nusa Tenggara. Moreover, our provincial and kabupaten migration dummy has a significant positive likelihood of exiting poverty. This implies that a poor individual who migrates to a different province or kabupaten increases his/her chance of exiting poverty. Conversely, for the non-poor moving to a different

province might be the reaction to an income loss, however, the associated positive likelihood in regression (2) is not statistically significant. Thus it seems that migration is, on the one hand, a means for the poor to better themselves, but on the other hand also a reaction to income loss, which is a plausible and possible reason for the migration variables in the income difference regression in table 7 to be insignificant in specification (1) and significant once interacted with initial income levels in specifications (2).

Moreover, looking at the sectoral characteristics, it is interesting to note that the probability of individuals who were 1993 in the agriculture sector and moved to the non-farm sector had a higher than average likelihood to exit poverty, even after controlling for many personal characteristics,<sup>23</sup> as compared to the poor people who were and remain in agriculture.

## 5. CONCLUSIONS

To conclude, this paper started with a relatively simple question, namely, what were the most successful strategies to escape poverty in Indonesia between 1993 and 2000, in how far do these pathways correspond to economic theory and what are the implied lessons to be learned and policy options to be considered. The presented results above suggest that there is not one single or simple answer, but that there are many factors which effect poverty dynamics and that a dataset can account, at best, for the broad pattern of poverty alleviation. Any attempt to understand poverty dynamics utilising aggregate evidence such as the SUSENAS dataset is suffering from severe limitations in terms of following individuals over time and ascribing characteristics to the individuals who managed to escape poverty. Thus, a deeper understanding of the conditions which enhance the chances of individuals to exit poverty must be gained by utilising panel datasets. However, this implies the caveat that if we wish to analyse change one cannot change the individuals in the dataset over time which necessarily implies neglecting “newcomers” which might mean missing some of the dynamics.

Unfortunately, there is no easy methodological answer or an unlimited and universally applicable dataset, so we are concentrating on what is possible given the data

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<sup>23</sup> Significant at the 10% level

and methodological limitations. The aggregate evidence seems to suggest that the most dynamic sector was the urban non-farm sector. Looking at the SUSENAS data the urban non-farm sector generated above average number of new employment opportunities and expanded the most. However, there are two caveats one needs to consider. Firstly, the aggregate number of urban dwellers might experience an above average increase due to new administrative boarder drawing and thus display an upward bias. Secondly, the number of urban dwellers might swell in particular due to young people that are not included in the micro dataset, thus they will not show up in the micro panel analysis. However, this tells us little about the individual characteristics of those who entered the urban non-farm sector or escaped rural poverty. Yet, this is the focus of this papers, - an understanding of the poverty dynamics.

The limitation of the IFLS panel dataset used is that we restrict our sample to the poor individuals who earned income in 1993. Thus, all our results concerning poverty dynamics are to be considered for those people who were poor and earned an income in 1993, which also means leaving out the “newcomers” and unemployed. Nevertheless, it is the only way which allows a thorough investigation of the dynamics of poverty change especially in combination with earned income and sectoral employment choice and change. There are a few conclusions which emerge looking at the micro dataset evidence. Firstly, most poor rural farmers exited poverty by increasing their productivity or engaging increasingly in rural non-farm agriculture, very few moved to urban areas. Secondly, for the rural poor people rural non-farm activities are a stepping stone out of rural poverty, seldom urban non-farm employment<sup>24</sup>. Thirdly, people engaged in urban non-farm activities are the least mobile, probably because their real and potential income is so much higher in general. Lastly, the chance of exiting rural poverty where actually higher than the chances of exiting urban poverty, the vulnerability, however, of falling back into poverty was much higher for agriculture than for non-farm jobs.

So what were the determinants of income levels and thus poverty? Our results identify the usual determinants of income level and poverty, namely, male, older, non-farm and more educated earners where those who had the highest income level and the lowest probability of being classified poor. This leads us directly to the next question,

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<sup>24</sup> The later case is most likely only true for the young



who were those who were poor in 1993 that managed to raise their income? Our micro growth regressions results show that the main economic losers in terms of forgone income growth were mostly female, young, rural, and engaged and remaining in farm activities. Moreover, they show an absolute convergence of income in Indonesia over the given time period, additionally the provinces grew comparably faster than Jakarta. However, all other things being equal, the provinces still displayed a growth disadvantage suggesting the need for better market integration, institutional set-up and infrastructure investment outside the capital. A further interesting result was that the poor seem to migrate in order to increase their income whereas the rich tend to migrate to mitigate income loss.

Directly connected to the micro-growth regression results is the likelihood analysis of exiting and entering poverty. The results from our dynamic poverty analysis indicate that, indeed, the main pathway out of poverty is to be found in the increased engagement of individuals in non-farm enterprises which significantly increases one's chance of escaping poverty, as households engaged in non-farm activities enjoy a higher average income and thus are less likely to be poor, not only in the way of diversified production, but in terms of increased productivity and thus income. Hence, the non-farm economy plays a crucial mediating role in the structural transformation process of Indonesia and thus the long term increases of average productivity levels which is implicitly needed for effective poverty reduction. However, being educated is by far the most robust effect as it increases the individual's chance of exiting poverty tremendously and it is the most effective insurance against falling into poverty. Moreover, we argue that being educated is a prerequisite to engage in higher productivity level non-farm activities, which are the main engine behind poverty change. Thus, educating the poor and removing physical constraints to the development of rural non-farm enterprises should ensure the most effective continuation of poverty reduction in Indonesia.

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**Table 3: Income Growth transitions by rural, urban and sector 1993-2000**

			Starting income    #,Obs		2000									
					Rural				Urban				Average Ending income    # Obs	
				#		#		#,						
			Farm	Obs	Nonfarm	Obs	Farm	Obs	Nonfarm	# Obs				
1993	Rural	Farm	48,470	1,591	40,660	1,268	79,660	275	22,305	31	107,177	17	44,868	1,591
					-12%		29%		-83%		77%		-8%	
		Nonfarm	103,792	1,415	50,006	329	121,182	984	49,788	18	150,425	84	109,966	1,415
					-47%		10%		-51%		-10%		6%	
	Urban	Farm	90,049	293	101,827	52	118,379	15	79,019	143	93,485	83	92,595	293
					-17%		-25%		4%		8%		3%	
		Nonfarm	192,893	2,220	0	24	269,483	109	90,356	111	176,623	1,976	176,623	2,220
					-100%		25%		-39%		-7%		-9%	
All			95,904	5,519	1,673		1,383	303		2,160		5,519		

**Note:** Data is for individuals who were aged between 15-55 in 1993 and were working in both years. Income figures are median monthly income in Rupiah in 1996 prices. Incomes are in Rupiah in 1996 prices. Income values and percentage changes in each cell represent the median incomes and percentage change in income of those individuals who made that transition.

**Table 4: Poverty Transition Matrix**

				# individuals	2000								Total	
					Poor				Non Poor					
					Rural		Urban		Rural		Urban			
					Agriculture	Non Agriculture	Agriculture	Non Agriculture	Agriculture	Non Agriculture	Agriculture	Non Agriculture		
1993	Poor	Rural	Agriculture	713	38.7	5.8	0.6	0.4	43.0	9.6	1.1	0.8	100.0	
			Non Agriculture	375	18.5	18.1	1.9	2.8	13.6	40.4	0.1	4.7	100.0	
		Urban	Agriculture	69	2.5	0.0	36.6	13.2	4.7	5.5	20.9	16.6	100.0	
			Non Agriculture	296	0.0	0.5	5.3	44.6	0.0	1.4	2.8	45.4	100.0	
	Non Poor	Rural		1,053	15.4	3.6	0.3	0.0	61.5	16.5	1.8	0.9	100.0	
			Agriculture	1,389	4.4	8.4	0.0	1.7	17.1	62.2	1.2	5.0	100.0	
			Non Agriculture	112	3.0	0.0	11.8	5.8	20.6	5.1	29.6	24.2	100.0	
		Urban	Agriculture	1,301	0.3	0.3	0.7	11.4	1.2	5.3	3.2	77.6	100.0	
			Non Agriculture											
	Total		5,307	578	269	78	333	1,284	1,340	143	1,284	100.0		
				10.9	5.1	1.5	6.3	24.2	25.3	2.7	24.2			

Note: Data are percentage of individuals in the category in 1993 who end up in the 2000 category. The individuals are those who were aged 15-55 in 1993 and were working.

**Table 5: The Determinants of Log Real Income in 1993 and 2000**

	1993 (1)	1993 (2)	2000 (3)	2000 (4)
	Log Real Income		Log Real Income	
Age	0.090 (5.37)**	0.086 (5.03)**	0.103 (5.57)**	0.098 (5.27)**
Age Squared	-0.001 (4.99)**	-0.001 (4.75)**	-0.001 (5.84)**	-0.001 (5.60)**
Sex	0.440 (11.53)**	0.444 (11.20)**	0.597 (15.60)**	0.608 (15.24)**
Working-hours/month	0.002 (12.37)**	0.002 (12.40)**	0.001 (6.64)**	0.001 (6.81)**
Wage Income Dummy	0.088 (2.53)*	0.072 (1.85)	-0.023 (0.66)	-0.050 (1.29)
Years of Schooling	0.087 (21.76)**	0.081 (18.63)**	0.103 (25.73)**	0.097 (22.19)**
Household Size	0.061 (4.02)**	0.063 (4.13)**	0.059 (4.61)**	0.058 (4.59)**
Number of Children < 5	-0.071 (2.75)**	-0.071 (2.74)**	-0.065 (2.28)*	-0.064 (2.24)*
Number of Children < 15	-0.041 (2.19)*	-0.040 (2.14)*	-0.038 (2.12)*	-0.036 (2.04)*
Number of Men in hh	-0.049 (2.61)**	-0.052 (2.73)**	-0.038 (2.10)*	-0.036 (2.00)*
Urban Dummy	0.240 (7.01)**	0.244 (7.18)**	0.056 (1.50)	0.069 (1.84)
North Sumatra	-0.184 (2.56)*	-0.181 (2.50)*	-0.114 (1.54)	-0.095 (1.28)
West Sumatra	-0.225 (2.98)**	-0.231 (3.02)**	-0.255 (2.66)**	-0.258 (2.68)**
South Sumatra	-0.453 (5.72)**	-0.470 (5.88)**	-0.179 (2.08)*	-0.177 (2.03)*
Lampung	-0.577 (6.71)**	-0.576 (6.65)**	-0.300 (3.31)**	-0.296 (3.25)**
West Java	-0.326 (5.71)**	-0.307 (5.32)**	-0.050 (0.82)	-0.048 (0.77)
Central Java	-0.597 (9.80)**	-0.583 (9.41)**	-0.293 (4.68)**	-0.269 (4.26)**
DiYogyakarta	-0.711 (10.59)**	-0.706 (10.62)**	-0.461 (6.15)**	-0.449 (5.99)**
East Java	-0.573 (9.82)**	-0.561 (9.56)**	-0.250 (4.02)**	-0.237 (3.78)**
Bali	-0.255 (3.75)**	-0.271 (3.95)**	-0.139 (1.80)	-0.155 (1.99)*
West Nusa Tenggara	-0.445 (5.04)**	-0.450 (5.05)**	-0.218 (2.92)**	-0.213 (2.85)**
South Kalimantan	-0.072 (1.00)	-0.091 (1.25)	-0.105 (1.21)	-0.119 (1.37)
South Sulawesi	-0.517 (6.06)**	-0.517 (6.11)**	-0.358 (3.48)**	-0.363 (3.53)**
Non-farm Dummy	0.440 (9.99)**		0.265 (5.81)**	
Mining Quarry		0.726 (6.59)**		0.537 (3.66)**
Manufacturing		0.288 (4.78)**		0.106 (1.61)



Electricity		0.534		0.345
		(4.23)**		(1.26)
Construction		0.429		0.248
		(6.40)**		(4.01)**
Wholesale		0.470		0.269
		(8.80)**		(4.93)**
Transport		0.416		0.112
		(6.62)**		(1.58)
Finance		0.720		0.609
		(5.14)**		(4.60)**
Social Services		0.594		0.420
		(10.02)**		(7.29)**
Constant	8.397	8.513	8.089	8.234
	(26.09)**	(25.99)**	(20.19)**	(20.43)**
Observations	4831	4831	4535	4535
R-squared	0.38	0.39	0.32	0.32
Robust t statistics in parentheses				
* significant at 5%; ** significant at 1%				

**Table 6: Logit Cross Sectional Poverty Regression**

	1993 Household	1993 Expenditure	2000 per Capita	2000 Poor
Age	-0.106 (2.17)*	-0.105 (2.17)*	-0.160 (3.46)**	-0.159 (3.40)**
Age Squared	0.001 (2.24)*	0.001 (2.26)*	0.002 (3.67)**	0.002 (3.63)**
Sex	0.274 (2.48)*	0.280 (2.40)*	0.053 (0.52)	-0.107 (1.01)
Working-hours/month	-0.002 (4.20)**	-0.002 (3.97)**	-0.001 (2.79)**	-0.001 (2.98)**
Wage Income Dummy	0.203 (2.12)*	0.156 (1.41)	0.235 (2.50)*	0.152 (1.46)
Years of Schooling	-0.166 (11.85)**	-0.167 (11.41)**	-0.194 (16.71)**	-0.184 (15.04)**
Household Size	0.188 (4.05)**	0.185 (4.02)**	0.242 (7.77)**	0.248 (7.95)**
Number of Children < 5	0.357 (4.96)**	0.361 (5.01)**	0.225 (3.15)**	0.213 (2.98)**
Number of Children < 15	0.004 (0.07)	0.004 (0.07)	0.051 (1.06)	0.044 (0.90)
Number of Men in hh	-0.030 (0.60)	-0.026 (0.51)	0.004 (0.09)	0.000 (0.00)
Urban Dummy	0.318 (2.95)**	0.316 (2.93)**	0.627 (5.89)**	0.644 (5.98)**
North Sumatra	0.902 (2.94)**	0.890 (2.91)**	0.392 (1.50)	0.316 (1.20)
West Sumatra	-0.026 (0.07)	-0.053 (0.15)	0.810 (2.92)**	0.716 (2.57)*
South Sumatra	1.475 (4.77)**	1.478 (4.76)**	1.214 (4.52)**	1.149 (4.27)**
Lampung	1.767 (5.63)**	1.732 (5.53)**	1.099 (3.85)**	1.041 (3.66)**
West Java	1.068 (3.82)**	1.024 (3.67)**	1.019 (4.59)**	0.969 (4.36)**
Central Java	1.750 (6.26)**	1.706 (6.13)**	0.758 (3.34)**	0.675 (2.97)**
DiYogyakarta	2.152 (7.27)**	2.114 (7.12)**	1.360 (5.55)**	1.258 (5.09)**
East Java	2.239 (8.12)**	2.221 (8.07)**	1.185 (5.26)**	1.134 (5.06)**
Bali	0.904 (2.96)**	0.894 (2.93)**	0.886 (3.51)**	0.863 (3.41)**
West Nusa Tenggara	1.158 (3.70)**	1.127 (3.61)**	1.091 (4.40)**	1.052 (4.25)**
South Kalimantan	0.914 (2.87)**	0.907 (2.84)**	0.668 (2.40)*	0.619 (2.22)*
South Sulawesi	1.076 (3.09)**	1.032 (2.98)**	0.583 (2.03)*	0.511 (1.76)
Non-farm Dummy	-0.708 (6.55)**		-0.445 (4.21)**	
Mining Quarry		-1.791 (2.93)**		0.230 (0.60)
Manufacturing		-0.495 (3.22)**		-0.297 (1.89)
Electricity		-0.806		-1.384

		(1.56)		(1.35)
Construction		-0.493		0.037
		(2.33)*		(0.18)
Wholesale		-0.805		-0.751
		(5.75)**		(5.39)**
Transport		-0.862		0.128
		(4.26)**		(0.66)
Finance		-0.731		
		(1.16)		
Social Services		-0.723		-0.767
		(3.54)**		(4.82)**
Constant	-0.435	-0.440	0.728	0.873
	(0.45)	(0.46)	(0.69)	(0.81)
Observations	4831	4831	4534	4504
Robust z statistics in parentheses				
* significant at 5%; ** significant at 1%				

**Table 7: Micro-growth or income difference regression of Difference in Log Real Income 1993-2000**

	(1)	(2)
	Difference in Log	Real Income 1993-2000
Log Real Income 1993	-0.605 (21.54)**	-0.545 (15.96)**
Age	0.038 (2.15)*	0.037 (2.09)*
Age Squared	-0.001 (2.58)**	-0.001 (2.53)*
Sex	0.448 (9.91)**	0.443 (9.86)**
Working-hours/Month 1993	0.001 (2.53)*	0.001 (2.56)*
Differences	-0.002	-0.002
Working-hours/Month 1993	(6.59)**	(6.69)**
Wage Income Dummy 1993	0.033 (0.82)	0.035 (0.86)
Years of Schooling	0.062 (11.29)**	0.062 (11.24)**
Household Size	0.056 (3.88)**	0.055 (3.83)**
Difference	0.042	0.044
Household Size	(1.72)	(1.84)
Number of Children < 5	-0.092 (2.24)*	-0.091 (2.21)*
Difference	0.063	0.061
Number of Children < 5	(1.88)	(1.83)
Number of Men in hh	-0.035 (1.65)	-0.036 (1.68)
Difference	-0.026	-0.027
Number of Men in hh	(0.79)	(0.84)
Urban Dummy	-0.037 (0.92)	-0.035 (0.88)
North Sumatra	-0.191 (2.17)*	-0.271 (3.04)**
West Sumatra	-0.160 (1.42)	-0.230 (2.03)*
South Sumatra	-0.079 (0.80)	-0.116 (1.17)
Lampung	-0.170 (1.64)	-0.264 (2.45)*
West Java	-0.041 (0.62)	-0.098 (1.43)
Central Java	-0.064 (0.87)	-0.113 (1.51)
DiYogyakarta	-0.202 (2.28)*	-0.258 (2.89)**
East Java	-0.089 (1.24)	-0.147 (2.00)*
Bali	0.094 (1.10)	0.028 (0.33)
West Nusa Tenggara	-0.021 (0.22)	-0.065 (0.69)

South Kalimantan	-0.115 (1.47)	-0.156 (1.95)
South Sulawesi	-0.078 (0.73)	-0.148 (1.36)
Provincial Move Dummy	-0.157 (1.22)	2.963 (2.28)*
Kabupaten Move Dummy	0.081 (1.15)	-0.543 (0.72)
Kecamatan Move Dummy	0.058 (1.31)	1.352 (2.67)**
Stay Non-farm	0.151 (2.48)*	0.147 (2.41)*
Move to Non-farm	0.004 (0.04)	-0.006 (0.07)
Move to Agriculture	-0.075 (0.79)	-0.089 (0.95)
PmoveIniY		-0.263 (2.47)*
KmoveIniY		0.056 (0.89)
KremoveIniY		-0.112 (2.59)**
Constant	5.452 (12.68)**	4.851 (10.12)**
Observations	3979	3979
R-squared	0.31	0.31

Robust t statistics in parentheses

\* significant at 5%; \*\* significant at 1%

Note: All variables, which are not difference variables, are from the IFLS 1993. So the dependent variable captures subsequent real income change conditioned on the initial explanatory variables and their subsequent change.

**Table 8: Geographic and Absolute Convergence**

	(1)	(2)	(3)
	Difference	Log Real	Income
North Sumatra	0.126 (1.38)	-0.176 (2.22)*	
West Sumatra	0.156 (1.37)	-0.158 (1.44)	
South Sumatra	0.435 (3.74)**	-0.074 (0.74)	
Lampung	0.468 (3.99)**	-0.148 (1.44)	
West Java	0.275 (3.66)**	-0.079 (1.18)	
Central Java	0.400 (5.46)**	-0.138 (1.93)	
DiYogyakarta	0.237 (2.83)**	-0.221 (2.62)**	
East Java	0.340 (4.49)**	-0.150 (2.10)*	
Bali	0.350 (4.22)**	-0.027 (0.34)	
West Nusa Tenggara	0.363 (3.47)**	-0.110 (1.23)	
South Kalimantan	0.096 (1.08)	-0.194 (2.40)*	
South Sulawesi	0.378 (3.59)**	-0.041 (0.41)	
Log Real Income 1993		-0.432 (18.38)**	-0.425 (19.34)**
Constant	-0.227 (4.28)**	5.195 (17.42)**	4.998 (19.40)**
Observations	3983	3983	3983
R-squared	0.01	0.19	0.19
Robust t statistics in parentheses			
significant at 5%; ** significant at 1%			

**Table 9: Logit regression dependent variable exit out of poverty (1993-2000, given poverty status in 1993)**

	(1)	(2)
	Exit Poverty	
Log Real Income 1993	0.241 (2.71)**	
Stay Urban	-0.892 (4.41)**	-0.794 (3.98)**
Move to Rural	0.593 (1.10)	0.783 (1.45)
Move to Urban	-0.402 (0.71)	-0.279 (0.51)
Stay Non-farm	0.655 (3.08)**	0.792 (3.73)**
Move to Non-farm	0.747 (2.57)*	0.816 (2.85)**
Move to Agriculture	-0.140 (0.45)	0.010 (0.03)
Constant	-2.535 (2.66)**	-0.014 (0.10)
Observations	887	887
Robust z statistics in parentheses		
* significant at 5%; ** significant at 1%		

**Table 10: Logit regression of entering and leaving poverty (1993-2000)**

	Move out of poverty (1)	Move into Poverty (2)
Log Real Income 1993	0.273 (2.52)*	-0.335 (4.36)**
Age	0.041 (0.49)	-0.109 (1.83)
Age Squared	-0.001 (0.74)	0.002 (2.00)*
Sex	-0.066 (0.30)	0.238 (1.44)
Working-hours/month 1993	0.002 (1.21)	0.000 (0.50)
Difference	-0.002	0.001
Working-hours/month 1993	(2.41)*	(1.30)
Wage Income Dummy	-0.106 (0.57)	0.351 (2.36)*
Years of Schooling	0.136 (4.54)**	-0.151 (7.55)**
Household Size	-0.295 (3.77)**	0.136 (2.26)*
Difference	-0.367	0.257
Household Size	(2.93)**	(3.81)**
Number of Children < 5	-0.429 (1.93)	0.377 (2.29)*
Difference	0.390	-0.298
Number of Children < 5	(2.05)*	(2.34)*
Number of Men in hh	0.161 (1.68)	0.194 (2.22)*
Difference	0.336	-0.079
Number of Men in hh	(1.97)*	(0.76)
Urban Dummy	-0.805 (3.73)**	0.467 (2.86)**
North Sumatra	-0.300 (0.28)	0.027 (0.07)
West Sumatra	0.409 (0.35)	1.170 (3.11)**
SoSumatra	0.161 (0.15)	0.982 (2.79)**
Lampung	-0.225 (0.20)	0.291 (0.69)
West Java	0.101 (0.10)	0.799 (2.78)**
Central Java	0.389 (0.38)	0.039 (0.12)
DiYogyakarta	-0.106 (0.10)	0.775 (2.23)*
East Java	0.548 (0.54)	0.869 (2.75)**
Bali	0.360 (0.34)	0.667 (1.91)
West Nusa Tenggara	0.628 (0.59)	1.150 (3.15)**
South Kalimantan	0.728	0.499



	(0.65)	(1.40)
South Sulawesi	1.180	-0.042
	(1.05)	(0.09)
Provincial Move Dummy	3.261	0.612
	(2.98)**	(1.27)
Kabupaten Move Dummy	0.724	-0.243
	(1.73)	(1.03)
Kecamatan Move Dummy	-0.244	-0.072
	(1.17)	(0.43)
Stay Non-farm	0.238	0.089
	(0.99)	(0.43)
Move to Non-farm	0.623	-0.088
	(1.80)	(0.28)
Move to Agriculture	-0.303	0.147
	(0.97)	(0.55)
Constant	-2.629	1.956
	(1.14)	(1.42)
Observations	886	3093

Robust z statistics in parentheses

\* significant at 5%; \*\* significant at 1%

## **APPENDIX 1: Variable List**

### **Table A1: List of Variables and their Definitions**

## **APPENDIX 2: Summary Statistics**

### **Table A2: Summary Statistics for IFLS 1993**

### **Table A3: Summary Statistics for IFLS 2000**

### **Table A4: Summary Statistics for IFLS 1993-2000**