

MADAGASCAR

**THE ROLE OF EMPLOYMENT AND EARNINGS FOR
SHARED GROWTH**

A World Bank Labor Market Study

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Acronyms and Abbreviations

AGOA	African Growth and Opportunity Act
CAS	Country Assistance Strategy
CPI	Consumer Price Index
EBA	Everything But Arms Initiative of the European Union
EPM	Enquête Périodique auprès des Ménages (Household Survey)
EPZ	Export Processing Zone
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
HHS	Household Survey
ILO	International Labor Organization
IMF	International Monetary Fund
INSTAT	Institut National de la Statistique (Malagasy National Statistics Bureau)
MAP	Madagascar Action Plan
MGA	Malagasy Ariary
MoF	Malagasy Ministry of Finance
NPL	National Poverty Line
PRSC	Poverty Reduction Support Credit
TFP	Total Factor Productivity
UNDP	United Nations Development Programme
WDI	World Development Indicators
MFA	Multi-Fiber Arrangements

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¹ Hoftijzer, Margo, and Stifel, David. 2007. "Exploring the Role of Employment and Earnings in Poverty Reduction: the Case of Madagascar," Economists' Forum Draft.

EXECUTIVE SUMMARY

A. SUMMARY OF FINDINGS

1. Poor people derive most of their income from work. However, there is insufficient understanding of the role of employment and earnings as a linkage between growth and poverty reduction, especially in low income countries. With the objective of providing inputs into the policy discussion on how to enhance poverty reduction through increased employment and earnings for given growth levels, this report explores this linkage in the case of Madagascar. Using data from the national accounts and household surveys from the years 1999, 2001, and 2005, the report arrives at the findings discussed below.

The structure of the labor market in Madagascar is typical of low income countries

2. Madagascar's labor market characteristics are typical for a low income country: labor force participation and employment rates are high, formality and waged employment rates are low, a large share of the population is active in agriculture, and there is a relatively high incidence of child labor. In addition, both the overall population and the labor force are growing at a rapid pace, increasing the need for a steady pace of job creation merely to maintain the current level of the employment rate.

3. A large share (88 percent) of the adult population is employed but, for many, employment does not provide a way out of poverty; almost two-thirds of the working adults are "working poor" living in poor households. By far the lowest returns to labor occur in agriculture. Median monthly earnings in the primary sector are only around 40 percent of those in the secondary and tertiary sectors (not controlling for worker characteristics). This difference in earnings corresponds to the relatively low labor productivity in the primary sector, which, when defined as average output per worker, is less than 15 percent of labor productivity in the secondary or tertiary sectors. Jobs that are better paid tend to be non-agricultural, waged, urban, and in the formal sector.

4. The structure of the labor market differs markedly between rural and urban areas. In rural areas – where 80 percent of the workers live – almost 90 percent of employment is in agriculture. The most common organizational unit of labor is the household enterprise (86 percent of rural workers). Even in secondary urban centers (comprising 12 percent of workers), three-quarters of employment is still in the form of family labor. In large urban centers (8 percent of workers) on the other hand, two-thirds of employment consists of wage jobs, but agriculture is still important in urban areas, providing 47 percent of employment. Services account for a similarly large share, while industry accounts for only 8 percent.

5. Returns to labor also vary by job location. Monthly median earnings are lowest in rural areas and highest in large urban centers. This difference also prevails between jobs in agriculture and wage and non-wage non-agricultural jobs. For example, the median non-agricultural wage worker in large urban centers earns 12 percent more than the median worker with the same type of job in a secondary city and earns 29 percent more than the median non-agricultural wage worker in a rural area.

Employment and earnings patterns in the period under observation were much affected by a short but severe crisis, and by increases in the price and production of rice

6. The period under observation in this report (1999-2005) is characterized by two developments. The first of these was a short but severe crisis starting at the end of 2001, and the subsequent economic rebound. Second, there was an increase in world rice prices which, in combination with a sharp depreciation of the local currency aided by public investments in rural areas, increased agricultural output and revenues.

7. Prior to the crisis, Madagascar had experienced relatively high growth rates, averaging 4.6 percent per year between 1997 and 2001. In 2002, however, GDP fell by almost 13 percent. As the crisis – which was of a political nature – was largely urban, it particularly affected the secondary and tertiary sectors. After the crisis ended these sectors rebounded quickly, and by 2004 GDP had returned to its pre-crisis level. Nevertheless, as a result of the population growth that had occurred in the interim, output *per capita* levels took longer to recover. By 2005, GDP per capita was still 5 percent lower than in 2001.

8. Even though output levels were quickly restored, the crisis had significant effects on the employment and earnings structure of the Malagasy population, and this was still clearly visible in 2005. In summary, the crisis appears to have had the following consequences.

9. The most striking effect of the crisis was the massive inflow of labor into agriculture. Between 2001 and 2005 the share of agricultural workers increased by 8 percentage points, to 77.7 percent, increasing the number of primary sector workers by almost one-third. In the same period the number of secondary sector workers fell by more than half, while the number of workers in the tertiary sector increased by 7 percent, which was half the rate of growth of the working age population in that period. The rise in the employment share of agriculture can thus be attributed to a combination of the secondary sector's shedding workers and the tertiary sector's generating an insufficient number of jobs to absorb enough labor entrants to maintain its share in employment.

10. The crisis also caused significant changes in labor productivity (defined as average output per worker), which are closely associated with the observed fall in GDP per capita. A growth decomposition suggests that, if the impact of the decline in labor productivity had not been offset by the effects of the rise in employment and the fall in the dependency rate, GDP per capita would have fallen by 13 percent between 1999 and 2005 instead of by the 3.6 percent that was actually observed. A similar decomposition by sector reveals that the primary sector in particular suffered from a fall in labor productivity. Considering the large influx of labor into agriculture, this outcome is not surprising. The secondary sector, on the other hand, experienced a substantial increase in labor productivity, as the sector saw a large share of workers depart while output levels did not change significantly. Neither sector seems to have contributed positively to changes in GDP per capita over the period 2001-05. In the primary sector the positive contributions of increased employment were more than offset by the fall in labor productivity, while in the secondary sector the opposite occurred, with the positive effects of higher labor productivity not matching the negative contribution of the fall in employment. In the tertiary sector neither changes in labor productivity nor changes in employment could be associated with growth in GDP per capita.

11. A comparison of labor productivity data with information on micro-level earnings allows some cautious interpretations of how macro developments affected individual workers. In the secondary sector, mean monthly earnings fell by 30 percent in the same period that average output per worker more than doubled. A closer look at the changes in the composition of workers in this sector seems to suggest that the less productive (self-employed and family enterprise) workers, in particular, left the sector between 2001 and 2005, which would provide an explanation (if not the only one) for the substantial increase in labor productivity. The large fall in mean earnings – while median earnings fell only modestly – may possibly be attributed to the highest paid (wage) workers experiencing either a fall in their earnings or the loss of their jobs as a consequence of the crisis. Tertiary sector workers seem to have experienced a pull-

down effect from the secondary sector, as the relatively high tertiary sector earnings converged with secondary sector levels while output per worker remained largely unchanged.

12. In the primary sector, somewhat surprisingly, the large influx of labor and the subsequent fall in average output per worker coincided with an increase in both mean and median earnings. It is assumed that this divergence is largely due to a number of data issues, including the exacerbation of both the increase in output and the fall in labor productivity, which do not allow meaningful conclusions to be drawn from the comparison between the two variables.

13. Among other factors, output data are assumed to have not fully captured the increase in both the quantity and the price of Madagascar's main crop, rice. These increases, however, are likely to have been among the main drivers of the 20 percent increase in average hourly earnings, which were in turn largely responsible for the rise in household per capita labor income of 15 percent between 2001 and 2005. A detailed review of the poverty impact of the changes in the prices of rice and other crops, and of public investments, is the subject of a forthcoming World Bank study.

A reduction in both the incidence and the depth of poverty, while at the same time average GDP per capita fell, can be explained by a reduction in inequality

14. The changes described above have had numerous implications for earnings inequality and the incidence and depth of poverty. As the 1999 household survey does not allow for the construction of comparable earnings data, the earnings-related observations in this report are limited to 2001 and 2005.

15. Between 2001 and 2005, earnings increased in the lower and middle parts of the earnings distribution (largely primary sector workers), and fell in the upper end of the distribution (the highest paid secondary and tertiary workers). As a result, earnings inequality fell in this period.

16. Another result of the convergence of sector earnings in combination with the influx of labor into agriculture was that the primary sector became a more important source of income for the better off households. For example, in 2005, the richest quintile of households derived almost half of its income from agriculture, compared to 22 percent in 2001. For the poorest households, the tertiary sector became a more important source of income (12.6 percent in 2005 compared to 5.4 percent in 2001), largely at the expense of primary sector income (81.0 percent in 2005 compared to 87.2 percent in 2001). In the absence of panel data, it is unclear whether these changes reflect a move of the poorest households from agriculture to services or whether the poorest quintile comprised a different set of households in 2005 and in 2001.

17. Between 2001 and 2005, the rural poverty rate fell by 3.8 percentage points (to 73.5 percent), while poverty in urban areas was almost 8 percentage points higher in 2005 than before the crisis in 2001 (52.0 percent compared to 44.2 percent). These changes may have been caused by a number of rural households moving to higher quintiles while urban households were re-ranked to lower positions in the distribution. In that case, the increased importance of the tertiary sector as a source of income for the poorer households would be at least partly explained by the increase in urban households among the poor, rather than by the moving of poor households into tertiary sector activities. Similarly, the increased importance of the primary sector as an income source for the better off households would be attributed to the increased number of rural households among the better off. Another possible explanation for the changes in urban and rural poverty rates could be that a net migration of poorer households from rural to urban areas occurred, which would imply that households did not move up or down to other quintiles but merely changed from being rural poor to being urban poor. Again, in the absence of panel data, neither hypothesis concerning the causes of the changes in rural and urban poverty rates can be tested.

18. Nationwide, the headcount poverty rate was 1 percentage point lower in 2005 than in 2001. An analysis of the sources of household income – hourly earnings, hours worked, household participation and (inverse) unemployment rates – and their changes over time suggests that this reduction in poverty was achieved by an increase in the share of working adults in the relatively better-off households. As the national poverty line puts the poverty rate in Madagascar at 68.7 percent (2005), changes in the poverty rate largely reflect changes in the conditions of the households, which are placed around the seventieth percentile of the expenditure distribution. Compared to 2001, members of these households received lower average hourly earnings, worked fewer hours, and were more likely to be unemployed in 2005. These developments, which all had a negative impact on household labor income, can be explained by the loss of (higher paid) secondary and tertiary sector employment, and the move of labor into agriculture that occurred due to the crisis. Presumably, households increased their labor force participation to cope with the adverse effects of the crisis, and a share of the households managed to escape poverty through this strategy.

19. One of the implications of having a large share of the population living well below the poverty line is that modest improvements in the well-being of the poorest may not affect the incidence, but may rather affect the depth of poverty. Between 2001 and 2005, the depth of poverty fell by more than 8 percentage points, from 34.9 percent to 26.8 percent. This improvement can be attributed solely to an increase in hourly earnings, which rose by 42 percent for the poor. Changes in all other sources of household income negatively affected the poorer households' income in this period: both the household participation rate and the number of hours worked per employed adult fell, and household unemployment increased. The increase in hourly earnings can be explained by higher earnings in the primary sector and by increased reliance on the tertiary sector (where earnings are higher than in agriculture) as a source of income. The fall in hours worked and the decline in the number of people who are working in the poorest households may be related to the massive influx of labor into agriculture, which may have created an oversupply of labor in this sector.

Obtaining good jobs: The importance of education and gender

20. Educational attainment plays an important role in determining the likelihood of obtaining a “good” job. A higher level of education is associated with the smaller probability of being employed in agriculture (where earnings tend to be lower), and the higher probability of obtaining formal (good) employment. The influence of determinants other than education – such as age, migrant status, or household status – on the probability of working in agriculture, informal, or formal employment are generally less substantial and straightforward.

21. Education is also an important determinant of the level of earnings an individual receives in various types of employment (agriculture, wage non-agriculture, non-wage non-agriculture). Returns to education are highest for wage workers. For example, wage workers with a primary education earned 23 percent more than wage workers without any education, while the returns to primary schooling were 12 percent for non-wage workers and 8 percent for those in agriculture. Wage workers with an upper secondary education earned 69 percent more than those without schooling, while those with post-secondary schooling earned on average 105 percent more. For primary and lower secondary education, returns were greater for non-wage labor than for agricultural workers.

22. When focusing on (non-agricultural) wage workers, and distinguishing between wage earners in the public, private formal, and private informal sectors, significant differences in returns to education are found. In particular, the returns to secondary education for wage workers in the public sector are approximately 25 percent higher than for wage workers in the formal private sector. This may be a sign of existing segmentation between these two parts of the labor market.

23. In addition to education, gender is an important determinant of earnings. When controlling for education, experience, and other factors determining employment selection, it was found that in non-agricultural employment (both wage and non-wage) women's earnings were about two-thirds of men's earnings. Unfortunately, the calculation method for the larger part of agricultural earnings did not allow a similar analysis of a possible gender gap in agricultural earnings.

24. Looking at wage employment, the gender gap in the informal sector is significantly greater than in the private formal sector. Whereas even in the formal sector women on average earned 26 percent less than men with otherwise similar characteristics, this gender gap was as high as 40 percent in the informal sector.

B. SUMMARY OF CONCLUSIONS AND PROPOSED WAY FORWARD

25. The findings of this report allow a number of conclusions to be drawn, from which a number of policy directions and suggestions for future actions and analysis can be distilled:

- To reduce poverty through employment, policies should focus on creating more relatively high-earning jobs rather than on merely creating more jobs.
- There is a large difference in labor productivity and earnings between the primary sector on the one hand, and the secondary and tertiary sectors on the other. Therefore, policies intended to alleviate poverty through increasing earnings may be most effective when they focus on employment-intensive growth in services and (particularly) industry, allowing workers to move from agriculture to a more productive sector. However, the agricultural sector is likely to remain the main employer of the poor on in the short and medium terms. Therefore, the government faces a trade-off in concentrating on moving poor workers to more productive sectors by strengthening labor-intensive output expansion in these sectors or on improving the well-being of the large groups that stay behind in agriculture. Sound cost benefit analyses of both options could aid the government in determining the most appropriate policy mix to accommodate both objectives.
- Further analysis is needed to better understand the crisis-related exit of mostly less productive workers from the secondary sector and the lack of their return to this sector well after the crisis ended. Better insights into the functioning of the secondary sector labor mechanisms, including any possible market failures, could be beneficial in the design of policies that support employment-intensive growth in both the secondary and tertiary sectors.
- During the 2001 crisis agriculture served as an important function of last resort for income generation for a large part of the population. The particular vulnerability of households that cannot use (increased) agricultural production as a coping mechanism may have to be taken into account in the design of social protection mechanisms. In addition, the relative success with which the sector could serve this role can perhaps be partly attributed to the public investment in rural infrastructure that have been made in recent years and also to a number of external factors such as increased world rice prices. This implies that the extent to which the agricultural sector can again function as a safety net during future crises should not be overestimated.
- As education and gender are the main determinants of acquiring good jobs, the government should continue to promote equal access to education across socioeconomic groups and geographic areas, as well as increased gender equality in the work place.
- The quality of labor analyses (among other factors) and the extent to which this can inform policy could be greatly improved by resolving a number of data issues, such as the enhancement of the

reliability of demographic data by the conducting of a new census, and a consistent focus on levels and changes in the *depth* of poverty in addition to the poverty *rate*.

INTRODUCTION

A. WHY EMPLOYMENT AND EARNINGS MATTER FOR POVERTY REDUCTION THROUGH SHARED GROWTH

1. There is little doubt that growth contributes significantly to poverty reduction.² It is also clear that countries differ in the degree to which income growth translates into poverty reduction. Although cross-country estimates suggest that differences in the responsiveness of poverty to income growth account for a small fraction of overall differences in poverty changes across countries, from the point of view of an individual country these differences may have significant implications for poverty reduction, especially in the short term.³

2. Labor markets – in particular employment and earnings – are believed to play an important role in the way that growth translates into poverty reduction. After all, the poor derive most of their income from labor. However, there is still insufficient understanding of the concrete linkages among growth, employment and earnings, and poverty reduction, and consequently of the relevant policy measures that would improve the effectiveness of labor markets as a mechanism for translating growth into increased income generation opportunities for the poor.

3. The ease with which the poor may take up the opportunities afforded by growth may depend crucially on the structure of employment, the returns to labor and their distribution, and the existence of imperfections and frictions in the labor market. For example, flexible labor markets and low barriers to mobility might make it easier for the poor to benefit from growth by allowing them to move more easily to growing, high labor productivity and high earnings sectors, particularly when growth is accompanied by an increased demand for unskilled labor, or when the poor are able to acquire the skills that are required by the growing sectors.

4. On the other hand, labor market imperfections or rigidities may prevent the poor from benefiting optimally from economic growth. The concern that this has been the case in some developing countries is reflected in the emphasis placed on “jobless growth” as an explanatory factor for the disappointing levels of poverty reduction in countries that had experienced relatively high levels of growth. While this has led to debates on how to foster employment-intensive growth, it is also recognized that poverty reduction through the labor market may be dependent more on the increased labor productivity and earnings capacity of the poor than on increased employment opportunities.⁴ Another, largely unresolved, debated question has been whether policy interventions should focus on increasing labor productivity and earnings for the work that is currently being carried out by the poor (e.g., in agriculture) or whether they should concentrate on increasing employment opportunities in the high(er) labor productivity sectors where few poor are active, so that more of the poor can move there (Fields, 2006).

² For example, Kraay (2006) finds that in the short and medium terms income growth accounts for 70 percent of the variation in headcount poverty, and in the long run for 97 percent.

³ See, for example, Bourguignon (2002), Kakwani, Neri, and Son (2006), Lucas and Timmer (2005), and Ravallion (2004) for evidence on heterogeneity in the poverty impact of growth. See Ravallion (2004) for a discussion of the relevance of this heterogeneity from the perspective of a country: a 1 percent increase in income levels could result in a poverty reduction of as much as 4.3 percent or as little as 0.6 percent.

⁴ ILO (2003).

B. OBJECTIVES AND STRUCTURE OF THIS PAPER

5. This report is aimed at providing a better understanding of how the labor market functions as a transmission mechanism between growth and poverty reduction, by studying the links in the case of Madagascar. In this way, the study intends to contribute to the discussion concerning the identification of policy priorities and interventions in Madagascar that will increase the reduction of poverty at given growth levels. The paper is also part of a broader research framework comprising several country studies and a cross-country analysis aimed at generating more insights into the linkages among growth, labor, and poverty reduction.

6. This report draws mainly on data from household surveys (HHS) conducted in 1999, 2001, and 2005, and on national accounts data. As the Malagasy population experienced the consequences of a crisis during part of the period under observation, this case study allows us to explore the above-mentioned linkages in a period during which output per capita actually decreased (2001-05), and, as far as the data permit, to provide a comparison with observed developments in a period in which per capita growth was positive (1999-2001).⁵

7. The report is structured into seven chapters. Chapter 1 describes the data and the main definitions used in this report. Chapter 2 provides the (socio)economic context of the study, with a particular emphasis on growth, poverty, and labor market characteristics. For the last item, this chapter uses an alternative set of labor indicators developed to capture labor market conditions in low and middle income countries – where low labor productivity and subsistence employment prevail – in a better way than they are captured by standard labor indicators.⁶ The paper then focuses on the linkages among output, employment, and labor productivity (Chapter 3), between labor productivity and earnings (Chapter 4), and between employment and earnings, and poverty (Chapter 5). Chapter 3 uses macro data to compare sectoral shares in output and employment, as well as their changes over time. It also explores the extent to which per capita output growth is associated with changes in employment and changes in labor productivity. Chapter 4 takes a look at the linkages between macro and micro data by reviewing the ways in which changes in aggregate and sectoral labor productivity translate into individual earnings as gathered from the household surveys. The chapter also reviews the relationship between productivity and earnings by looking at the linkages between changes in aggregate and sectoral labor productivity data (macro) and changes in individual earnings as gathered from the household surveys (micro). Chapter 5 examines the origins and determining factors of household earnings and employment and assesses their impact on poverty and poverty reduction. Chapter 6 analyses the individual and household characteristics that are associated with having either “good” jobs or “bad” jobs and reviews the question of whether there may be barriers preventing the movement of workers from “bad” to “good” labor market segments. Finally, Chapter 7 describes the main conclusions of this report and provides suggestions for future work based on these conclusions.

⁵ Owing to the data limitations of the 1999 HHS, analyses concerning earnings data are restricted to the 2001 and 2005 surveys.

⁶ World Bank, 2007a (forthcoming). “A Guide for Assessing Labor Market Conditions in Developing Countries.”

1. DEFINITIONS AND DATA

A. DEFINITIONS

1.1 This report adopts a broad concept of labor markets and earnings to capture, as fully as possible, the entire spectrum of income generating individuals and activities in a low income context. In this chapter, key terms that are used in the discussions that follow are defined in Table 1.1.

Table 1.1: Definitions

Employment	
Labor market	The place where labor services are bought, sold, and exchanged. The labor market comprises wage and salaried workers and their employers, but also non-wage family enterprise workers and the self-employed, who make up the largest share of workers in Madagascar.
Labor force	The sum of the working age employed and unemployed.
Employed	An individual who performed market activities for at least one hour in the week prior to the survey, or who has a permanent job.
Unemployed	A working age individual who is not employed but is actively looking for work.
Inactive	A person who is neither employed nor actively looking for work.
Wage worker	A worker who has declared being salaried for his/her work.
Self-employed	A self-declared self-employed person, living in a household in which there are no other self-employed or unpaid family enterprise workers.
Household enterprise worker, family enterprise worker	A self-declared self-employed person living in a household with other self-employed or unpaid family enterprise workers.
Formal employment : - Strict definition - Broad definition	- Employment which provides paid leave, social protection, and pension contributions. - Employment which provides social protection or pension contributions.
Working age population	The population between 15 and 64 years of age.
Child labor	A child between 6 and 14 years old, who performed market activities for at least one hour in the week prior to the survey, or who has a permanent job.
Earnings	
Earnings, labor income	All cash payments, payments in kind, and benefits received in exchange for labor services in wage and salaried employment, self-employment and other forms of labor exchange. "Earnings" and "labor income" are used interchangeably, although the latter is more often used when referring to the labor income of a household rather than of an individual. Depending on the context, earnings include only primary job earnings (e.g., when comparing earnings in the different sectors) or the sum of earnings in both the first and a possible second job (when total household labor income is relevant). Throughout this report, earnings are mostly expressed on a monthly basis

Wage earnings	Total cash and in-kind earnings as declared in the survey, regionally deflated.
Earnings of the self-employed	For non-agricultural work: sum of declared profits and value of household auto-consumption, net of taxes and deflated regionally. For agricultural work: owing to difficulties in the calculation of agricultural production, earnings are estimated as the residual of household expenditure minus received wages, non-farm earnings, and transfers, regionally deflated.
Household enterprise earnings	Earnings are derived in the same way as those for the self-employed, but divided by the number of adult household members performing either non-agricultural or agricultural work.
Low earner	An employed individual whose earnings are below the national poverty line.
Working poor	Those employed who reside in households where average per capita expenditures are below the national poverty line.

B. DATA

1.2 This report is based on two main sources of information: national accounts data and household surveys.

1.3 Two different sets of national accounts data were available for the output data. One was received directly from the *Institut National de la Statistique* (INSTAT). This set provided GDP, sectoral and sub-sectoral output data in constant and current prices for the period 1995-2006. The second set also originated from INSTAT but some of the data had been adjusted by the IMF. This set contained estimates and projections, for the period 1999-2026, of GDP, sectoral and sub-sectoral output in current prices; GDP, sectoral and sub-sectoral growth rates in constant prices; and sectoral and sub-sectoral shares of GDP in constant prices.

1.4 A comparison of the two data sets revealed that for the period 1999-2006, GDP and sectoral growth rates were identical, but that differences in the sub-sectoral growth rates were quite substantial. On the basis of this observation, this report uses the GDP and sectoral growth rates from the original INSTAT (covering 1995-2006 and corresponding to the IMF-adjusted data for the period 1999-2006), and the levels of GDP as well as sectoral and sub-sectoral output from the IMF-adjusted data set.

1.5 The multi-purpose household surveys (*Enquêtes Périodiques auprès des Ménages*) were conducted by INSTAT in 1999, 2001, and 2005. The 1999 survey comprised 5,120 households, the 2001 survey comprised 5,080 households, and the 2005 survey comprised 11,781 households. All surveys were held in a single round between September and December of the relevant year. All questionnaires include sections on education, health, housing, agriculture, household expenditure, and employment. The 2001 and 2005 questionnaires include additional sections, on (among other subjects) assets and non-farm enterprises. For a measure of household well-being, this report uses the estimated household level consumption aggregate as constructed by INSTAT.

1.6 A number of concerns regarding the accuracy and comparability of the data sets have arisen. The three main issues and their implications are described below.

1.7 First, the nationwide population levels and dependency rates that can be derived from the household surveys (HHS), as well as their changes over time, differ fairly significantly from those of other sources, such as INSTAT, the IMF and the WDI, as is shown in Table 1.2. There is no certainty as to which source is the most reliable. Madagascar's last population census was in 1993, and population and dependency rate estimates for the more recent years lack reliability. Nevertheless, some apparent

discrepancies in the HHS data, as well as some practical arguments, warranted the adjustment of the data to the IMF population and WDI estimates.

1.8 With regard to the population data, the 3.1 million increase between 2001 and 2005 which follows from the HHS data and which represents an annual growth rate of almost 5 percent, seems somewhat unrealistic. Throughout this report, population levels and the related variables have therefore been adjusted to match IMF estimates. This also improves comparability between the micro data from the household surveys and the macro data from the national accounts, and also the output data used in this report correspond to the data used (and adjusted) by the IMF. With regard to the dependency rates, the sharp fall and subsequent increase in dependency rates within a six-year period cast doubts on the reliability of (particularly) the 2001 dependency rate as derived from the HHS. Since the dependency rates are especially important for the macro analysis in Chapter 2, the dependency rates in that part of the report have been adjusted to match those from the WDI. As is shown in the last column of Table 2.1, the WDI dependency rates for Madagascar are comparable, though slightly higher, than the WDI dependency rate for Sub-Saharan Africa as a whole. No adjustments in dependency rates have been made in the other sections of this report.

Table 1.2: Population and Dependency Rates in Madagascar, Various Sources, 1999-2005

	Population (mln.)		Dependency rate*		
	<i>HHS</i>	<i>IMF</i>	<i>HHS</i>	<i>WDI</i>	<i>WDI, Sub-Saharan Africa</i>
1999	14.6	15.0	0.93	0.92	0.91
2001	15.7	15.9	0.86	0.91	0.90
2005	18.8	17.9	0.95	0.89	0.88

* Dependency rate defined as number of children and elderly per working age person.

1.9 The second issue is that a number of differences exist between the 1999 survey and the surveys of 2001 and 2005. The main consequence of these differences is that no earnings data can be derived from the 1999 HHS that are comparable to those calculated from the later surveys. This is largely (although not solely) caused by the absence of a non-farm enterprise module in the 1999 survey.⁷ In the 2001 and 2005 surveys, both employment and earnings information can be derived from the employment, agriculture, and non-farm enterprise sections combined. Although the absence of a non-farm enterprise section in the 1999 survey does not prevent the construction of employment data, it does present problems for the derivation of earnings data. Non-farm enterprise earnings for 1999 can be estimated from “other sources of revenue,” but their comparability with the 2001 and 2005 data on non-farm enterprise is doubtful. Moreover, as non-wage agricultural earnings are defined as the residual of household expenditures and other earnings, doubts about non-farm enterprise earnings automatically translate into uncertainty about the reliability of agricultural earnings. For this reason, when analyzing earnings this report is limited to the years 2001 and 2005.

1.10 Third, the poverty rates construed from the 1999 survey are not fully comparable with those from 2001 and 2005, among other reasons, because the 1999 HHS used a different bundle of goods to construct consumption aggregates.⁸ While in this report the 1999 poverty rate is calculated to be 71.3 percent,

⁷ In addition to the absence of the non-farm enterprise section, the 1999 survey does not provide information on time spent working (e.g., days per week, hours per day), nor on outgoing transfers (remittances), both of which absences make it more difficult to arrive at reasonable earnings estimates.

⁸ In 2001, a new method to construct the national poverty line (NPL) was introduced. The 2001 NPL equaled a per capita annual consumption of 988 600 Malagasy Francs, which corresponded to the sum of the price of minimum food (2133 Kcal daily) and non-food goods in Antananarivo prices. The poverty rate is determined using real per capita expenditure, rural/urban and province deflated. The NPL is adjusted annually to inflation (CPI) and, since

earlier publications have put it at 71.7 percent.⁹ This latter poverty rate is arrived at by using a calculation method that attempts to ensure comparability with surveys that were conducted before 1999. Clearly, differences in the calculation method of the poverty rate can result in different values of indicators that are determined for the “poor” and “non-poor” sub-sections of the population, such as the unemployment rate of the poor, the share of wage workers among the non-poor, etc. To test whether indicators for the poor and the non-poor change significantly when they are based on the two different poverty rate calculation methods, the main statistics used in this report were calculated using both poverty rates. The differences that were found were minimal.

1.11 While the above-mentioned issues were those that posed (or initially seemed to pose) the most substantial risks to data comparability, they were not the only issues. In a number of cases questionnaires changed slightly, either by small modifications of questions or by additions or removals of possible answers. For example, the 2005 HHS asks for profits net of taxes in the non-farm enterprise section, while the 2001 HHS does not specify whether profits should be net or gross of taxes. Or, in 2005, “Always” (*Toujours*) was added to the list of possible responses to the question “When did you look for a job?” Appendix 1 of World Bank (2007a) contains a more detailed description of the comparability issues between the 2001 and 2005 household surveys. While the possibility that these changes influence the comparability of the surveys cannot be excluded, this report assumes that on balance their effects have been so minimal that they do not critically affect the analyses in this report.

2005, converted into the Malagasy Ariary. The composition of the basket used to construct the consumption aggregate has not changed since 2001.

⁹ See, for example, Dorosh, P. et al. (2003).

2. COUNTRY CONTEXT

In this chapter:

- *Overall and rural poverty rates have fallen since 1999, but the urban population still feels the adverse impact of a severe crisis in 2002, even though economic growth was quick to rebound. The medium-term economic outlook is positive, with projected annual growth rates of 8 percent, among others due to substantial expected investments in nickel mining.*
- *As in most low income countries, labor participation and employment rates are high, a large share of the population is active in agriculture, and formal and waged jobs are relatively rare.*
- *There are large differences in employment structure between areas with different levels of urbanization. ‘Good jobs’ are usually waged, non-agricultural, urban, and formal, and are more likely to be held by educated males.*

A. POPULATION, INCOME, AND POVERTY

A fast growing, rural population with an increasingly large labor force...

2.1 Madagascar’s 17.9 million population has continued to grow at a rapid pace. From 2000 to 2005, the population grew at an average annual rate of 2.9 percent, compared to 2.3 percent per year in Sub-Saharan Africa as a whole. Over a quarter of the population lives in urban areas, indicating a steady pace of urbanization since the 1960s, when more than 85 percent of the population lived in rural areas. Nevertheless, the urbanized share of the population in Madagascar is still well below the Sub-Saharan average of 35 percent.

2.2 Madagascar’s strong population growth rate, even in the African context, appears in part to be due to the population’s relatively high longevity. At 55.8 years in 2005, the average life expectancy at birth was almost 20 percent higher than the average of 46.7 years in Sub-Saharan Africa. While the pace of population growth continued to increase in the last part of the twentieth century, it began to decline in 2000 and reached 2.7 percent in 2005. This apparent reversal seems to be related to a steady decrease in birthrates, and may be interpreted cautiously as a sign that Madagascar has reached the next stage of demographic transition.¹⁰ A continuing fall in population growth would be accompanied by a rise in the share of the working age population – a share which has been fairly constant at around 52 percent since the mid-1960s, but which has been on the rise since 2000, reaching 52.9 percent in 2005 (Table 2.1). The associated decrease in the dependency ratio, which according to U.S. Census Bureau estimates will fall from 83.6 percent in 2005 to 71.0 percent in 2025, would increase the scope for higher savings and investments.¹¹ As the East Asian experience has shown, this could offer ample opportunities for accelerating economic growth and raising the living standard of the population. The extent to which the

¹⁰ Before starting to fall from 2000, the population growth rate had increased from 2.5 percent annually in 1960 to 3.0 percent in 1999. Life expectancy at birth increased from 40.1 years in 1960 to 55.8 years in 2005. The birthrate has fallen steadily from 48.9 births per 1,000 population in 1960 to 38.0 births per 1,000 in 2004.

¹¹ U.S. Census Bureau – IDB Summary Demographic Data for Madagascar. The dependency rate is defined as the sum of the number of those under 15 years and over 65 years of age, as a share of those aged 15-64.

increase in the share of the working age population leads to a reduction in poverty will depend critically on the increased availability of good jobs for the poor.

... witnesses a fall in rural poverty, while urban areas still feel the adverse impact of a crisis

2.3 Living standards in Madagascar are generally bleak. In 2005, the average annual per capita income was US\$233. Although this reflects an improvement compared to the previous few years, it is still substantially lower than the average Malagasy income per capita in the 1990s. In 2005, 68.7 percent of the population lived below the national poverty line, with poverty in the countryside being substantially higher than in urban areas (73.5 percent and 52.0 percent, respectively). The 2005 poverty rate was lower than the 2001 rate. However, it is unlikely that there was a constant decline in poverty in the intermediate years, because the crisis that began at the end of 2001 is believed to have initially raised the share of the poor, particularly in urban areas. Although no poverty data for the period 2002-04 exist, one estimate puts the overall poverty rate at 73 percent directly after the crisis.¹²

2.4 In 2005, the effect of the crisis on poverty still appeared to be visible in the urban poverty rate. While urban poverty had fallen by an impressive 8 percentage points between 1999 and 2001, it returned to its 1999 level in 2005, and it is likely that urban poverty was even higher in the years between 2001 and 2005. Poverty in rural areas, where the lion's share of the Malagasy population lives, shows an opposite trend. Rural poverty rates increased slightly between 1999 and 2001, and although the crisis is assumed to have caused a deterioration in living conditions in rural areas, by 2005 the rural poverty rate was almost 4 percentage points lower than it had been in 2001. This reduction in rural poverty can be attributed in part to public investment in rural areas and in part to increases in world rice prices, in combination with a sharp depreciation of the local currency.¹³ Notwithstanding this impressive post-crisis rural rebound, almost three-quarters of the rural population continue to live in poverty¹⁴ (see Table 2.1).

¹² World Bank, October 2003, "Country Assistance Strategy for the Republic of Madagascar."

¹³ It should be noted that many of the poor are subsistence farmers who do not trade (large amounts of) rice. The increase in rice prices increased the value of auto-consumption and thus reduced incidence and depth of poverty, and made rice farmers better off than those who had to pay market prices to obtain rice. However, they are unlikely to have considered themselves 'better off' in 2005 than in 2001, owing to the increase in rice prices.

¹⁴ The \$1 a day poverty line is below the national poverty line. Compared to the national poverty line, the \$1 a day poverty line can therefore be viewed as a measure of deep(er) poverty. During the post-crisis period, those rates moved in a parallel fashion to the official poverty rates at the national, urban and rural levels. In the pre-crisis period, despite a fall in the percentage of rural inhabitants who were poor, those who remained poor were worse off, as indicated by the 10 percentage point increase in rural \$1 a day poverty.

Table 2.1: Population, Income, and Poverty in Madagascar, 1960-2005

	1960	1970	1980	1990	1999	2000	2001	2002	2003	2004	2005
Population											
Population growth (annual %)	2.5	2.6	2.8	2.9	3.0	2.9	2.9	2.8	2.8	2.7	2.7
Population ages 0-14 (% of total)	43.8	45.1	45.1	45.0	44.8	44.8	44.7	44.5	44.4	44.2	44.0
Population ages 15-64 (% of total)	53.4	52.0	51.9	52.0	52.1	52.2	52.3	52.4	52.5	52.7	52.9
Population ages 65 and above (% of total)	2.8	2.9	3.0	3.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Age dependency ratio (dependents to working-age population)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Urban population (% of total)	10.6	14.1	18.5	23.6	25.9	26.0	26.2	26.3	26.5	26.6	26.8
Income											
GDP per capita (constant 2000 US\$)	389	405	342	271	235	239	247	209	224	229	233
GDP per capita (constant local currency)	46,766	48,697	41,097	32,599	28,297	28,787	29,656	25,177	26,887	27,541	28,045
GDP per capita growth (annual %)		2.6	-2.0	0.2	1.6	1.7	3.0	-15.1	6.8	2.4	1.8
Poverty											
Poverty rate, at national poverty line (% population)											
- Total					71.3		69.7	73.0			68.7
- Rural					76.7		77.3				73.5
- Urban					52.1		44.2				52.0
Poverty rate, at \$1 a day poverty (% population)											
- Total					53.0		60.8				60.0
- Rural					58.7		68.7				65.0
- Urban					33.3		34.2				42.3

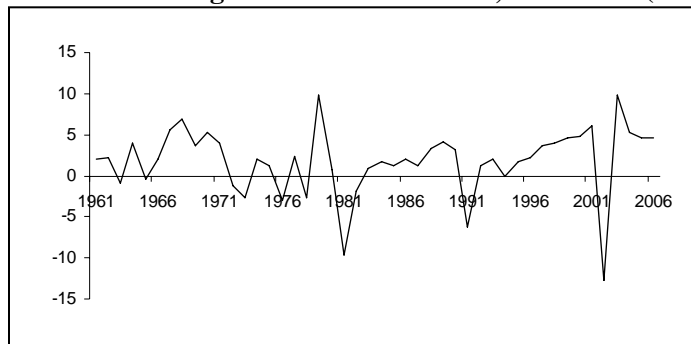
Sources: *World Development Indicators (WDI)*. Poverty rates: World Bank estimates from Household Survey data. Poverty rate for 2002 is derived from simulation.

B. MACROECONOMIC CONTEXT

The Malagasy economy rebounded from a severe, mainly urban, crisis in 2002

2.5 Madagascar's economy since independence in 1960 has been characterized by periods of moderate to fairly high growth levels, interrupted by regular periods of brief but often severe crisis which tend to be caused by structural domestic imbalances to be either triggered or aggravated by external shocks (Figure 2.1). The country's more recent past was tainted by a six month political crisis, which started in December 2001 and was triggered by contested elections. Prior to the crisis, a period of economic growth averaging 4.6 percent between 1997 and 2001 had increased average living standards nationwide, although the benefits were largely confined to the urban areas. The crisis had a significant impact on social and economic conditions. As net inflows of foreign direct investment were reduced to less than 10 percent of their previous level, exports faltered, and infrastructure was destroyed, GDP in 2002 fell by almost 13 percent compared to the year before.

Figure 2.1: GDP Growth, 1960-2006 (annual, %)



Source: WDI (2006 estimate).

2.6 After the crisis the economy was relatively quick to rebound. With output growth rates of 9.8 percent and 5.3 percent, respectively, in the two years following the crisis, GDP had returned to its 2001 level by 2004. In 2005, investment levels were recovering toward their pre-crisis levels, and growth was originating largely from improved performance in the agricultural sector, higher tourism receipts, and continued public investment programs. Despite the adverse effects of high oil prices, the financial crisis of the electric parastatal JIRIMA, and the stagnation of growth in the textiles sector owing to the phasing out of the Most Favored Nation Status Agreement, growth still reached 4.6 percent in 2005 and 4.7 percent in 2006.

The medium-term outlook is positive, and the government is committed to strengthening economic stability

2.7 From 2007 to 2011 growth is expected to average 8.0 percent per year, with the main sources of this growth including mining, tourism, construction, and more efficient agriculture. The economy in general, and the mining sector in particular, are expected to benefit significantly from a recently confirmed nickel mining investment of around US\$3 billion (or some 50 percent of GDP) over the next

three years, which has led to a significant upward revision of growth in the short and medium terms.¹⁵ Both tourism and agriculture are expected to gain from ongoing (public) investments. Exports are projected to grow at an average of almost 20 percent per year in the 2007-11 period, with the growth originating from mining, tourism and a more diverse range of agricultural products. Although the Export Processing Zones (EPZs) are going through a consolidation phase, a hopeful sign that the sector can again become a source of growth in the future is that textile exports have been stronger than expected because the industry is diversifying and moving toward higher value added products.

2.8 Overall, the macroeconomic outlook is relatively stable. Nevertheless, problems in domestic revenue mobilization hamper the government's ability to implement its ambitious and recently published Madagascar Action Plan 2007-2010, which serves as Madagascar's second Poverty Reduction Strategy Paper. Improving tax revenues, as well as managing the macroeconomic impacts of large investment flows and making further progress in the restructuring of JIRIMA, will remain the government's key priorities in the near future. Meanwhile, foreign assistance continues to play an important role in macro management and poverty reduction.

The 2002 crisis temporarily increased the importance of the primary sector in total output

2.9 Since the mid-1990s output growth in the manufacturing and services sectors has substantially exceeded growth in the primary sector in every year except during the crisis year 2002. Between 1996 and 2001, annual growth rates averaged 5.1 percent for the secondary sector and 4.7 percent for the tertiary sector, compared to only 2.5 percent for the primary sector. As a result, the shares of the secondary and tertiary sectors in total output have increased (to 13.4 and 52.6 percent, respectively, in 2002) at the expense of that of the primary sector (34.0 percent). Although the crisis temporarily interrupted this trend, the trend appears to have picked up again in recent years. In 2006, the tertiary sector generated an estimated 53.8 percent of output, the primary sector provided 33.5 percent, and the secondary sector still produced a mere 12.7 percent (see Table 2.2).

2.10 The secondary and tertiary sectors were severely hit by the crisis. In 2002, output fell by 20.7 percent and 15.0 percent, respectively, reducing the sectoral shares in total output to pre-1995 levels. The impact of the crisis on the primary sector was much more limited, as 2002 output fell by only 1.3 percent (see Figure 2.2). Despite relatively modest growth rates in the years after the crisis, output in this sector had returned to its pre-crisis level by 2003. The secondary and tertiary sectors also managed to rebound from the crisis relatively quickly, with 2003 growth rates of 14.5 percent in the secondary sector and 10.6 percent in the tertiary sector. By 2006, four years after the crisis, the output levels in all three sectors were well above their pre-crisis levels of 2001.¹⁶

¹⁵ Previous estimates of GDP growth during the 2007-11 period amounted to an average of 5.6 percent per year, which is similar to the projections for 2007 and 2008 in the OECD's African Economic Outlook.

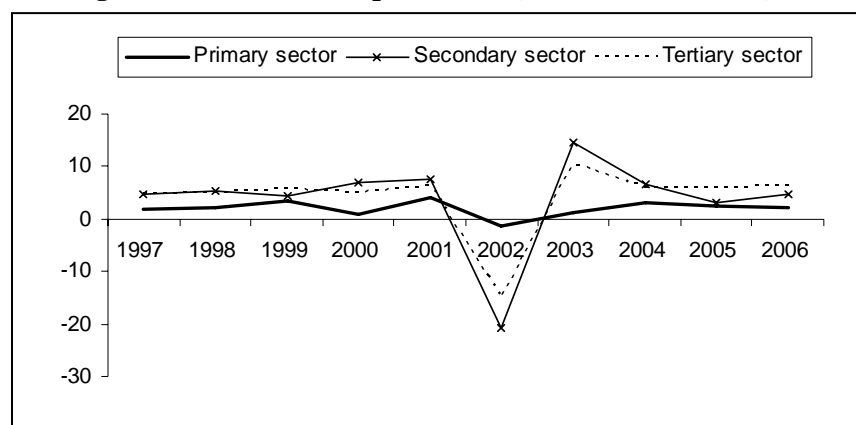
¹⁶ In 2006, primary sector output was 7.9 percent higher than in 2001, secondary sector output was 4.4 percent higher, and tertiary sector output was 12.2 percent higher.

Table 2.2: Macroeconomic Indicators, 1997-2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Output										
GDP (bln. constant local currency)	409.1	425.2	445.1	466.2	494.3	431.6	473.9	498.8	521.8	546.5
GDP growth (annual %)	3.7	3.9	4.7	4.7	6.0	-12.7	9.8	5.3	4.6	4.7
Primary sector (share of total output, %)	36.6	35.9	35.5	34.6	34.0	37.8	35.6	35.0	34.3	33.5
Secondary sector (share of total output, %)	12.6	12.8	12.7	13.1	13.4	11.9	12.7	12.9	12.7	12.7
Tertiary sector (share of total output, %)	50.8	51.3	51.8	52.3	52.6	50.3	51.7	52.2	53.0	53.8
Expenditures, inflation, lending, trade, and FDI										
Household consumption (% of GDP)	87.5	85.2	85.6	85.5	76.4	84.2	82.0	82.7	84.2	
Total consumption (% of GDP)	95.3	93.0	92.8	92.3	84.7	92.3	91.1	92.2	92.3	
Gross capital formation (% of GDP)	12.8	14.8	14.9	15.1	18.5	14.3	17.9	24.3	22.4	
Inflation (consumer prices, annual %)	4.5	6.2	9.9	12.0	6.9	15.9	-1.2	13.8	18.5	
Lending interest rate (%)	30.0	27.0	28.0	26.5	25.3	25.3	24.3	25.5	27.0	
Trade (% of GDP)	51.8	50.8	56.7	68.7	61.4	38.6	55.2	81.8	66.0	
Foreign direct investment (net inflows, % of GDP)	0.4	0.5	1.6	2.1	2.1	0.2	0.2	1.0		
Foreign direct investment (net inflows, current US\$)	14.0	17.0	58.0	83.0	93.0	8.0	13.0	45.0		

Note: Sectoral output shares are expressed as share of total output from the three sectors, not taking into account indirect taxes and other items which are not directly attributed to sectoral output.

Sources: Output data: MoF and IMF staff projections, World Bank calculations. Other data: *World Development Indicators*.

Figure 2.2: Sectoral Output Growth, 1997-2006 (annual, %)

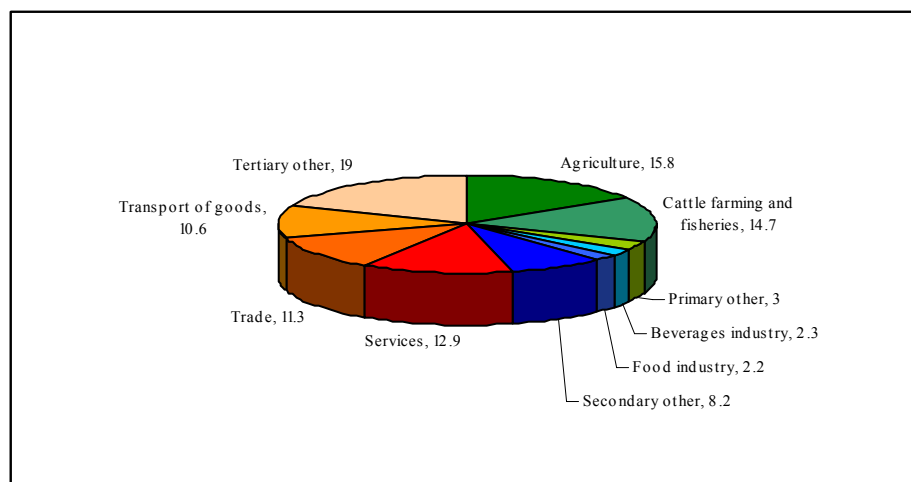
Source: MoF and IMF staff projections.

Agriculture and cattle farming are the main sub-sectors, while the secondary sector is fragmented into numerous small industries

2.11 Figure 2.3 depicts the output shares of the largest sub-sectors in each of the three main sectors in 2006. As the figure shows, agriculture and cattle farming and fisheries are the two largest sub-sectors in the economy. Together they make up more than 30 percent of total output, or 90 percent of primary sector output. The three next largest sub-sectors – services, trade, and transport of goods – are all in the tertiary sector. Together they make up around three-quarters of total tertiary sector output. With output shares varying between 10 and 13 percent of total output, they do not vary much in size. Almost one-fifth of total output is made up of other, smaller, sub-sectors in the tertiary sector, including public administration and public works, which account for 5.1 and 3.8 percent of total output, respectively.

2.12 The secondary sector is made up of a relatively large number of sub-sectors, all of which accounts for less than 2.5 percent of total output. The largest sub-sectors are the beverages and food industries, which together make up more than one-third of total secondary sector output. Other sub-sectors in the secondary sector include EPZs and the energy sector (1.7 percent and 1.5 percent, respectively), and electronic equipment, tobacco, metal, pharmaceuticals, and construction material. (In figure 2.3, these are all incorporated in the ‘Secondary Other’ category.)

Figure 2.3: Sub-sectoral Output Shares, 2006 (%)



Source: MoF and IMF staff projections.

Export Processing Zones and public works have been the fastest growing sub-sectors

2.13 Table 2.3 depicts the growth trends of the largest sub-sectors in each of the three main sectors for the period 1999 to 2006. It depicts the sub-sectors’ average annual growth rates for the pre-crisis, crisis, and post-crisis years as well as for the overall period. The table also shows – as an indicator of crisis recovery – the output for 2006 relative to the pre-crisis output levels for 2001.

2.14 The fastest growing sub-sectors in the 1999-2006 period were the EPZ and the public works sector. For the EPZs, high overall growth occurred despite a substantial but temporary output contraction in 2002. Indeed, except for the textiles sector, no sub-sector in the Malagasy economy was as heavily affected by the crisis as the EPZs, as their situation was aggravated by their export focus and their location in the capital, which suffered from a blockade during the crisis.¹⁷ As a consequence of this disproportionately large output decline, the share of the EPZs in overall output fell by one-third in 2002. However, the post-crisis recovery of the EPZ sector was quick and vast: with a growth rate of 76 percent in the year after the crisis, value added generated by the EPZs had returned to pre-crisis levels by the end of 2003. Due this quick rebound and the impressive growth rates before and after the crisis, the EPZ share in total value added increased between 1999 and 2004 from 1.0 to 1.8 percent.¹⁸ However, growth

¹⁷ National accounts data distinguish between the textile industry *within* and *outside* of the EPZ context. The textile industry output that is included in the EPZ data is not counted in the textile industry sub-sector.

¹⁸ Although sub-sectoral output data for before 1999 are less reliable, they indicate that the share of EPZ output in value added tripled within a decade, from 0.6 percent in 1995 to 1.8 percent in 2004.

stagnated in 2005 and output even fell by 5 percent in 2006, by which year the EPZ share of total output had declined to less than 1.7 percent (see also Box 2.2).

2.15 The *public works* sector particularly experienced strong growth in the post-crisis period.¹⁹ From 2003 to 2006, the sector grew by an average of 24.2 percent per year. This growth reflects, among other things, the substantial boost in public investments in an ambitious road rehabilitation and management program. By 2006, output from public works was more than double its level just prior to the crisis, and the sector is expected to continue experiencing annual growth rates of 14 percent and more until 2010.

Table 2.3: Growth Trends in the Main Sub-sectors, 1999-2006

	Average annual output growth, sub-periods (%)			Average annual output growth, overall period (%)	Crisis-recovery: output relative to 2001 (%)
	1999-2001	2002	2003-2006	1999-2006	2006
Primary sector	2.9	-1.3	2.3	2.0	107.9
Agriculture	2.9	0.8	3.3	2.8	114.8
Cattle farming and fisheries	1.1	2.6	2.5	2.0	113.3
Secondary sector	6.3	-20.7	7.2	3.4	104.3
Beverages industry	10.7	-13.2	5.6	5.1	107.5
Food industry	1.4	-10.3	5.3	1.9	109.7
EPZ	28.3	-40.0	24.0	17.6	125.4
Energy	1.2	-31.1	5.4	-0.7	85.0
Tertiary sector	5.5	-15.0	7.2	3.8	112.2
Services	10.4	-19.3	7.1	5.0	106.2
Trade	3.6	-7.4	4.3	2.6	109.5
Transport of goods	2.9	-21.1	8.2	2.6	107.8
Administration	0.6	2.0	3.2	2.1	115.6
Public works	10.9	-15.1	24.2	14.3	201.4

Sources: MoF and IMF staff projections; HHS World Bank calculations.

2.16 The *energy* industry experienced a substantial contraction during the crisis which was not offset by strong growth rates in the surrounding years. Consequently, this industry is the only relatively substantial sub-sector that did not see its output increase in the period under observation and that by 2006 had not yet recovered to the pre-crisis levels. Owing to the sector's weak performance relative to that of the other larger sub-sectors, its share in overall output gradually declined from 2.1 percent in 1999 to 1.5 percent in 2006.

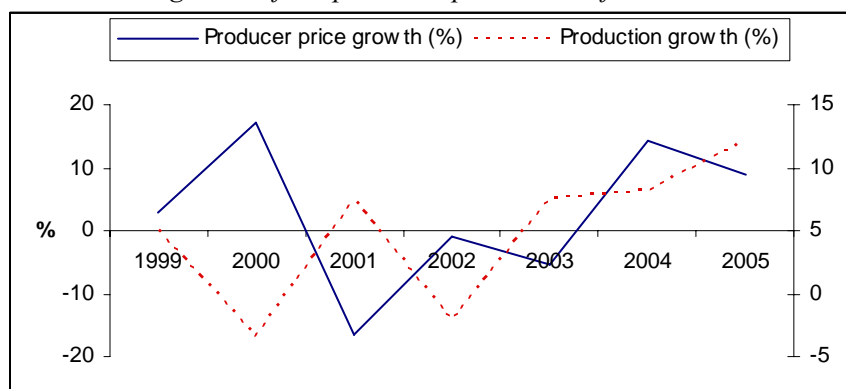
2.17 The economy's largest sub-sectors in terms of output – *agriculture* and *cattle farming and fisheries* – showed a relatively modest growth both before and after the crisis (and a modest contraction in 2002). Agricultural growth in particular has picked up since 2003. This can be attributed in part to the increase in world prices for rice in combination with the sharp depreciation of the currency in the first half of 2004, which is believed to have sparked production (see Box 2.1). By 2006, both sub-sectors had recovered from the crisis, with output levels exceeding those of 2001 by more than 13 percent. Forestry, the only other sub-sector in the primary sector (not depicted in the table), fared less well. Owing largely to substantial output decreases in 2002 and 2003 and to only weak growth rates in the succeeding years, the output for 2006 was only 70 percent of its 2001 level.

¹⁹ The Public Works sub-sector can broadly be defined as publicly funded projects, constructed with high labor-intensive methods, with the double objective to provide (social) infrastructure as well as income through employment for vulnerable population groups.

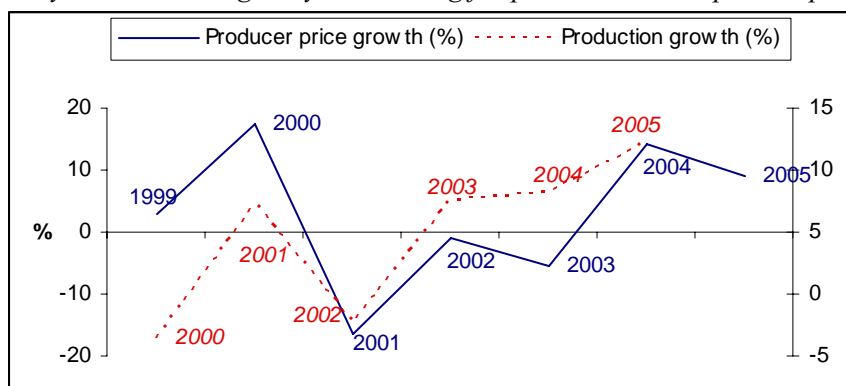
2.18 Unlike most of the primary sector, almost all of the major sub-sectors in the secondary and tertiary sectors experienced a fall in output in 2002. The impact of the crisis on the *beverages* and *food industries* was relatively weak compared to the impact on most other industries. In the tertiary sector, *services* and *transport* were especially hard hit, with 2002 output levels falling by 21.1 percent and 19.3 percent, respectively. The decrease in value added through *trade* was limited to 7.4 percent. By 2006, however, output levels of all major sub-sectors – except the previously mentioned energy industry – widely exceeded the pre-crisis output levels of 2001.

Box 2.1: A Lagged Link between Growth of Rice Prices and Production?

Trends in the growth of the price and production of rice seem linked,



... particularly when assuming a 1-year time-lag for production to respond to price changes



Source: FAOSTAT (<http://faostat.fao.org>). Producer prices derived from annual producer prices in local currency, and production from annual data in 1000 tons.

Box 2.2: Export Processing Zones: Drivers of Growth at Risk

In 1991, the Government of Madagascar started to offer tax incentives and other benefits to companies intending to export more than 95 percent of their production. In the mid-1990s, these *Zones Franches*, or Economic Processing Zones (EPZs), had become the most dynamic sector of the Malagasy economy, having attracted 120 EPZ companies within five years. Apart from the favorable tax treatment, EPZ investors were attracted by the low labor costs of the Malagasy workforce and the country's unsaturated textile quota under the Multi-Fiber Arrangements (MFA). Indeed, textile companies comprise a large part of the EPZ companies. In 2001, according to the Central Bank, clothing accounted for 90 percent of EPZ production, with the remaining 10 percent divided among food-processing, crafts, and services such as data processing.

The strong export growth trends that Madagascar experienced in the 1990s can to a substantial extent be attributed to the success of the EPZs. From 1991 to 2001, the value of total exports almost tripled, the share of manufactured products in total exports grew from 16 percent to 48 percent, and the share of clothing in total exports rose from 5 to 43 percent. Although the 2002 crisis took a heavy toll on EPZ companies, they rebounded quickly, and by 2004 the 186 operational EPZ companies employed more than 100,000 workers. The year 2005, however, brought renewed threats to the EPZ sector, as the expiration of the MFA removed an important reason for investments in the Malagasy textile industry. Output growth in the EPZ sector stagnated in 2005, and even shrank by 5 percent in 2006. Although Madagascar's export-oriented sectors, unlike their Asian competitors, continue to benefit from special tariffs under preferential agreements concluded with the United States (AGOA) and the EU (Cotonou, EBA), the EPZ sector is not expected to continue to be a source of economic growth in the near future. Nevertheless, the textile industry is diversifying and moving toward higher value-added products, which may be cautiously interpreted as a sign that the sector could again be a source of growth in the medium to longer term.

Meanwhile, according to Cling et al. (2007), the wage premium that EPZs used to offer their employees compared to employees with similar characteristics in other formal secondary sector jobs in the mid 1990s has gradually evaporated and turned negative, particularly since the beginning of the millennium.* Furthermore, the quality of labor standards in EPZs (including social security affiliation, paid holidays, job security, and working hours) which used to be relatively high, is declining toward the standards in the rest of the formal secondary sector (which are still much higher than in the informal sector). The expiration of the MFA may be one of the causes of these trends; additional possible explanations could be related to the 2000 rise in the exchange rate, the aftermath of the 2002 crisis, and the EPZs' export orientation, which did not allow them to profit from the domestic boom as other industries did.

* "Wages" in this context do not include benefits such as paid holidays or bonuses. EPZs tend to provide relatively high benefits. Possibly, the observed trend of the wage premium would change if these bonuses were included.

Sources: Cling, Razafindrakoto, Roubaud (2007); and CRS, UNDP, ILO (2005).

Box 2.3: Integrated Growth Poles: New Motors of Growth?

Non-agricultural private sector growth in Madagascar appears to be constrained by a deficient investment climate, poor and unreliable infrastructure, and high risks associated with the policy environment. While wide-ranging reforms addressing the structural impediments to private sector led growth have been initiated, results are only expected in the medium to long term. The Government of Madagascar has identified three regions in which appropriate market conditions could be created to generate more immediate high private sector growth in the tourism, mining and manufacturing sectors. The government has identified a number of constraints to business development which are either general or specific to these *pôles intégrés de croissance*, or integrated growth poles, and is assisted by the World Bank and other donors in addressing these. In particular, activities focus on supporting export-led growth in the Antananarivo-Antsirabé Region (for example, through technical assistance aimed at enhancing EPZ competitiveness and the creation of an ICT Business Park); tourism in the Nosy Be Region (e.g., infrastructure upgrading and the adoption of a tourism development master plan); and both mining and tourism in the area of Tolagnaro (the upgrading of infrastructure, key public utilities services, and the adoption of tourism and urban development plans). Efforts aimed at strengthening the business environment in all three growth poles include improving the business environment through the monitoring of governmental policy and regulatory changes, strengthening the investment promotion agency and the creation of registries, and building capacity and improving access to finance for micro, small and medium scale enterprises.

Source: World Bank (2005), “Integrated Growth Poles Project – Project Appraisal Document.”

C. THE LABOR MARKET²⁰

The labor market structure in Madagascar is characteristic of low income countries

2.19 As is typical of many low income countries, labor force participation and employment rates in Madagascar are high, formal and waged employment rates are low, a large share of the population is active in agriculture, and there is a relatively high incidence of child labor (Tables 2.4 and 2.5).

2.20 Of the total working age population in 2005, 88.1 percent were either working or actively looking for work and nearly 86 percent held jobs. This represented an increase of 4 percent from 2001 and 8 percent from 1999.

2.21 Although open unemployment more than doubled between 2001 and 2005 (there was little change from 1999 to 2001), it remains low at 2.6 percent of the adult labor force. This measure, however, sends mixed information for low income countries such as Madagascar, where unemployment can be viewed as a luxury afforded to those with the means to forgo income-earning employment while searching for “good” jobs.²¹ Thus, it is not surprising that the poverty rate among unemployed individuals is lower than for workers in general (42 percent and 65 percent, respectively).

2.22 Employment is characterized predominantly by jobs that are either non-wage (85.1 percent) or agricultural (77.7 percent) or both (76.7 percent). Although non-wage employment rose by 3.4 percentage points between 2001 and 2005, the effect has been a return to the 1999 levels. In the pre-crisis period, wage employment was growing at a faster rate than non-wage employment. Agricultural employment, however, rose consistently over the entire time period.

²⁰ See World Bank (2007a) for a more elaborate description of labor market conditions in Madagascar.

²¹ Indeed, it is unclear whether an increase in unemployment in such a situation is a signal of deteriorating or of improving conditions.

Table 2.4: Basic Labor Market Indicators for Madagascar, 2005, 2001, and 1999

Indicator	Level			Change (2005-2001)	
	2005	2001	1999	Absolute	Percent
Employment and unemployment					
Labor force	88.1	83.5	80.2	4.6	6%
Employment-to-population ratio*	85.8	82.5	79.2	3.3	4%
Unemployment rate	2.6	1.2	1.3	1.4	113%
Child labor rate	18.8	24.3	26.4	-5.5	-23%
Women's employment rate	83.2	77.8	72.2	5.4	7%
Poverty rate among unemployed	42	44	61	-1.5	-3%
Wage and salaried workers					
Median monthly earnings (MGA x 1,000)**	71.5	88.1		-16.6	-19%
Earnings inequality (Gini)	0.45	0.49		0.0	-9%
Low earnings rate***	18.6	15.8		2.9	18%
Poverty rate	47	33	50	14.0	42%
Non Wage workers					
Median monthly earnings (MGA x 1,000)**	32.2	25.3		6.9	27%
Earnings inequality (Gini)	0.47	0.61		-0.1	-23%
Low earnings rate***	36.6	50.9		-14.3	-28%
Poverty rate	69	77	71	-8.3	-11%
All workers					
Median monthly earnings (MGA x 1,000)**	35.3	30.8		4.5	15%
Earnings inequality (Gini)	0.50	0.62		-0.1	-19%
Low earnings rate***	33.8	44.1		-10.3	-23%
Poverty rate	65	69	68	-4.0	-6%

* The individual is employed if he/she has a permanent job or has worked at least 1 hour in the week prior to the survey.

** Earnings levels for 2001 are expressed in thousands of MGA and divided by 0.6476 (= 197,720 / 305,300 = 2001 poverty line / 2005 poverty line) to compare 2005 and 2001.

*** Low earnings line: Official national poverty line, 305,300 MGA per year for 2005.

Source : HHS 2005, 2001, 1999.

Table 2.5: Hierarchical Decomposition of the Labor Market, 2005, 2001, and 1999

	Level (millions)			Change (%)		Hierarchical rates (%)			Change (%-points)	
	2005	2001	1999	2001-2005	1999-2001	2005	2001	1999	2001-2005	1999-2001
A. Total working population (6+)	14.44	12.84	12.13	12.5	5.8	100	100	100		
B. Child population (6-14)	4.78	3.85	3.89	24.3	-1.0	33.1	30.0	32.1	3.1	-2.06
B1. Child laborers	0.90	0.93	0.88	-3.6	5.5	18.8	24.2	22.67	-5.4	1.53
C. Elderly population (65+)	0.49	0.42	0.49	16.4	-14.4	3.4	3.3	4.0	0.1	-0.75
C1. Employed	0.31	0.26	0.27	20.8	-5.0	63.7	61.3	55.8	2.4	5.53
D. Working age population (15-64)	9.17	8.57	7.75	7.0	10.6	63.5	66.8	63.9	-3.3	2.91
D1. Inactive	1.09	1.41	1.53	-22.8	-7.9	11.9	16.5	19.8	-4.6	-3.26
<i>a) Discouraged</i>	0.07	0.11		-40.9		6.1	7.9		-1.9	7.90
D2. Active	8.08	7.15	6.22	12.9	14.9	88.1	83.5	80.2	4.6	3.26
<i>b) Unemployed</i>	0.21	0.09	0.08	140.8	9.8	2.6	1.2	1.3	1.4	-0.12
<i>c) Employed</i>	7.87	7.07	6.14	11.3	15.2	97.4	98.8	98.7	-1.4	0.12
c1) Wage and Salaried	1.17	1.29	0.92	-9.2	40.3	14.9	18.3	15.0	-3.4	3.32
<i>i) With low earnings</i>	0.22	0.20		7.5		18.6	15.7		2.9	
<i>i) Management</i>	0.12	0.22		-45.7		10.1	17.0		-6.8	
<i>ii) Skilled workers</i>	0.41	0.41		-0.4		34.8	31.7		3.1	
<i>iii) Unskilled workers</i>	0.65	0.66		-2.6		55.1	51.4		3.7	
c2) Non Wage Employed	6.69	5.77	5.22	15.9	10.6	85.1	81.7	85.0	3.4	-3.29
<i>ii) With low earnings</i>	2.33	2.70		-13.7		34.4	46.6		-12.2	
c1.1) Primary	6.30	5.19	4.58	21.3	13.3	80.1	73.5	74.6	6.6	-1.12
c2.1) Industry	0.20	0.48	0.34	-58.8	40.7	2.5	6.8	5.6	-4.3	1.24
c3.1) Services	1.37	1.36	1.22	0.8	11.9	17.4	19.2	19.8	-1.9	-0.60

Source: HHS 2005, 2001, 1999.

2.23 The informal sector dominates the labor market. A conservative estimate places 64.5 percent of the 1.2 million wage laborers in the informal sector. Considering the total workforce, including non-wage workers, approximately 95 percent of the 7.9 million working adults are informally employed. Using a more restrictive measure of formality, we find that 74.2 percent of workers are informally employed.²² (Informality figures are not included in the tables.)

2.24 Although nearly one in five children between the ages of 6 and 14 were involved in some kind of income-earning activities in 2005, this constituted a fall in the child labor rate of 23 percent compared to 2001, and of 29 percent compared to 1999. Child labor is 42 percent higher among poor households than among non-poor households. Children tend to be employed in the sectors with the lowest earnings and the highest low earnings rates. On a brighter note, the percent of working children who attend school more than tripled from 15 to 46 percent between 2001 and 2005. (See Box 5.1 in Chapter 5 for a closer look at child labor rates across regions and household expenditure levels.)

2.25 It is worthwhile to note that, unless otherwise noted, labor indicators in this report concern the working age population, which is defined as those between 15 and 64 years of age. This has as a consequence that the production of children and the elderly is attributed to working adults, resulting in an upward bias of their productivity. Another option would have been to not define a ‘working age’, and base labor indicators on the entire population. Assuming, however, that children and elderly are generally less productive than those who are currently defined as being of working age, this option would have created a downward bias to the productivity of working age adults.

There are large differences in employment structure between areas with different levels of urbanization . . .

2.26 In rural areas (where 80 percent of workers reside) nearly 9 out of 10 working adults were employed in primary sector activities in 2005, while services accounted for most of the remainder. In urban areas, on the other hand, services accounted for 46.9 percent of primary jobs and industry for 7.9 percent. Even in urban areas, agriculture remained an important source of employment, providing 45.2 percent of urban jobs.

2.27 By far the largest number of workers holds a primary job in a family enterprise. In rural areas the share of (predominantly agricultural) family enterprise workers is as much as 86 percent. In urban areas more than half of all of the working age employed persons are in family enterprises, although this share is much smaller if only the large urban centers (i.e., the provincial capitals) are taken into account. In these large urban centers only 22 percent of the working adults are engaged in family enterprises, and wage work is the dominant type of employment, providing jobs to 66 percent of the employed (Figure 2.4).

2.28 In the pre-crisis period from 1999 to 2001, the number of wage jobs grew by 373,000, reflecting an increase of 31 percent. This growth rate was almost three times as high as the growth rate of non-wage jobs (11 percent). As a result, the share of wage jobs to total employment increased by 3.3 percentage points, to 18.3 percent. Most of the new wage jobs (239,000) were created in rural areas, raising the share of rural wage workers by 3.0 percentage points to 12.2 percent of all rural workers. In the large urban centers, the number of generated wage jobs was smaller (96,000) but more substantial in relative terms, resulting in an increase in the share of wage workers by 6.4 percentage points, to 57.5 percent. The

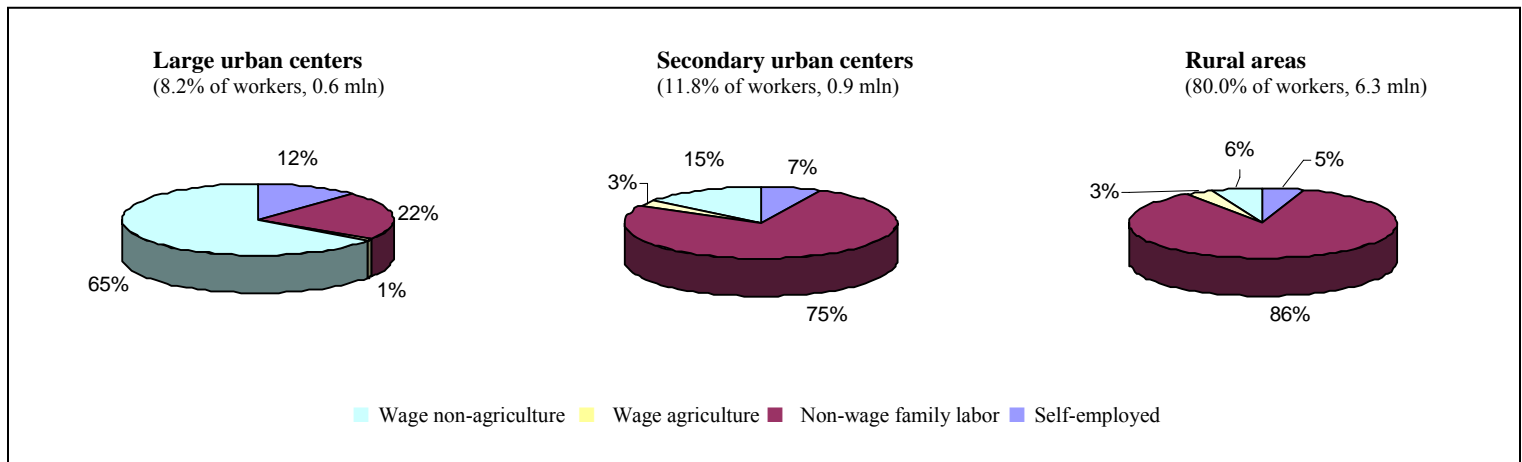
²² The conservative estimate considers a worker to be employed in the formal sector if the worker or the worker’s employer contributes to a pension fund, or if the worker receives social protection. The stricter definition identifies a worker as “protected” if the worker simultaneously has a pension fund, receives social protection, and is given paid leave.

generation of wage jobs was most modest in secondary cities in both absolute and relative terms. There, the creation of 38,000 wage jobs raised the share of wage workers by 2.43 percentage points, to 30.2 percent.

2.29 The period between 2001 and 2005 shows a different picture if we look at employment generation and the relative importance of wage jobs – both nationwide and when distinguishing between areas with different levels of urbanization. First of all, the impact of the 2002 crisis is clearly visible in the relatively limited total number of jobs created between 2001 and 2005. Whereas in the two-year period from 1999 to 2001 the number of jobs rose by 15 percent, net employment creation between 2001 and 2005 was only 11 percent (794,000 jobs). This increase can be completely attributed to the growth in non-wage jobs, as the level of wage jobs fell by 119,000 (9.2 percent). This development was in sharp contrast to the preceding period of 1999-2001, where the growth of wage employment far exceeded that of non-wage jobs. As a result, the share of wage employment fell by 3.4 percentage points, bringing the share of wage workers in total employment back to around the 1999 level (14.9 percent).

2.30 The fall in wage work can be attributed almost entirely to a reduction in non-agricultural jobs in secondary cities and rural areas (by 256,000 jobs). In large urban areas, non-agricultural wage jobs actually increased by 15 percent (53,000), which further increased the already high share of non-agricultural wage work by almost 9 percentage points, to 65.1 percent (see Figure 2.4). Wage employment in agriculture increased as well, by as much as 60 percent (or 80,000 jobs) in rural areas. However, neither increase was sufficient to offset the negative impact of the fall in non-agricultural wage jobs outside of Madagascar’s large cities.

Figure 2.4: Employment Status by Level of Urbanization, 2005



Source: HHS 2005.

... and between workers with different levels of education

2.31 More than half of working age adults have no formal education. Approximately 30 percent have primary education and 15 percent have secondary education. In addition, three-quarters of the new workforce entrants are uneducated. Employment rates are highest among those without any education (93.2 percent) and lowest among those with an upper secondary education (64.6). In addition, employment rates fall steadily as educational attainment levels increase up through secondary education.

2.32 As education levels increase, individuals shift out of agriculture and into industry and services (though much more rapidly into the latter), the percentage of the workforce in agriculture decreases persistently with education levels (89.8 percent to 14.6 percent), while the percentages in industry (1.0 percent to 12.8 percent) and services (9.1 percent to 72.6 percent) increase.

2.33 Of the 14.9 percent of the workforce with wage and salaried jobs, 55.1 percent are employed in unskilled positions. In large urban areas this share is 42.8 percent, while the share of the unskilled among the wage workers is 48.8 percent in secondary urban areas. Not surprisingly, in rural areas unskilled labor accounts for 65.6 percent of wage labor.

“Good” jobs tend to be waged non-agricultural, urban, and in the formal sector, ...

2.34 Access to employment does not necessarily translate into a path out of poverty for many workers and their families in Madagascar. Almost two-thirds of the working age population that was gainfully employed in 2005 lived in poverty (the “working poor”). Despite improvements since 2001, job quality remains low, and median monthly earnings for all adult workers were MGA 35,600 (approximately US\$17.8).

Table 2.6: Low Earnings and Poverty by Employment Category, Region, and Gender (2005)

	Median Earnings (monthly, MGA x1,000)	Low Earners (%)	Poverty Rate (%)
National			
Agriculture (wage and non-wage)	31.5	37.5	72.3
Non-wage non-agriculture	51.9	32.2	42.0
Wage non-agriculture	87.1	11.8	38.7
Large urban centers			
Agriculture (wage and non-wage)	...	...	...
Non-wage non-agriculture	68.5	12.2	32.6
Wage non-agriculture	100.0	8.8	32.9
Secondary urban centers			
Agriculture (wage and non-wage)	31.9	37.6	68.6
Non-wage non-agriculture	58.4	27.7	41.1
Wage non-agriculture	89.5	13.2	43.3
Rural areas			
Agriculture (wage and non-wage)	31.3	37.6	72.9
Non-wage non-agriculture	37.6	43.6	46.7
Wage non-agriculture	77.8	14.7	43.6
Men			
Agriculture (wage and non-wage)	39.1	37.1	71.7
Non-wage non-agriculture	66.0	24.2	37.0
Wage non-agriculture	99.8	8.4	38.9
Women			
Agriculture (wage and non-wage)	38.3	37.9	72.9
Non-wage non-agriculture	44.0	37.9	45.5
Wage non-agriculture	67.5	17.8	38.4

Source: HHS 2005.

2.35 The lowest returns to labor are found in agriculture. Unsurprisingly, the agricultural sector is also the sector in which the largest share of workers has earnings that fall below the poverty line. With 37.5 percent, the share of these “low earners” in the agricultural sector is over three times as large as that of non-agricultural wage workers (11.8 percent). For each employment category, earnings tend to be highest (and low earnings and poverty rates lowest) in the more urbanized areas (Table 2.6).

2.36 Wage workers in the private formal sector have median earnings that are 60 percent higher than those of informal wage workers. Further disaggregation of non-wage employment by formality is also revealing. Median earnings among employees in registered non-farm enterprises are more than two and a half times higher than those for workers in unregistered enterprises.

... and are more likely to be held by educated males

2.37 Access to higher quality jobs is positively associated with educational attainment. At the extreme, monthly earnings of the median worker with an upper secondary education are almost 2.5 times as high as those of the median worker without schooling (MGA 76,000 compared to MGA 30,900).²³ The association between job quality and education applies within different worker types, but it is less strong. In agriculture, wage earnings for those with an upper secondary education are only 20 percent higher than for those with no schooling. Gains in earnings are larger across employment types within education categories than across education categories for those up through upper secondary education (Table 2.7).

Table 2.7: Employment Status and Earnings by Education Level, 2005

Education Level	Wage Workers			Non-wage Workers		
	Agriculture	Informal	Formal	Agriculture	Informal	Formal
<i>Distribution by employment category per education level (% , columns add up to 100%)</i>						
None	3.5	4.3	1.0	84.7	6.0	0.6
Primary	2.6	6.6	2.0	78.8	8.3	1.7
Low Secondary	2.6	12.3	10.5	56.1	14.9	3.5
Upper Secondary	2.6	17.9	28.2	30.8	12.8	7.7
Post-Secondary	3.7	14.8	59.3	11.1	3.7	7.4
<i>Monthly earnings by education level and employment category (MGA x 1,000)</i>						
None	37	56	83	29	39	...
Primary	42	68	98	33	37	82
Low Secondary	39	70	116	40	63	111
Upper Secondary	45	75	122	45	80	119
Post-Secondary	160	105	166	40	100	261

Source: HHS 2005.

2.38 Men have greater access to well-paid jobs than women. Nearly two-thirds of wage employed women hold unskilled positions, while less than half of men do so. Women tend to be employed more often in agriculture and the informal sector where earnings are relatively low, while men tend to have higher rates of employment in the formal sector where earnings are relatively high. In terms of earnings, men fare better than women in every employment category other than non-wage agriculture, and these

²³ Earnings for those with post-secondary education are more than double this amount. However, they make up only a small percentage of the work force.

differentials are not driven by differences in educational attainment.²⁴ Differences range from 10 percent for formal non-farm enterprise employment to 67 percent for informal non-farm enterprise employment. Informal male wage workers earn 55 percent more than women (Table 2.6).

²⁴ No meaningful comparison between male and female non-wage non-agricultural earnings can be derived from the data, owing to the household-based calculation of agricultural earnings in family enterprises.

3. GROWTH, EMPLOYMENT, AND LABOR PRODUCTIVITY

In this chapter:

- *The fall in GDP per capita in the period under observation (1999-2005) is associated with a large fall in average labor productivity. In the same period, the employment rate increased.*
- *The fall in labor productivity seems strongly linked to the substantial inflow of labor into the agricultural sector as a result of the 2002 crisis.*
- *In the secondary sector, a large crisis-related fall in employment coincided with a substantial increase in labor productivity. The tertiary sector, which showed positive changes in employment and labor productivity before the crisis, experienced a fall in both indicators in the 2001-2005 period.*

3.1 This chapter uses macro data to review the employment and labor productivity profile of growth for the period from 1999 to 2005. It first describes economic sectors and sub-sectors in terms of output and employment shares, and discusses which sectors are particularly important for the working poor. It then decomposes changes in per capita growth into changes in (sectoral) employment and labor productivity.

A. COMPARING THE OUTPUT AND EMPLOYMENT SHARES OF SECTORS AND SUB-SECTORS

The 2002 crisis caused a massive labor inflow into agriculture and resulted in substantial changes in sector labor productivity

3.2 There are substantial differences in the shares of output and employment accounted for by each of the main economic sectors. For example, while it employs over 80 percent of the working age population, the primary sector generated just over one-third of total output in 2005. Moreover, while most primary sector workers were active in agriculture, this sub-sector generated only 16.1 percent of total output. The tertiary sector, in contrast, produced more than half of output in 2005 but employed only 17.4 percent of the working population. Finally, the secondary sector generated 12.7 percent of output while employing a mere 2.5 percent of the working population.

3.3 The substantial differences between the sectors in output shares relative to employment shares seem to indicate that there may be substantial differences in labor productivity between the sectors. In particular, primary sector (agricultural) labor productivity appears to be considerably lower than in the secondary and tertiary sectors. Indeed, if labor productivity is defined as average output per worker, primary sector labor productivity was only 8 percent of secondary sector labor productivity and 14 percent of tertiary sector labor productivity in 2005.

3.4 Table 3.1 depicts the sectoral and sub-sectoral output and employment distribution for 1999, 2001, and 2005. Taking into account the 2002 crisis, we consider the period from 1999 to 2001 as a fairly

“regular” pre-crisis period, while the differences in variables between 2001 and 2005 are likely to be at least partly due to the impact of the crisis.

3.5 The changes in output and employment distribution that occurred in the pre-crisis period (1999-2001) were characteristic for a country in the early stages of industrialization such as Madagascar: the primary sector declined, while the other sectors gained ground in terms of output (secondary and tertiary sectors) and employment (secondary sector). It is interesting to note that while the overall employment share of the primary sector fell this was largely due to a substantial fall in the employment share of the forestry sector; the employment share of agriculture actually increased by 0.6 percentage points.²⁵ The success of the secondary sector in this period was to a large extent driven by the textiles and leather industry, in combination with the strong growth in the output share of the mining sector and employment growth in the food and wood industries. In the tertiary sector, the increase in output share can be largely attributed to the growth of the services sector, which saw its share rise from 12.3 percent in 1999 to 13.5 percent of total value added in 2001.²⁶

Table 3.1: Sector and Sub-sector Output and Employment Shares, 2005, 2001, and 1999

	2005		2001		1999	
	Output %	Employment %	Output %	Employment %	Output %	Employment %
Primary sector	34.3	80.1	34.0	73.9	35.5	74.6
Agriculture	16.1	77.7	15.1	69.7	16.0	69.1
Cattle farming and fisheries	15.1	2.0	14.3	3.1	14.4	3.2
Forestry and other primary	3.0	0.4	4.7	1.1	5.2	2.3
Secondary sector	12.7	2.5	13.4	6.8	12.7	5.6
Agro and food industry*	5.0	0.3	5.2	1.0	5.3	0.8
Mining	0.2	0.2	0.3	0.3	0.1	0.3
Energy	1.5	0.2	2.0	1.1	2.1	0.2
Textile and leather *	1.8	0.9	1.6	2.5	1.3	1.9
Wood industry	0.3	0.3	0.4	0.9	0.4	0.6
Construction materials	0.3	0.4	0.4	0.8	0.4	0.6
Other secondary	3.5	0.3	3.5	0.3	3.1	1.1
Tertiary sector	53.0	17.4	52.6	19.3	51.8	19.8
Public works	3.3	1.4	2.1	0.6	1.8	0.7
Transport	13.4	0.9	14.6	1.8	14.8	1.3
Trade	11.3	5.4	11.3	6.3	11.6	6.6
Bank and insurances	2.1	0.1	1.7	0.1	1.6	0.1
Administration**	5.2	2.4	4.8	2.9	5.2	3.1
Other tertiary**	17.6	7.2	18.0	7.6	16.8	8.0

* EPZ output is allocated to the agro and food (10 percent) and textiles and leather industries (90 percent), based on 2001 Central Bank data. EPZ output makes up between 70 percent (1999) and 88 percent (2005) of the output of the textiles and leather industry.

** Owing to the incompatibility of data sources, public telecommunications and postal output is included in “Other tertiary” while public workers in post and communications are included in “Administration” in the employment data.

Sources: MoF and IMF staff projections; World Bank calculations from HHS data.

²⁵ The rise in the agricultural employment share is possibly related to agriculture’s serving as a “sector of last resort” for new entrants in the labor market, in combination with a high population growth, particularly in rural areas.

²⁶ Services are not recognized as a separate sub-sector in table 3.1. It is distinguished as a sub-sector of the tertiary sector in the national accounts (output), but the HHS does not allow the distinction of services in employment data.

3.6 The most striking observation when comparing the output and employment data for the period 2001-05, which includes the crisis, is the substantial increase in the share of agricultural employment. This rise (8 percentage points) came at the expense of nearly all of the other sub-sectors in the primary, secondary and tertiary sectors; only the public works sector saw its share in employment rise as well in this period. In particular, the secondary sector's employment share was reduced significantly, from 6.8 percent to 2.5 percent. The agro and food, energy, textiles and leather, and wood industries all saw their share in employment fall to around one-third of their 2001 levels.

3.7 Nominal employment levels show that the number of persons active in the secondary sector declined by more than 50 percent in the period 2001 to 2005, while the number of tertiary sector workers rose by 7 percent – half the rate of growth of the working age population. At the same time, the number of primary sector workers increased by almost one-third. These numbers suggest that the increase in the agricultural share in employment cannot be attributed entirely to new labor entrants who view agricultural work as an employment of last resort. Rather, it seems likely that the crisis caused a massive influx of labor from the secondary and tertiary sectors to agriculture, the effects of which were still clearly visible in 2005.

3.8 Although the distribution of sectoral employment differs significantly between 2001 and 2005, the differences in output shares were much less pronounced, with the primary and tertiary sectors gaining few percentage points at the expense of the secondary sector.²⁷ Most remarkably, secondary sector output shares remained fairly stable despite the sharp reduction in employment. The share in agricultural output rose by half the rate of its share in employment. The different developments in sectoral output and employment shares hint at fairly substantial changes in relative labor productivity of the sectors. This assumption is confirmed by nominal output and employment data. Compared to 2001, labor productivity – defined as average output per worker – increased by 130 percent in the secondary sector and decreased in the primary and tertiary sectors by 18 percent and 1 percent, respectively. As a result, whereas in 2001 it took 4 workers in agriculture to produce the same value added as 1 worker in the secondary sector, it took more than 12 workers in 2005. While tertiary sector productivity still exceeded the average output per worker in the secondary sector by 30 percent in 2001, by 2005 it took 3 tertiary sector workers to produce the same level of output as 2 workers in the secondary sector. (Chapter 4 reviews how these changes in sectoral labor productivity could be reconciled with the observed changes in mean and median sectoral earnings over the same period.)

The sectoral distribution of the employment of the poorest differs from that for all workers

3.9 In addition to sectoral output and employment shares in the three years under observation, Table 3.2 depicts the sectoral employment distribution of the poorest consumption quintile of workers. As described in Chapter 2, the share of the poorest workers who are active in the primary sector is even larger than the share of all workers in this sector. In 2005, only 8.0 percent of the poorest workers were active in either the secondary (0.7 percent) or the tertiary (7.3 percent) sector, compared to almost 20 percent of all workers.

3.10 Turning to the changes in the sectoral employment distribution of the poorest over time, it becomes clear that in the pre-crisis period from 1999 to 2001 the share of the poorest workers who were in the primary sector increased substantially. The share of these workers in the primary sector became as much as 21 percentage points higher than the share of all workers in this sector (compared to a difference of 8.5 percentage points in 1999). This development could be explained by primary sector workers

²⁷ The similarity of sectoral output shares in 2001 and 2005 conceals the crisis-related increase and subsequent decline in the importance of the primary sector in terms of output in the intermediate years.

becoming poorer or by workers in the poorest quintile moving into the primary sector. Considering that the total share of primary sector employment actually fell in this period, and that between 1999 and 2001 rural poverty increased whereas urban poverty declined, the former may be the more plausible explanation. However, in the absence of panel data this assumption cannot be tested.

3.11 The large gap between the share of all workers and the share of the poorest workers who were active in the primary sector was reduced to 12 percentage points by 2005. This was due to a fall in the share of poor workers, and particularly to an increase in the share of all workers active in the primary sector. One can cautiously assume that the former is at least partly due to increased agricultural earnings and a relative shift of poverty from rural to urban areas. The latter can be attributed to the aforementioned influx of labor into the primary sector due to the 2002 crisis.

3.12 At the same time, the share of the poorest workers in the secondary sector had been reduced at the same rate as the share of total workers; in both 2001 and 2005 the chance that a worker was active in the secondary sector was around four times as high as the possibility that a worker in the poorest income quintile would be found in this sector. The share of the poorest working in the tertiary sector more than doubled between 2001 and 2005, even though the increase in the overall employment share of this sector was much less pronounced.

Table 3.2: Sectoral Shares of Output and Employment, All Workers and the Poorest Quintile (2005, 2001, 1999)

	Primary			Secondary			Tertiary		
	2005	2001	1999	2005	2001	1999	2005	2001	1999
Output	34.3	34.0	35.5	12.7	13.4	12.7	53.0	52.6	51.8
Employment:									
- Total	80.1	73.9	74.6	2.5	6.8	5.6	17.4	19.3	19.8
- Poorest quintile	92.0	95.1	83.1	0.7	1.7	3.5	7.3	3.2	13.4

Sources: MoF and IMF staff projections; World Bank calculations from HHS data; poverty data based on national poverty line.

B. DECOMPOSING PER CAPITA GROWTH INTO LABOR PRODUCTIVITY, EMPLOYMENT AND DEMOGRAPHIC CHANGES

Relating changes in GDP per capita to changes in employment, labor productivity, and demographics

3.13 In exploring the links between growth, labor, and labor poverty, the question arises as to what extent changes in per capita income growth are related to changes in employment, productivity and dependency rates. A better understanding of these linkages can provide useful guidance to policy discussions aimed at reducing poverty through labor, particularly at a time when a changing demographic structure is expected to substantially increase the pool of available labor.²⁸

3.14 There are various ways in which the changes in these three components – employment, labor productivity, and population structure – can be disentangled and related to changes in per capita growth. In this section, we use a Shapley approach to decompose and attribute to each component a share of total observed growth using the following identity:

²⁸ In this section, as in most of the remainder of the report, the term ‘productivity’ is sometimes used to describe ‘labor productivity’, which in this report is defined as ‘average output per worker’.

$$\frac{Y}{N} = \left(\sum_{i=1}^S \frac{Y_i}{E_i} \frac{E_i}{A} \right) * \frac{A}{N}$$

Equation 3.1

in which Y is total output, Y_i is the value added of sector $i = 1 \dots S$, E_i is the number of adult workers in sector i , A is the working age population, and N is the total population. Y/N is thus equal to GDP per capita, and Y_i/E_i reflects productivity per worker in sector i . E_i/A_i equals the share of the working age population employed in sector i , and is interpreted as a measure of employment in sector i . A/N , finally, is the share of the population that is of working age; this variable is therefore inversely related to the dependency rate.

3.15 Just as per capita output can be described as a product of labor productivity, employment and the inverse of the dependency rate, *changes* in output per capita can be described in terms of the changes in these variables. Subsequently, a Shapley decomposition can be used to identify the marginal contribution of each of these variables to the observed changes in output per capita (see also Annex A and Shorrocks, 1999).

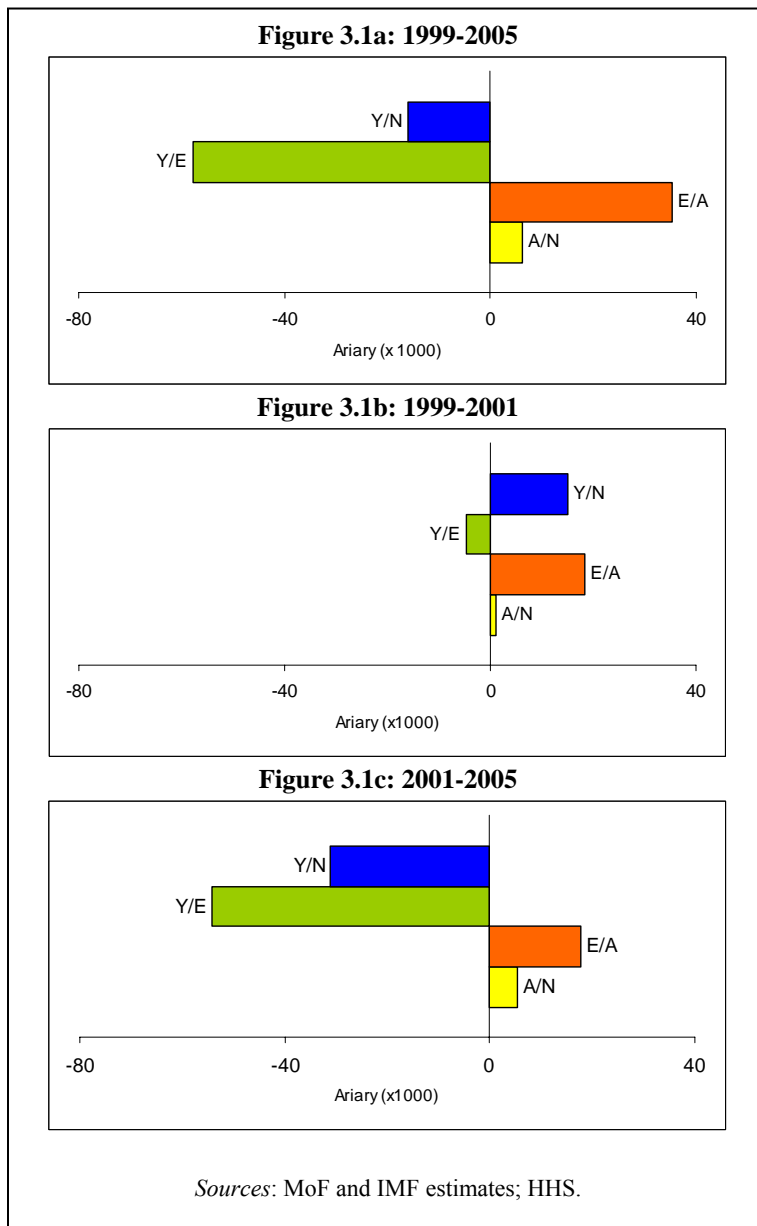
The fall in GDP per capita is associated with a substantial decrease in labor productivity

3.16 The decomposition has been performed at the aggregate level and also when distinguishing between the three main economic sectors. Figure 3.1 depicts the changes in per capita output and the contributions of changes in aggregate employment and productivity, and dependency rates, for the period 1999-2005 (Figure 3.1a), as well as for the sub-periods 1999-2001 (Figure 3.1b) and 2001-2005 (Figure 3.1c).

3.17 The figure illustrates the decrease in GDP per capita between 1999 and 2005 by approximately MGA 16,000, or 3.6 percent. This decline can be fully attributed to the fall in GDP per capita in the sub-period 2001-05, which includes the 2002 crisis. The decline in GDP per capita was accompanied by a strong fall in productivity – which, again, took place mainly in the latter part of the period under observation. If the productivity fall had not been partly offset by the positive contributions (in both sub-periods) of the increase in employment and the share of adults in the population, the decline in GDP per capita would have been similar to the negative contribution of the fall in productivity, equaling almost MGA 60,000, or 13 percent of GDP. Similarly, if output per worker had remained constant, then GDP per capita would have increased by more than MGA 41,000 (or 8.6 percent), mainly owing to the rise in the share of the employed among adults (MGA 35,000) and to a lesser extent to the growth in the share of adults in the population (MGA 6,000).

3.18 Additional analysis of the observed decline in labor productivity indicates that it can be almost fully attributed to a fall in total factor productivity, rather than to a sharp decrease in the capital-labor ratio. The conducted analysis proves, however, quite sensitive to assumptions about the production function and to the data used. (See Annex A2.)

Figure 3.1 Aggregate Contributions to Changes in GDP per Capita, 1999-2005 (MGA x1,000)



All sectors contributed to the negative growth in the 2001-05 period, albeit for different reasons

3.19 Table 3.3 depicts the contributions of sectoral employment and productivity changes to changes in GDP per capita. The contribution of the primary sector was negative in both sub-periods, since a fall in labor productivity was not offset by the positive contributions of employment growth. The contributions of the secondary and tertiary sectors were positive in the pre-crisis period; in the secondary sector this was due to the relatively large employment increase, while in the tertiary sector it was largely attributed to productivity increases. In the subsequent period of 2001-05, however, a fall in employment resulted in negative contributions for both sectors.

3.20 Although from 2001 to 2005 none of the sectors contributed positively to GDP per capita growth, the underlying reasons for these negative contributions appear to have differed substantially by sector. In the primary sector, the substantial influx of workers resulted in the considerable positive contribution of the employment variable, but very likely also contributed to the substantial fall in output per worker. The opposite occurred in the secondary sector, where a massive departure of workers is assumed to have been closely linked to the almost equally substantial positive contribution of the increase in labor productivity. In the tertiary sector both employment and labor productivity fell. Even though the contributions of both variables, and particularly productivity, were fairly modest, the fact that they were both negative implied that they enforced rather than offset each other, as was the case in the other sectors in this period. As a result, the overall negative contribution of the tertiary sector was more significant than those of the primary and secondary sectors, even though these latter sectors experienced much more pronounced changes in both employment and productivity.

Table 3.3: Sectoral Contributions to Changes in GDP per Capita, 1999-2005 (MGA x1,000)

	Y/E	E/A	Total
Primary sector			
1999-2005	-37	24	-13
1999-2001	-7	5	-2
2001-2005	-30	19	-11
Secondary sector			
1999-2005	46	-49	-3
1999-2001	-10	15	5
2001-2005	56	-64	-8
Tertiary sector			
1999-2005	6	-12	-6
1999-2001	8	3	11
2001-2005	-2	-15	-17

Sources: MoF and IMF estimates; HHS.

4. RELATING AGGREGATE AND SECTORAL LABOR PRODUCTIVITY WITH EARNINGS

In this chapter:

- *A fall in income inequality explains how poverty rates could fall at the same time that GDP per capita declined. The fall in income inequality is related to earnings increases in agriculture, and to a fall in earnings in the secondary and tertiary sectors.*
- *There are some indications that the crisis caused the more unproductive secondary sector workers to leave the sector, and the highest earners in this sector to accept either an earnings cut or job loss. For tertiary sector workers, the crisis seems to have caused earnings to converge downward toward those in the secondary sector.*
- *Data and data compatibility problems prevent a meaningful comparison of primary sector labor productivity and earnings information.*

4.1 We now turn to the relationship between some of the aggregate indicators of economic performance described in the previous chapter and individual labor earnings.²⁹ The relationship between these indicators is relevant because earnings are a close individual level analog to labor productivity as measured in the national accounts data. Economic theory suggests a link between earnings and labor productivity, although the strength of the link would depend on the prevailing wage mechanism(s).

4.2 After having explored changes in aggregate and average variables in the previous chapter, this chapter starts by reviewing the household survey earnings data. Unlike the macro data, these data permit us to also take distributional issues into account. “Looking beyond the averages” in this way will help to reconcile some of the messages on labor productivity changes from the previous chapter with the individual-level labor earnings data.³⁰ The remainder of this chapter compares the information on labor productivity from the aggregate data with the earnings data obtained from the household surveys.

4.3 However, as we will see below, the comparisons that are made are surrounded by uncertainties, rendering this chapter to necessarily be largely descriptive. First of all, it is unclear to what extent (changes in) earnings do indeed reflect (changes in) labor productivity. While labor productivity is defined as average output per worker in this report, the marginal product of labor may be a more appropriate determinant of earnings.³¹ Furthermore, at times the comparison merely provides insights into the nature and extent of compatibility issues between the micro and macro data, rather than into the links between labor productivity and earnings. Finally, as labor income is described in terms of *monthly*

²⁹ This chapter’s analysis is limited to the years 2001 and 2005, due to the lack of comparable earnings data for 1999.

³⁰ Ravallion (2001) notes that, “The poor typically do share in the benefits of rising aggregate affluence, and they typically do suffer from economic contraction. However, there is a sizable variance around the ‘typical’ outcomes for the poor. One source of variance is that ‘economic growth,’ as measured in the national accounts, is not always reflected in average household living standards as measured in surveys, at least in the short run.”

³¹ See Temple (2005).

earnings, the analysis does not take into account changes in the number of hours worked per month that could help explain potential discrepancies between changes in monthly earnings and in labor productivity. Changes in hours worked, and their effect on household income, are addressed in the following chapter.

Income inequality has fallen

4.4 Table 4.1 presents the mean and median monthly labor earnings for all workers and for workers in each of the economic sectors. In 2005, the median monthly earnings (MGA 35,300 per month, or approximately US\$17.6) were even lower than the mean monthly earnings (MGA 55,500, or around US\$27.7). The earnings distribution is thus skewed, with median earnings representing the earnings of the “middle” worker, while mean earnings reflect the earnings of workers in around the seventieth percentile of the 2005 earnings distribution. Earnings inequality in 2005 was less pronounced than in 2001, a development which is also illustrated by the falling Gini coefficient (measuring earnings inequality) in Table 2.4. This reflects the fact that the distribution of earnings is becoming less dispersed, which in this case is consistent with the lower and middle portions of the distribution experiencing increases in earnings (e.g., rising median earnings) while the earnings of those at the upper end of the distribution fall (e.g., falling mean earnings). As is further discussed later in this chapter, contributing factors to the compression of the earnings distribution seem to have been (i) an increase in primary sector earnings; (ii) the fact that the highest paid secondary sector workers have seen their wages fall or their jobs disappear; and (iii) a pull-down effect through which the higher earnings in the tertiary sector converged with those in the secondary sector.

Table 4.1: Monthly Labor Earnings by Sector, 2005, 2001

<i>Thousands of 2005 MGA</i>	Mean			Median		
	2005	2001	% Diff	2005	2001	% Diff
Primary	39.7	33.8	17.5	31.6	24.2	30.6
Secondary	103.2	148.1	-30.3	80.0	83.6	-4.4
Tertiary	118.4	177.6	-33.3	72.3	92.6	-22.0
Total	55.5	69.4	-20.0	35.3	30.8	14.6

Source : HHS 2005, 2001.

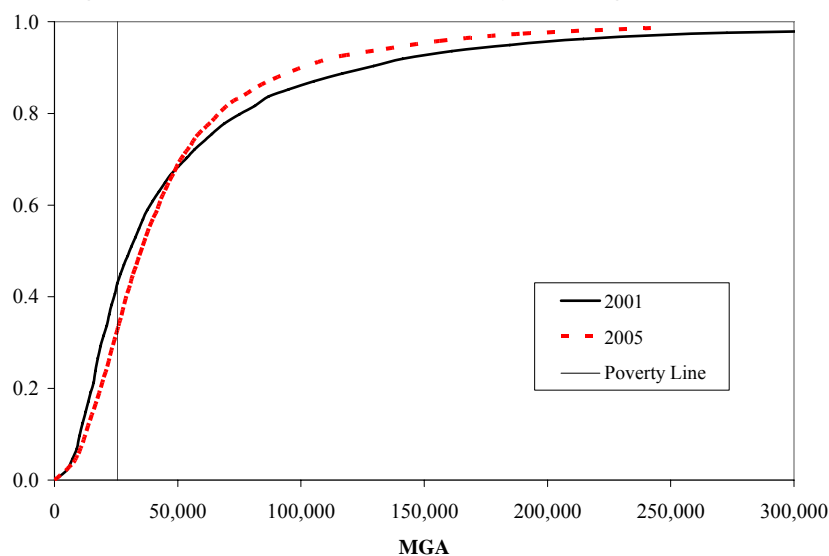
4.5 The decrease in labor earnings inequality is further illustrated by the compression of the 2005 distribution of earnings compared to the 2001 distribution seen in Figure 4.1. Monthly earnings for all workers rose for those workers up to approximately the sixty-seventh percentile (the 2005 distribution is to the right of the 2001 distribution up to this point), while they fell for the 33 percent of the workers with the highest earnings.³²

4.6 When distinguishing between the three economic sectors, Table 4.1 shows that in the primary sector both the mean and median earnings increased between 2001 and 2005, while at the same time the secondary and tertiary sectors experienced a fall in the mean and median earnings levels. Thus, the

³² This does not imply that all individuals with higher earnings were necessarily worse off in 2005 than in 2001, nor that those with low earnings were better off. Since these distributions treat individuals anonymously, there has probably occurred some switching in the order of individuals. Further, the distributions are estimated using two cross-sectional datasets, the latter of which represents a larger number of workers owing to population growth. It should be noted that the poverty line in Figure 4.1 illustrates the low earnings rates reported in Table 2.4.

compression of the earnings distribution seems to have been driven by a fall in the earnings among the higher paid workers in the secondary and tertiary sectors and a rise in the earnings of the lower paid workers in the primary sector in combination with the sectoral shift of workers into the primary sector. The magnitudes of the changes in sectoral earnings (a greater fall for mean than median secondary and tertiary earnings and a larger increase for median than for mean primary earnings) are consistent with an overall decrease in inequality in the earnings distribution.

Figure 4.1: Distributions of Monthly Earnings, 2001, 2005



Sources: HHS 2005, 2001.

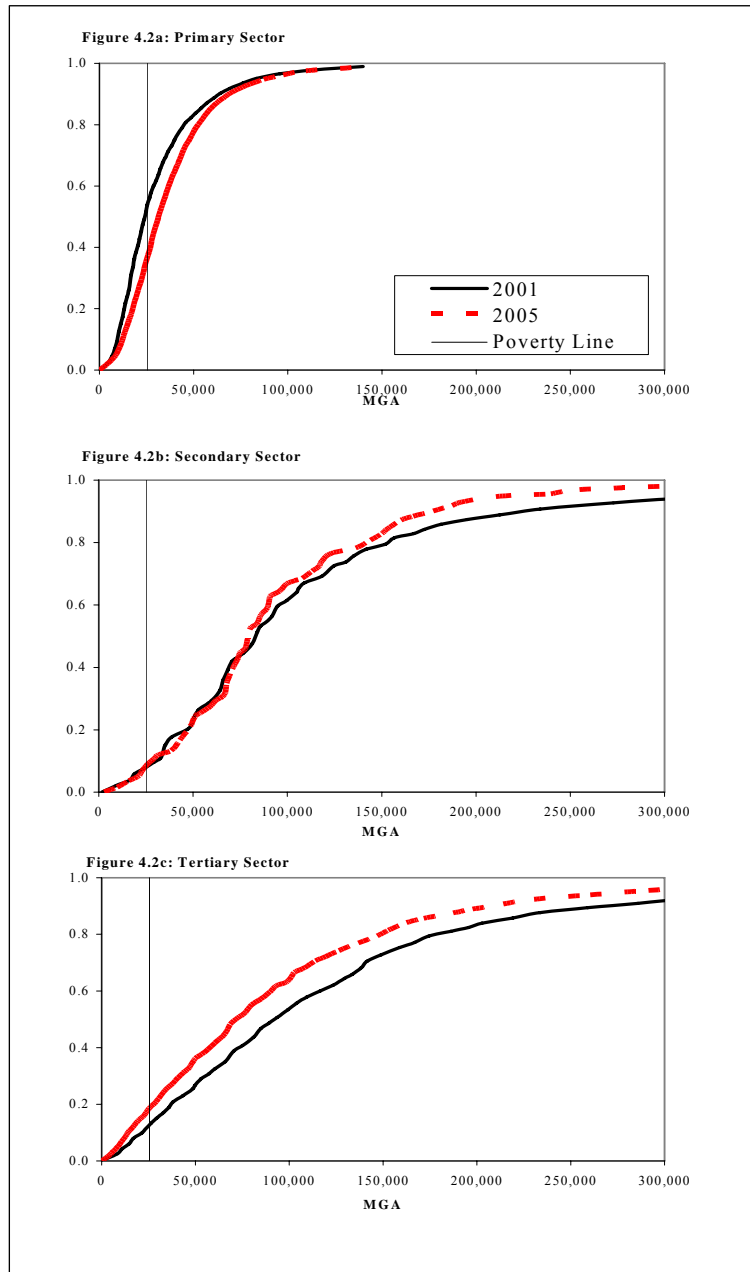
In the primary sector, data and data compatibility problems prevent a meaningful comparison of labor productivity and earnings data

4.7 If we turn to the comparison of macro productivity and micro earnings data, and start from the competitive market assumption that earnings are a direct reflection of labor productivity, the fall in average monthly earnings by 20 percent between 2001 and 2005 is consistent with the 11 percent fall in aggregate productivity in the same period. However, the changes in sectoral earnings do not appear to be consistent with those in sectoral labor productivity. Primary sector productivity, for example, fell during this period while earnings in this sector rose, and the very substantial increase in secondary sector productivity was not reflected in the changes in earnings, as mean secondary sector earnings fell by almost one-third.

4.8 How can the increase in mean primary sector earnings (17.5 percent) be reconciled with the fall in aggregate labor productivity of an approximately equal extent in this sector? Unfortunately, in the case of the primary sector, a number of data and data compatibility issues appear to be at play that exacerbate the reduction in output per worker and the increase in earnings. As these data concerns seem substantial enough to severely complicate a meaningful comparison of labor productivity and earnings data, this section concerning the primary sector is necessarily limited to a description of the data issues.³³

³³ A forthcoming World Bank study will review the poverty impact of the changes in the prices of rice, vanilla, and other crops that occurred between 2001 and 2005, as well as the impact of public investments in this period.

Figure 4.2: Distribution of Monthly Earnings by Sector, 2001 and 2005



Source: HHS 2005, 2001.

4.9 First, *the price increases of the main crop are partly reflected in earnings but not in output.* Aiming to reflect quantity rather than value, output is expressed in constant prices and is thus not expected to capture the relatively large price increases of agriculture’s main crop, rice. Earnings data are also adjusted to reflect changes in real, rather than nominal, earnings. However, the index used to correct the earnings data is based on economy-wide price changes. When it was applied to the primary sector only, it would not have fully captured the price increases that occurred in this sector.

4.10 Second, *the primary sector output may have been underestimated in 2005*. One reason for this assumption is that the estimation of the aggregate output of the primary sector is based, among other things, on projections that tend to smooth annual fluctuations. The increase in production between 2001 and 2005 may therefore have been larger than is assumed in the output data. This assumption is reinforced if we take into account the fact that, in particular, production changes in the more remote areas may not be well captured in the national accounts, while there are reasons to assume that production in those areas has been relatively substantial: (i) public investments in rural infrastructure are assumed to have improved market access in the more remote areas, increasing production incentives; and (ii) primary sector earnings increases have been more substantial among the lowest earners than among the best earners (Figure 4.2a). Assuming that the lowest earners are located mostly in the more remote areas, this may indicate that output increases in those areas were more substantial than in the less remote areas.³⁴

4.11 Third, *agricultural earnings for 2005 may have been overestimated*. Owing to difficulties in estimating the value of agricultural production, agricultural non-wage earnings have been estimated as a residual between household consumption on the one hand, and non-agricultural non-wage earnings, wage earnings, non-labor earnings and net transfers, on the other. A strong assumption of zero savings is made in using this residual as an estimate of agricultural non-wage earnings. It is possible that these earnings have been overestimated for 2005 because the political crisis in 2002 and the ensuing economic disruptions forced households to use their savings or accumulated stocks of produce to maintain consumption levels. In that case, the amount of savings used for consumption would have been incorrectly attributed to agricultural earnings. The fact that the 2005 survey was conducted more than three years after the crisis, however, reduces the strength of this concern.

4.12 Finally, differences between micro and macro data occur because *earnings as derived from household surveys reflect distributional issues which do not occur in the national accounts output data*, in which changes in output across sub-sectors are averaged. In the case of Madagascar, modest growth in the primary sector output may be a result of the 42 percent fall in high-value vanilla production, partly offsetting the 28 percent increase in rice production during this period.³⁵ Since a small portion of agricultural workers are involved in vanilla production (less than 2.5 percent), and a large portion produce rice (over 85 percent), the distribution of agricultural earnings in the household survey data is determined largely by the outcomes for rice producers, not by vanilla producers. In addition, because rice workers account for the majority of agricultural workers, the household survey is more likely to be representative of rice workers.³⁶ Thus, the increases in both mean and median labor earnings – and the entire distribution – measured in the household survey are likely to represent increases in the production of rice (and other crops for which there were increases in production during this period, such as maize, cassava and fruit). Changes in primary sector output per worker in the national accounts, on the other hand, average the changes in output across all of the sub-sectors.

The more unproductive workers seem to have left the secondary sector, ...

4.13 Although the possibility that the comparability of micro and macro data for the secondary sector is also to some extent compromised by data compatibility issues cannot be excluded, the productivity and earnings data for this sector seem to allow a meaningful comparison and a cautious interpretation.

³⁴ See Stifel, Minten, and Dorosch (2003) on the correlation between individual earnings and household consumption, and household consumption and remoteness.

³⁵ FAOStat, 2007.

³⁶ There were only 200 households out of a sample of 11,781 that reported producing vanilla.

4.14 While secondary sector mean wages fell by almost one-third between 2001 and 2005, average output per worker more than doubled. At the same time, the number of persons working in the sector decreased by more than half. The notion that a large share of workers could apparently depart without significantly affecting overall sector output suggests that the sector shed large numbers of unproductive workers. As is seen in Table 4.2, in 2005 wage workers made up a substantially larger share of all secondary sector workers (77 percent) than in 2001 (59 percent), which might suggest that it was largely the self-employed and household enterprise workers who left the sector in this period. That they could exit from the sector without causing a fall in total output could be a sign of disguised unemployment among these workers.³⁷

Table 4.2: Employment Distribution in the Secondary Sector, 2005 and 2001 (%)

	2005	2001
Wage employment	77.4	59.0
Self-employed	5.6	14.1
Family labor	17.0	27.0

Source: HHS 2005, 2001.

4.15 The assumption that the less productive workers left the sector is strengthened by the earnings data for the self-employed. Although the share of the self-employed in secondary sector employment dropped from 14 percent to 6 percent, the median earnings of this category were almost 70 percent higher in 2005 than in 2001. This leads to the hypothesis that the most productive (highest earning) self-employed remained in the sector while others moved (probably) to the primary sector.

... while the highest wage earners seem to have seen their wages fall or their jobs disappear

4.16 Although these observations provide an explanation for the sharp increase in labor productivity, the question remains as to why higher productivity was not accompanied by higher earnings, except, presumably, in the case of the self-employed. For an answer, we return to the difference between mean and median earnings (Table 4.1). Mean earnings in the secondary sector dropped by more than 30 percent but median earnings fell less than 5 percent. This reflects the fact that it was largely those at the top of the secondary sector income distribution who saw their earnings fall. As can be seen in Figure 4.2b, changes in median earnings for the lowest-earning quintiles in the secondary sector were ambiguous and much less pronounced. Considering the importance of the share of waged workers in this sector, and taking into account that the median earnings of waged workers fell by only 8 percent, it also seems likely that in the waged sector the highest paid workers experienced a relatively substantial loss of earnings, if not their jobs. The latter seems to be supported by the observation that, for the economy as a whole, the decline in wage employment was largely driven by the fall in (presumably higher paid) management-level positions. An additional explanation for this trend could be that the only enterprises that weathered the crisis were those that either paid lower wages in the first place, or reduced them during the period under observation.

³⁷ Disguised unemployment occurs when the marginal labor product is positive but the removal of a worker does not reduce output (see Sen [1966]).

The relatively high wages in the tertiary sector converged with secondary sector levels

4.17 The tertiary sector experienced a sharp reduction in mean earnings, even though the average output per worker barely changed. Unlike the secondary sector, there were no significant differences in earnings changes between the earnings quintiles (hence, changes in mean and median earnings were fairly similar), nor were there substantial shifts in the shares of waged, self-employed and household enterprise workers. Developments in the tertiary sector can thus be summarized as a shedding of workers, and unchanged labor productivity, in combination with a substantial fall in average earnings.

4.18 The rationale behind these developments is as yet unclear. One possible (but only partial) explanation could be that the crisis-related fall in the tertiary sector labor demand eliminated or reduced a barrier that had kept tertiary sector wage earnings artificially high prior to the crisis. Because wage workers made up 55 to 60 percent of tertiary sector workers, changes in their earnings would be reflected in a change in median earnings, just as the absence of wage workers' productivity would limit the observed changes in average output per worker. As is reflected in Table 4.3, tertiary sector wages exceeded those in the secondary sector by 12.6 percent. By 2005, median wage earnings had fallen in both sectors and the difference had been reduced to 4.8 percent. While this clearly indicates a convergence of wages between the sectors, the assumption that wage workers' productivity did not change (or hardly changed) while earnings fell remains untested and thus unconfirmed. An analysis of possible reasons for the initial difference in wage earnings between the secondary and tertiary sectors as well as for their convergence could help shed more light on whether the crisis helped to "unleash market forces" where tertiary sector workers had previously been sheltered from competition, or whether other factors were at play.

4.19 At the same time that tertiary sector wages converged downward to the secondary sector level, family enterprise workers in both sectors saw their earnings fall by around 30 percent, thereby maintaining the original earnings difference of around 3 percent. Mirroring this line of thought, it has been suggested that thaw might explain the changes in wages: that this similarity in earnings levels and changes might imply that no barriers between the secondary and tertiary sectors exist for family workers, and that perhaps this openness might improve the extent to which earnings reflect labor productivity.

4.20 For the self-employed (10-15 percent of tertiary sector workers), tertiary sector earnings fell drastically as earnings in the secondary sector rose. As a result, in 2005 tertiary sector earnings were only 60 percent of the earnings of the secondary sector self-employed, even though in 2001 they had been 60 percent higher. It is unclear as to what assumptions concerning the relation between labor productivity and wages can be drawn from these developments.

Table 4.3: Median Earnings by Sector and Employment Status, 2005 and 2001 (MGA x 1,000)

	2005			2001		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
Wage employment	39.2	84.8	88.9	49.4	91.9	103.5
Self-employed	50.1	118.2	70.2	38.3	70.0	111.2
Family labor	30.6	45.0	46.8	23.0	65.6	67.6

Source: HHS 2005, 2001.

5. LINKING EMPLOYMENT AND EARNINGS WITH POVERTY

In this chapter:

- *Between 2001 and 2005, earnings differences between the poor and the non-poor, as well as across employment categories, became smaller.*
- *The fall in poverty rate in this period seems due to an increase of the number of working household members in the relatively better-off households. The fall in the poverty depth seems closely linked to the increase in hourly earnings of the poorer population groups.*
- *For the poorer households, tertiary sector income was substantially more important in 2005 than in 2001. For the better-off households, the fall in importance of the secondary sector corresponds with findings that the crisis particularly affected the high earners in this sector.*

5.1 This chapter examines the links between employment and labor earnings on the one hand and poverty on the other. While the many-faceted nature of poverty is recognized, for the purpose of this analysis it is defined in terms of expenditure levels, since these are relatively objective measures of poverty which can be derived from household surveys and are strongly linked to labor income.

5.2 While the individual has been the focal point of the previous chapters, poverty is measured at the household level. Therefore, after a brief description of the labor market conditions of the poor and the non-poor at the individual level, the unit of analysis in this chapter moves to the household level.³⁸ The chapter starts by comparing the employment and income profiles of the poor with those of the better-off segments of the population. It then moves to an examination of the effect of changes in the sectoral structure of household earnings and employment on poverty. Finally, the components that make up household labor income are examined, and the impact on poverty of changes in each of these components is assessed.

5.3 First of all, however, it is worth briefly focusing attention on the impact of the level of the selected poverty line that is used in the subsequent analysis. As was described in Chapter 2 the national poverty line, which is used to determine poverty-based indicators in this report, puts the headcount rate of poverty in Madagascar at 68.7 percent (2005). This has two implications. First, when “the poor” are discussed in this context, this actually refers to the large majority of the Malagasy population. If a focus is desired on a smaller share of the population that is poor even in relative terms, it may be preferable to focus on the one or two poorest expenditure quintiles of the population rather than on all of the poor. To allow both, the following analysis tends to reflect the results of the distinction between “poor” and “non-poor” as well as the distinction between the various expenditure quintiles.

³⁸ Also, since many labor allocation decisions in low income countries such as Madagascar are at the household level, any effort to establish a link between labor market outcomes and poverty must view those outcomes in the context of the household (see, for example, Behrman [1999] and Singh, Squire and Strauss [1986]). Not that this report does not touch upon intra-household distribution issues.

5.4 Second, the high headcount poverty rate implies that improvements in the conditions of the poorest of the poor are not reflected in changes in the headcount poverty rate unless they are so substantial that they pull households out of poverty. The poverty headcount rate therefore may be a less appropriate indicator for capturing changes in the living conditions of a large share of the poor than, for example, the depth of poverty. This is taken into account in Sections B and C of this chapter, which analyze the effects of sectoral changes and earnings determinants not only on poverty incidence but also on poverty depth.

A. EMPLOYMENT AND EARNINGS PROFILES OF THE POPULATION

Different developments in the employment status of the poor and the non-poor

5.5 Table 5.1 depicts the employment status of the working age population by poverty level for the years 1999, 2001, and 2005. There has been a clear trend of decreasing inactivity, which is combined with a rise in employment but also with an increase in unemployment. Not surprisingly, the poor had higher levels of employment and lower levels of unemployment and inactivity in each of these years.

5.6 The patterns of change of these variables over time have been quite different for the two groups. Between 1999 and 2001, the share of the non-poor who worked decreased. Their level of employment fell, and the share of unemployed and inactive adults increased. In the same period, the poor started to work more frequently, as evidenced by the rise in employment and the fall in both unemployment and inactivity. It is possible that the economic circumstances in Madagascar in this period were such that they allowed some of the better-off to remain idle, while at the same time they provided increased job opportunities for those (the poor) who wanted to work.

5.7 The situation was reversed from 2001 to 2005. By 2005, non-poor inactivity had decreased substantially. While a significant share of the formerly inactive was working by 2005 (employment increased by 9.1 percent), the doubling of the unemployment rate would seem to indicate that not all of those who wanted to work had found jobs. The non-poor may have attempted to deal with the adverse effects of the 2002 crisis by raising the share of workers in their households (an assumption which is strengthened in Section C of this chapter). The poor, on the other hand, experienced only minor changes during the same period. The fall in inactivity of the poor by 1.1 percentage point appears to have resulted mainly in an increase in the unemployment rate of approximately equal extent.³⁹

5.8 Of those who worked, four out of five were in household enterprises, while 15 percent were wage employed and the remaining 6 percent were self-employed (2005 data). For the poor, family labor was even more important (85 percent), while a larger than average share of the non-poor were in wage employment or were self-employed (see Table 5.2, and Annex 4 for the same table by expenditure quintiles).

5.9 As mentioned in Chapter 2, the period from 1999 to 2001 saw the share of waged workers increase (by 3.3 percentage points) at the expense of the shares of both the self-employed and family workers. However, the share of the poor with waged work fell by 2.3 percentage points in this period, as the shares of the poor in self-employment and family labor rose.

³⁹ See Annex 4 for a replication of Table 5.1 by quintiles, which reveals some additional insights. For example, in 2005 the poorest quintile had lower employment and higher inactivity than the subsequent two quintiles. This may imply that although it may be mainly the better-off who are unemployed or inactive, these can also be characteristics of the poorest of the poor who are in that situation because they are not able to find work.

**Table 5.1: Employment Status of the Working Age Population by Poverty Level
2005, 2001, and 1999**

	Employed	Unemployed	Inactive
2005	85.8	2.6	11.9
Poor	88.7	1.7	9.8
Non-Poor	80.8	4.4	15.5
2001	82.5	1.2	16.5
Poor	88.4	0.8	10.9
Non-Poor	71.7	2.2	26.7
1999	79.2	1.3	19.8
Poor	80.7	1.2	18.3
Non-Poor	76.1	1.6	22.7

Source: HHS 2005, 2001, 1999.

5.10 In 2005, the share of workers in family labor was 5.6 percentage points higher than it had been in 2001. This change in the distribution of workers across employment categories was largely due to changes in the distribution of the non-poor: the share of the non-poor in family labor rose by almost 22 percentage points to 68.2 percent, at the expense of both wage employment and self employment. In the same period, changes in the distribution of the poor across employment categories were much less pronounced. The increase in the share of family workers can be assumed to be closely related to the rise in primary sector workers by 6.2 percentage points in the same period. It should also be noted that the large increase in the share of the non-poor in family labor mirrors the sectoral shifts as observed in Chapter 3 (Table 3.2), where it was noted that despite the increased importance of the primary sector as a source of employment the share of the poor in this sector had actually gone down.

**Table 5.2: Employment Status of the Working Age Employed population by Poverty Level
(2005, 2001, 1999)**

	Wage employed	Self-employed	Family labor	Total	Weekly working hours	
					1 st job	1 st and 2 nd job
2005	14.9	5.9	79.2	100	37.0	45.4
Poor	10.8	4.1	85.2	100	35.6	44.4
Non-Poor	22.7	9.2	68.2	100	39.7	47.1
2001	18.3	8.2	73.6	100	42.3	46.9
Poor	8.7	5.7	85.6	100	40.9	46.1
Non-Poor	39.8	13.7	46.5	100	45.3	48.7
1999	15.0	9.7	75.3	100	..	..
Poor	11.0	7.8	81.2	100	..	..
Non-Poor	23.5	13.9	62.5	100	..	..

Source: HHS 2005, 2001, 1999.

5.11 On average, the employed poor work fewer hours per week than the non-poor, particularly when only the workers' primary jobs are taken into account. In 2005 the poor spent 10.3 percent less time in their primary job than the non-poor (35.6 hours compared to 39.7 hours per week). This difference is reduced to 5.7 percent when the hours worked in second jobs are also taken into account. These data may reflect that poverty among the working poor is caused at least partly by their inability to work enough hours to help them escape poverty, even after having taken on a second job. Indeed, looking at poor workers in wage jobs, it appears that, in 2005, 27.2 percent were poor owing to short working hours only

(< 40 hours per week), while another 30 percent of poor wage workers were poor owing to a combination of both short working hours and low productivity (World Bank, 2007a).

5.12 Between 2001 and 2005, the average number of hours worked by employed persons in their primary jobs fell substantially, by 13 percent (5.3 hours per week). The work force seems to have made up for these lost hours by working more hours in second jobs. As a result, the decline in the average number of hours worked in primary and secondary jobs combined was limited to 3 percent (1.5 hours).⁴⁰ This increase in hours worked in second jobs was solely due to the sharp increase in the share of workers who held second jobs (from 13.3 percent to 28.9 percent). The number of hours spent by workers in second jobs actually decreased (from 23.7 to 21.7 hours per week). The decline in hours worked in the primary job, being partly offset by a rise in hours spent on a second job, occurred among both poor and non-poor workers.

Earnings differences between employment categories and between the poor and non-poor became smaller

5.13 If we turn our attention from employment status to earnings, we see that the median earnings of waged workers were higher than those of the self-employed, and that, in turn, the median earnings of the self-employed were higher than those of family laborers. This was the case not only for the working population as a whole, but also for the different employment categories by expenditure quintile or by poverty status, in 2001 and in 2005. For example, the median earnings of the poorest 20 percent of the wage workers were higher than those of the poorest 20 percent of the self-employed. The difference for the poorest 20 percent of the family laborers was even more pronounced. And the difference between wage workers and household enterprise workers was so substantial that the median earnings of the poorest quintile of wage workers corresponded to those of the fourth expenditure quintile of family laborers in 2005. In other words, in 2005 only around 30 percent of family laborers had median earnings that were above those of the poorest wage workers (Table 5.3).

5.14 Between 2001 and 2005 the differences in median earnings between all employment categories were reduced, as the earnings of wage workers fell by almost a quarter and the earnings of the self-employed and family laborers increased (by 11 percent and 20 percent, respectively), the latter increase being related in particular to the rise in agricultural earnings. An interesting pattern emerges when the changes in earnings over time are compared between the poor and the non-poor. For wage workers, the earnings of both the poor and the non-poor were lower in 2005 than in 2001. For the self-employed and household enterprise workers, however, the median earnings of the non-poor fell while those of the poor increased, which resulted in a narrower gap between the earnings of the poor and those of the non-poor.

⁴⁰ The household surveys do not contain information on employment in addition to first and second jobs.

Table 5.3: Median Monthly Earnings by Employment Status, by Quintile and Poverty Level, 2005 and 2001 (MGA x 1,000)

	Wage workers	Self-employed	Family labor
2005	71.50	57.00	31.10
Poorest	41.90	32.10	17.00
Q2	50.00	44.10	25.80
Q3	51.30	46.80	31.30
Q4	73.00	64.80	39.00
Richest	110.00	71.80	60.20
Poor	48.90	44.10	26.00
Non-Poor	100.00	76.10	49.60
2001	88.10	51.50	24.30
Poorest	24.70	22.50	12.90
Q2	42.30	37.20	19.50
Q3	60.10	35.00	25.90
Q4	77.20	44.20	42.00
Richest	120.00	116.80	70.30
Poor	58.70	33.50	21.00
Non-Poor	108.70	99.90	60.50

Source: HHS 2005, 2001, 1999.

The importance of agricultural earnings for better-off households increased substantially

5.15 As mentioned earlier in this chapter, poverty is measured at the household level. Table 5.4 moves individual employment and earnings information to the household level by showing the various sources from which household income is derived and the shares of household income that they provided in 2001 and 2005. By far the largest share of household income is derived from agriculture (69 percent in 2005), with smaller shares from non-agricultural wage employment (15 percent), non-farm enterprise income (13 percent), and non-labor income transfers (4 percent). Compared to 2001, this reflects a 7 percentage point increase in agricultural earnings which occurred mainly at the expense of a fall in non-agricultural wages.

5.16 The changes in the composition of household income for the poor in this period differed substantially from those of the non-poor. There were also large differences between the various expenditure quintiles. Not surprisingly, the poor derived a larger share of their income from agriculture than the non-poor in both 2001 and 2005. However, there was a large increase in the share of agricultural income for the non-poor, from 31 percent in 2001 to 53 percent in 2005. This rise in the agricultural share came largely at the expense of income from wage employment, which was the main source of income for the non-poor in 2001 but saw its share reduced to 24 percent in 2005. These data appear to be consistent with earlier findings that earnings increased in the primary sector and fell in industry and services, and that there has been a major crisis-related influx of labor into agriculture.

5.17 A comparison between expenditure quintiles completes this picture. In the two richest quintiles, the portions of income derived from non-farm enterprise and, particularly, non-agricultural wage work, fell between 2001 and 2005, while that from agricultural income increased. The rise in the importance of agricultural income was especially pronounced in the richest population quintile; there, the share of agricultural income more than doubled from 22 percent to 47 percent. An opposite trend was seen in the poorer expenditure quintiles, where a (modest) decrease in the share of agricultural income of around 5

percentage points occurred, which was picked up by both non-agricultural wage employment and non-farm enterprise employment. In the absence of panel data, it is not possible to determine whether these changes occurred through changes in the income structure of households that remained within the same quintile (i.e., the poorest households remaining the poorest while becoming less reliant on agricultural income) or as a result of the re-ranking of households across the distribution (e.g., more agriculture-dependent households moving to higher expenditure quintiles).

Table 5.4: Structure of Household Income by Quintile and Poverty Level, 2005 and 2001 (%)

	Agriculture*	Wage employment**	Non farm enterprise	Net transfers***	Total
2005	68.6	14.6	13.1	3.7	100
Poorest	80.1	7.1	8.7	4.1	100
Q2	75.3	11.8	10.4	2.5	100
Q3	74.6	10.6	11.8	3.0	100
Q4	67.1	15.7	13.5	3.6	100
Richest	45.7	27.8	21.0	5.4	100
Poor	75.9	10.1	10.8	3.2	100
Non Poor	52.5	24.4	18.3	4.9	100
2001	62.1	20.0	13.3	4.6	100
Poorest	84.5	4.9	6.4	4.3	100
Q2	80.1	7.5	8.7	3.7	100
Q3	70.3	14.4	11.3	3.9	100
Q4	53.4	25.9	16.3	4.3	100
Richest	21.7	47.9	23.8	6.6	100
Poor	75.6	10.8	9.6	4.0	100
Non Poor	30.9	41.5	21.8	5.8	100

* Residual + agricultural wages; ** excluding agricultural wages; *** family remittances and public transfers.

Source: HHS 2005, 2001.

Public transfers and remittances appear to have had a positive impact on poverty reduction

5.18 Before turning to an examination of the composition of household earnings by sectoral origin, we briefly touch upon the effects of non-labor income transfers on poverty. As is clear from Table 5.5, non-labor income transfers, defined as the sum of family remittances and public transfers received by the household, make up a larger share of income for the better-off households in the population. This was the case in 2001 as well as in 2005, although in the latter year the importance of transfers relative to labor-income sources had declined.

5.19 The impact of remittances and public transfers on both the poverty rate and the poverty gap is depicted in Table 5.5⁴¹ Both in 2001 and in 2005, these transfers helped reduce the poverty rate by 1.7 percentage points, with the larger part of these positive effects being due to remittances (public transfers accounted for a reduction in poverty of 0.4 percentage points in 2005 and 0.2 percentage points in 2005). Also in both years, non-labor income transfers are estimated to have reduced the poverty gap in 2005 by 2 percentage points.

⁴¹ For this table, poverty is measured through income. Hence, the poverty data in the table are not similar to the poverty data used throughout the rest of this report, which are based on expenditures.

Table 5.5: Impact of Non-labor Transfers on Poverty, 2005 and 2001

	2005	2001
Headcount poverty, based on:		
- total income	69.2	69.5
- total income minus remittances and public transfers	70.9	71.2
- total income minus public transfers	69.4	69.9
Poverty gap, based on:		
- total income	28	36
- total income minus remittances and public transfers	30	38
- total income minus public transfers	29	36

Source: HHS 2005, 2001, 1999.

B. SECTORAL EMPLOYMENT, EARNINGS AND POVERTY

5.20 Like Table 5.4, Table 5.6 depicts the sources of household income, but this time distinguishing between earnings from the three economic sectors. In addition to reflecting the findings on agricultural earnings from the previous section of this chapter (by showing the important role of the primary sector for the poor in particular and for the better-off increasingly), this table also shows the relative importance of the secondary and tertiary sectors in the provision of household income.

The importance of tertiary sector income increased substantially for the poorer households

5.21 The tertiary sector was, after the primary sector, the second largest source of earnings (21.4 percent in 2005). Secondary sector activities, on the other hand, accounted for only 3.5 percent of household income in 2005. Owing to the substantial increase in the importance of the primary sector for the better-off households, the share of primary sector earnings in household income for the nation as a whole went up by 6.0 percentage points. The shares of all other identified sources of income declined, particularly that of the secondary sector, which saw its share reduced by more than half. The reduction in the tertiary sector's share between 2001 and 2005 was limited to 0.5 percentage points.

5.22 As for the primary sector, the average changes in the secondary and tertiary sector shares mask important differences in distributional levels and changes in the composition of household income. For example, those in the richest quintile earned considerably more from secondary and tertiary sector activities (6.8 percent and 36.6 percent, respectively) than the poorest (1.9 percent and 12.6 percent, respectively). As the importance of the primary sector declined for the poorest households (despite the increase in median earnings for primary sector workers observed earlier), the share of income originating from the tertiary sector more than doubled for the two poorest quintiles. Conversely, richer households became substantially more dependent on primary activities as earnings from both the secondary and tertiary sectors fell.

The relatively strong fall in the importance of the secondary sector for the better-off households corresponds with findings that the crisis affected the high earners in this sector particularly

5.23 The secondary sector was the only sector of which the relative importance as a source of household income fell for all expenditure quintiles. This confirms the decrease in both employment and

earnings in this sector. The relatively large fall in the secondary sector income share for the two richest quintiles further corresponds with the assumption posited in Chapter 4 that, owing to the crisis, the highest (wage) earners in the secondary sector in particular experienced either a fall in income or the loss of their job.

5.24 There are various possible explanations for the observed increase in the share of tertiary sector income of the poor in combination with the rise in the importance of primary sector earnings of the better-off in the population. One possibility is that a portion of the poor moved into tertiary sector activities and a portion of the rich moved into agriculture (the latter option seeming particularly plausible considering the effects of the crisis). Another option is that there have been changes in the geographic composition of households in the various income quintiles. As rural poverty fell and urban poverty increased between 2001 and 2005, the poorest quintiles in 2005 probably contained more urban households which would be less dependent on primary sector income than in 2001. Similarly, there would be more primary sector dependent rural households in the better-off quintiles in 2005 than there were in 2001. Although it may appear that the actual changes in household income structure by quintile have been the result of both possible developments, the absence of panel data does not allow the verification of this assumption.

Table 5.6: Structure of Household Income by Sector, by Quintile and Poverty Level, 2005 and 2001

	Primary (%)	Secondary (%)	Tertiary (%)	Non-labor earnings (%)	Income transfers** (%)	Total
2005	70.7	3.5	21.4	0.7	3.7	100
Poorest	81.02	1.9	12.6	0.5	4.0	100
Q2	77.1	2.1	17.8	0.5	2.5	100
Q3	76.2	3.0	16.9	1.0	2.9	100
Q4	68.8	3.6	23.0	1.0	3.7	100
Richest	50.6	6.8	36.6	0.4	5.5	100
2001	64.8	7.9	21.9	1.0	4.5	100
Poorest	87.2	3.0	5.4	0.2	4.3	100
Q2	82.4	4.3	8.4	1.1	3.7	100
Q3	73.3	5.0	16.0	1.9	3.8	100
Q4	56.7	10.7	27.0	1.2	4.3	100
Richest	23.7	16.5	52.9	0.4	6.5	100

Source: HHS 2005, 2001, 1999.

A decomposition of poverty changes in changes “within” and “between” sectors...

5.25 In an effort to better understand the link between changes in household sectoral earnings and poverty, changes in poverty can be decomposed into those components that can be attributed to changes in poverty within the sectors, and to movement among the sectors, as proposed by Ravallion and Huppi (1991). By applying an additively separable poverty measure, P , to two distributions of household consumption over time (years 1 and 2), the difference in national poverty for this time period can be broken down into three general components:⁴²

⁴² The Foster, Greer and Thorbecke (1984) measures, P_{α} , are a class of such additively separable poverty measures. In this analysis we use the headcount ratio (P_0) and the depth of poverty (P_1).

$$P^2 - P^1 = \sum_{s=1}^3 (P_s^2 - P_s^1)n_s^1 + \sum_{s=1}^3 (n_s^2 - n_s^1)P_s^1 + \sum_{s=1}^3 (P_s^2 - P_s^1)(n_s^2 - n_s^1)$$

Intrasectoral effects:
Change in poverty arising from
within sector poverty changes
Intersectoral effects:
Change in poverty arising from
employment/earning shifts
Interaction between sectoral
changes and population shifts

Equation 5.1

where P_s^t is the poverty measured in sector s at time t , and n_s^t is the population share of sector s at time t . The first component, the intra-sectoral effects, shows how changes in poverty within each sector contribute to the aggregate change in poverty. The second component is the contribution of changes in the distribution of the population across the sectors. The final component, the residual, can be interpreted as a measure of the correlation between population shifts and changes in poverty within the sectors.

5.26 Because the decomposition is performed at the household level, households must be assigned to a sector. Since households have multiple sources of income, this is not straightforward, and this section adopts two approaches to allocate households to a sector. In the first approach, households are assigned to a sector if more than half of the workers in the household were employed in that sector. The second approach assigns households to a sector if more than half of the total household labor income is derived from that sector. In both cases there are households for which either employment or income is distributed across all three sectors in such a way that they are not associated with any sectors. These households, along with those with no labor income, are categorized as “other.”

5.27 The results of the decompositions are shown in Table 5.7. The upper half of the table depicts the results of the decomposition using the approach that categorizes households by number of workers in each sector; the lower half depicts the results from the approach that classifies households by sectoral income. The interpretation of the results is similar to the results of the Shapley decomposition in Chapter 3. For example, if the classification is by number of workers, the headcount poverty rate would fall by 6.8 percentage points owing to the fall in poverty in the primary sector, provided that there had been no movement of workers between sectors. Likewise, the movement of workers into the primary sector would have caused poverty to increase by 7.0 percentage points if the inter-sectoral poverty reduction (i.e., the increases in primary sector earnings) had not occurred at the same time.

5.28 As is clear from Table 5.7, the two classification methods produce similar results except for the intrasectoral effects attributed to the secondary sector. Furthermore, the directions of the various effects are similar for both the incidence (headcount ratio) and the depth of poverty measures, although the relative magnitude of the contributions is always higher for the incidence.

... attributes the fall in poverty largely to a decrease in poverty within the primary sector

5.29 The decrease in poverty between 2001 and 2005 appears to be due largely to the fall in poverty *within* the primary sector (6.8 percentage points in the sectoral categorization by household workers and 6.5 percentage points in the categorization by household earnings).

5.30 The employment shift out of the secondary and tertiary sectors into the primary sector following the 2002 crisis is reflected in the rising shares of the population living in primary sector households. For example, the percentage of the population living in households with more than half of the household workers employed in the primary sector rose from 67.4 to 75.5 percent. Similarly, the share living in

households in which more than half of the earnings came from this sector rose from 66.5 to 73.4 percent (Table 5.7). As more households became more dependent on primary sector employment and earnings, the sector accounted for a greater percentage of the poor. This is illustrated by the positive and large inter-sectoral effects (7.0 percentage points in the upper half of the table and 5.9 percentage points in the lower half). With poverty rates highest in the primary sector, it is not surprising that national poverty would rise substantially as more workers are employed in this sector and we assume that the sectoral poverty rates are held constant.

5.31 The opposite is observed for the tertiary sector, where poverty within the sector has risen (positive intra-sectoral effect). However, because employment in this sector fell (15.6 percent lived in households with more than half of the workers in the tertiary sector in 2005 compared to 17.5 percent in 2001), and, in particular, because a portion of the poor left, the sector contributed marginally to a fall in national poverty, as seen in the small positive inter-sectoral effect.

5.32 In a similar way to the tertiary sector, the secondary sector is attributed a negative inter-sectoral effect, as the fall in employment lowered the share of the poor. As has been mentioned, the sign of the intra-sectoral effect in the secondary sector is ambiguous.

Table 5.7: Decomposition of Changes in Poverty into Intra-sectoral and Inter-sectoral Effects, 2001-2005

	2005	2001	Change	<u>Intra-sectoral effects</u> :				<u>Inter-sectoral effects</u> :				Residual
				Prim.	Sec.	Tert.	Other	Prim.	Sec.	Tert.	Other	
<i>Households categorized by shares of workers</i>												
Levels												
Incidence (P₀)	68.7	69.7	-1.0	-6.8	-0.4	3.1	0.1	7.0	-1.5	-0.5	-1.0	-0.9
Depth (P₀)	26.8	34.9	-8.7	-10.5	-0.3	1.2	0.1	3.7	-0.6	-0.2	-0.3	-1.2
Share of Total Population												
2005				67.4	5.9	17.5	9.3					
2001				75.5	1.6	15.6	7.4					
<i>Households categorized by shares of income</i>												
Levels												
Incidence (P₀)	68.7	69.7	-1.0	-6.5	0.8	3.3	-0.2	5.9	-1.6	-0.3	-1.3	-1.1
Depth (P₀)	26.8	34.9	-8.7	-9.9	0.0	1.2	-0.1	3.1	-0.6	-0.1	-0.6	-1.0
Share of Total Population												
2005				66.5	7.5	21.8	4.2					
2001				73.4	3.5	21.0	2.1					

Source: HHS 2005, 2001, 1999.

5.33 It is worth noting that although this decomposition is informative it suffers from a weakness in that it cannot fully differentiate the sources of income changes. For example, the decreased reliance on primary sector income for the poorest households does not lead to a shift in household category since well over 50 percent of their household income remains to come from the primary sector. The fall in the depth of poverty among households in this category that may be due to increases in tertiary sector income is attributed to improvements in the primary sector. With this in mind, Section C moves away from the sectoral sources of household earnings and turns to a different breakdown of household income.

C. THE VARIOUS SOURCES OF LABOR INCOME AND THEIR LINK WITH POVERTY

A decomposition of poverty changes in changes in sources of income ...

5.34 Another way of analyzing how labor income is linked to poverty is to disentangle those sources of household per capita labor income that are responsible for the observed changes in income. This approach, based on a methodology from Kakwani, Neri and Son (2006), decomposes changes in household labor income into components such as household average hourly earnings, hours worked and employment. This decomposition can then be used as a basis for simulating changes in poverty. The starting point is to note that the average weekly labor income of household j can be written as:

$$\frac{I_j}{N_j} = \frac{I_j}{H_j} \frac{H_j}{E_j} \frac{E_j}{L_j} \frac{L_j}{N_j}$$

Equation 5.2

where I_j is the total weekly labor income of the household, N_j is the number of household members, H_j is the total number of hours worked per week by household members, E_j is the number of employed household members, and L_j is the number of household members participating in the labor force. Because an important fraction of labor stems from children and – to a lesser extent – elder workers, hours worked (H_j), household employment (E_j), and household labor force (L_j) are determined taking into account all household members, not just those of working age.

5.35 Using equation 5.2 as a basis, one can determine the portions of the average change in average household labor income that are due to changes in household hourly earnings, hours worked, unemployment, and participation. These results appear in the bottom panel of Table 5.8 (see Annex B2 for a more elaborate description of this approach).

... shows that the rise in per capita household labor income was due to increased hourly earnings

5.36 The results of the decomposition appear in the bottom panel of Table 5.8. The two upper panels depict the value of the various sources of labor income for 2005 and 2001; the third panel shows the changes in these values between the two years. This third panel illustrates that between 2001 and 2005 there was an increase in the average hourly earnings and the household participation rate, both of which would be expected to have affected per capita household income positively. On the other hand, in the same period the unemployment rate increased and the number of average hours worked per week per employed person fell, and these developments are likely to have had a negative effect on household income. As the table shows, the overall impact of these changes has been positive, as average household per capita weekly labor income increased by 15 percent between 2001 and 2005.

5.37 The fourth panel attributes weights and directions to the contributions of the various sources of earnings to this 15 percent increase in labor income. As expected, changes in the household participation rate and, in particular, average hourly earnings, affected income growth positively. Indeed, 138 percent of the increase is explained by the rise in hourly earnings, offsetting both the fall in average hours worked and the rise in household unemployment.

Changes in hourly earnings increased the income of the poor and reduced that of the better-off

5.38 Changes in per capita household labor income have not been uniform across the population: the labor income of the poor increased by 29 percent while that of the non-poor fell by 15 percent. A review of the changes per expenditure quintile shows that the poorer quintiles showed the greatest gain. Average household earnings rose in each of the three poorest quintiles by 53.0 percent, 37.6 percent, and 18.1 percent, respectively. At the same time they fell by 2.5 percent and 20 percent, respectively, in the two richest quintiles.

5.39 It is interesting to note that changes in hourly earnings explain both the increase in total earnings among the poorer households and the fall in total earnings among the better-off. It should be noted that the rate of growth of hourly earnings falls from 76 percent for the poorest quintile to 26.9 percent for the middle quintile. It then turns negative for the fourth quintile (-5.6 percent) and the richest (-25.6 percent) quintile. Thus, changes in hourly earnings account for between 133.3 percent and 149.3 percent of the changes in total household per capita labor income.

Table 5.8: Household Labor Income Profile, 2005 and 2001

<i>Geometric mean across households</i>	Expenditure Quintile					Poor	Non-Poor	Total
	Poorest	Q2	Q3	Q4	Richest			
2005								
Average hourly earnings	152.5	224.3	258.1	312.6	506.2	216.0	432.6	267.2
Average hours worked per week by the employed	37.6	40.6	42.3	42.8	44.1	40.4	43.8	41.4
Household unemployment rate	1.5	1.4	1.9	2.3	4.7	1.6	4.1	2.4
Household participation rate*	36.7	38.6	41.9	45.0	48.5	39.6	47.5	41.9
<i>Total household per capita weekly labor income</i>	<i>2,090</i>	<i>3,551</i>	<i>4,578</i>	<i>6,039</i>	<i>10,345</i>	<i>3,465</i>	<i>8,727</i>	<i>4,599</i>
2001								
Average hourly earnings	86.6	146.6	203.3	331.2	680.0	152.2	546.3	222.3
Average hours worked per week by the employed	41.2	43.4	43.8	45.5	45.5	43.1	45.6	43.8
Household unemployment rate	0.3	0.8	0.7	1.2	2.7	0.7	2.2	1.1
Household participation rate*	38.1	40.4	43.3	41.5	42.8	40.9	41.9	41.2
<i>Total household per capita weekly labor income</i>	<i>1,366</i>	<i>2,581</i>	<i>3,876</i>	<i>6,196</i>	<i>12,924</i>	<i>2,681</i>	<i>10,297</i>	<i>3,995</i>
Percent Change								
Average hourly earnings	76.0	53.0	26.9	-5.6	-25.6	41.9	-20.8	20.2
Average hours worked per week by the employed	-8.9	-6.5	-3.4	-5.8	-3.1	-6.3	-3.9	-5.5
Household unemployment rate	484.5	63.1	177.3	90.3	71.5	122.6	89.2	105.7
Household participation rate*	-3.6	-4.4	-3.1	8.5	13.3	-3.0	13.6	1.8
<i>Total household per capita weekly labor income</i>	<i>53.0</i>	<i>37.6</i>	<i>18.1</i>	<i>-2.5</i>	<i>-20.0</i>	<i>29.3</i>	<i>-15.2</i>	<i>15.1</i>
Sources of Change in Labor Income (percent)								
Average hourly earnings	133.7	138.4	149.3	124.9	133.3	142.8	140.6	138.3
Average hours worked per week by the employed	-21.9	-21.9	-21.6	128.4	14.1	-26.7	24.1	-42.8
Household unemployment rate	-3.0	-1.8	-7.8	23.8	9.1	-3.6	11.9	-9.3
Household participation rate*	-8.8	-14.8	-19.9	-177.1	-56.5	-12.5	-76.6	13.8
<i>Total household per capita weekly labor income**</i>	<i>+</i>	<i>+</i>	<i>+</i>	<i>-</i>	<i>-</i>	<i>+</i>	<i>-</i>	<i>+</i>

* Share of adult household member who are working or looking for work.

** A "+" indicates that average labor income rose, while a "-" indicates that it fell between 2001 and 2005.

Source: HHS 2005, 2001.

5.40 For the poorer households this increase in hourly earnings tended to be the only source of labor income that contributed positively to the rise in earnings. Its impact was substantial enough to easily offset the negative impacts of the fall in hours worked, the fall in participation rate, and the increase in

unemployment. In the better-off households, the negative effect on labor income of the fall in hourly earnings was compounded by the reduction in the number of hours worked as well as by the increase in unemployment. The only component that dampened these effects was the participation rate.

The increase in hourly earnings reduced the depth of poverty, though not its level

5.41 Increasing the understanding of the linkages among poverty, employment, and earnings involves the simulation of the effect on poverty of changes in the sources of labor income. The following approach is taken in this chapter. To isolate the effect of changes in hourly earnings, the average hourly earnings for all households are scaled in the 2001 data, so that the mean of each expenditure quintile equals the mean of the 2005 data. The resulting changes in total labor earnings are added to household expenditures, on the basis of which new poverty levels are calculated. The difference in the simulated poverty level and the original poverty level is then attributed to changes in hourly earnings. The same approach is taken to derive the contribution of changes in the number of average household hours worked, and the percent of household members who are employed.

5.42 The results of this simulation, summarized in Table 5.9, are consistent with the previous analysis. They also illustrate that the effects of earnings and employment on poverty depend on the type of poverty measure used (incidence or depth), which highlights the importance of an emphasis on distribution, as in earlier parts of this report.

5.43 Consider the change in the incidence of poverty. Since a large percent of the population falls below the poverty line (68.7 percent in 2005), factors that affect the headcount ratio will necessarily affect the relatively better-off households (i.e., those households around the seventieth percentile). As noted in Table 5.8, average hourly earnings fell for those households in the two richest quintiles, which explains the fact that the simulated changes in hourly earnings alone resulted in an increase in poverty of 1.0 percentage point.

5.44 Changes for the poorer parts of the population, on the other hand, influenced the depth rather than the incidence of poverty. For example, the increase in hourly earnings for those at the lower end of the distribution has had little effect on the incidence of poverty, as this measure is insensitive to changes in the earnings of those who remain poor. But it does affect the depth of poverty, as this measure represents the average consumption shortfall in the population (i.e., the average of the poverty gaps). Thus, the substantial increases in hourly earnings for households in the lowest three quintiles resulted in a 6.9 percentage point decrease in the depth of poverty. The resulting increases in labor earnings for these households more than offset the increase in the share that became poor owing to the fall in earnings among the better-off households.

Table 5.9: Simulated Changes in Poverty Due to Changes in Household Labor Income Profile (reference year 2001)

	2005	2001	Diff	Hourly earnings	Hours worked	Percent employed	Other
Incidence (P₀)	68.7	69.7	-1.0	1.0	1.5	-1.9	-1.7
Depth (P₁)	26.8	34.9	-8.1	-6.9	1.3	0.4	-3.0

Source: HHS 2005, 2001.

5.45 The opposite can be observed for employment. The fall in employment among poorer households contributes to an increase in the depth of poverty, while a rise in employment (an increase in household

participation means an increase in household employment) among households in the top two quintiles translates into a decrease in the percent of households that are poor.

5.46 The combination of the sectoral decomposition of poverty and the simulated changes in poverty based on the components of household labor income helps to formulate a larger picture of how changes in employment and earnings affected individuals in different types of households, and how these changes manifested themselves in changes in poverty.

5.47 For example, the fall in the poverty rate (headcount ratio) appears to be driven by households in the upper portion of the income distribution who rely more on agriculture for their incomes, and who escape poverty through having more household members who work.

5.48 Although the poorest 40 percent of the population remain poor, the depth of their poverty has fallen as a result of higher earnings. These higher earnings appear to come from earnings in the tertiary sector, as they rely more on this sector as a source of household income. Although earnings in the tertiary sector have fallen overall, households with members who switch from low-paying agricultural employment to higher-paying non-farm employment will see a rise in household income even if they do not escape poverty entirely.

See Annex B3 for a comparison of the changes in household per capita weekly labor income and the sources of these changes between rural and urban areas, and between Madagascar's six provinces.

Box 5.1: A Closer Look at Child Labor

A closer look at child labor rates at different points in time (2005, 2001), and across regions with different levels of urbanization, produces the following findings (see table below):

- Child labor rates decreased among the poorest households, and increased in the better-off households. This occurred across the country, in large urban centers, secondary cities, and rural areas alike.
- Child labor rates in large urban centers were consistently and considerably lower than in secondary cities and rural areas.
- In large urban centers and rural areas, the child labor rate fell between 2001 and 2005. In secondary cities, the child labor rate increased.

These observations allow a number of assumptions:

- The differences in changes in child labor rates between the expenditure quintiles may be linked to the condensation of the income and expenditure distributions. Poorer households became better off, reducing their need for child labor, while at the same time better-off households coped with a fall in earnings and expenditures by increasing household employment, including of their children.
- The relatively high earnings and the large supply of “good jobs” in large urban centers offer an explanation for the low child labor rates in these areas. Additional reasons could include better access to education, fewer opportunities for children to work (most child labor involves farm activities) and thus also lower opportunity costs to education, and the higher importance attached to education in large urban centers.
- The increase in child labor in secondary cities may reflect that these cities were particularly hard-hit by the crisis. As mentioned earlier, unlike households in the larger cities, where wage work increased, households in secondary cities experienced a reduction in both the number and the share of wage jobs (by 13.2 percentage points). Although wage employment also declined in rural areas, the share of rural wage work fell by only 2.8 percentage points. An additional explanation of the relative high impact of the crisis on secondary cities is that it may have been more difficult for households in these areas to benefit optimally from the increased earnings opportunities in agriculture. Although a large share of workers was engaged in agriculture, access to (good) land may have been limited relative to access for households in rural areas.
- The large decline in rural child labor rates may have not only been related to improvements in the economic well-being of rural households (recall that rural poverty fell by 3.8 percentage points). An additional explanation may be that the large increase in the supply of adult labor due to the crisis reduced the demand for child labor. Indeed, the labor inflow was so substantial that it is assumed to have reduced even the average weekly working hours of adults.

These – as yet untested – findings not only endorse the link between poverty and child labor, but also reflect a high sensitivity of child labor rates to short-term changes in the economic well-being of households. In other words, child labor is used as a mechanism to cope with the (risk of) immediate household income loss. Furthermore, the use of child labor as a coping mechanism occurs in all layers of the population, even among the better-off households. Particularly taking into account the possible long-term negative effects of child labor – as it keeps children from going to school and thus limits their future earnings potential – improved (access to) alternative household coping mechanisms may not only reduce child labor rates in the short term, but are also likely to generate benefits that will help to structurally reduce poverty (particularly when combined with efforts to improve the access to and the quality of education, such as are ongoing under the Education For All initiative).

Table 5.10: Child Labor Rates by Expenditure Quintile and Level of Urbanization, 2005, 2001

		Total	Poorest	Q2	Q3	Q4	Richest
National	2005	18.8	24.3	18.3	18.6	17.4	12.6
	2001	24.3	36.6	26.3	24.3	18.2	7.1
Large urban	2005	2.9	0.0	7.9	0.0	0.9	3.1
	2001	5.1	16.9	20.3	5.0	4.5	2.0
Second cities	2005	18.5	25.3	18.2	20.6	15.4	12.1
	2001	15.7	39.4	24.6	15.3	7.1	5.6
Rural	2005	20.5	24.9	19.3	19.7	19.8	15.6
	2001	27.7	36.8	26.7	27.3	23.1	10.6

6. GOOD JOBS, BAD JOBS*

In this chapter:

- *Educational attainment reduces the probability of working in agriculture. Educational attainment is also positively linked with earnings levels in each employment category.*
- *Differences in education and experience do not fully explain gender differences in wage earnings. The gender wage gap in the informal sector is significantly larger than in the formal private sector.*
- *Higher returns to secondary education in the public sector compared to those in the formal private sector could be a sign of segmentation between these two labor market segments.*

6.1 As indicated in Chapter 2, good jobs – measured in terms of earnings – tend to be waged, non-agricultural, urban, and in the formal sector, and are more likely to be held by the higher educated and by men. This chapter further explores the individual and household characteristics that influence the probability that an individual will acquire a good job, as well as the determinants of earnings. It also reviews whether earnings differences between good and bad jobs may be due to labor market segmentation.

A. THE PROBABILITY OF GETTING A GOOD JOB

6.2 To estimate how individual and household characteristics affect the probability that an individual will be in a certain employment category, a multi-nominal logit model has been applied on the 2005 HHS data. The employment categories that have been distinguished are “non-agricultural formal,” “non-agricultural informal,” and “agricultural,” where the first is considered as providing the “best” type of employment and the last is assumed to provide the “worst” jobs.⁴³ In addition, the category “not working” is included, covering both unemployment and inactivity. The (possible) determinants of employment that are tested by the model include age, educational attainment, household structure, a number of measures of non-labor income and assets, and migration and capital city dummies. The model has been run separately for working age men and women in both rural and urban areas, and the results are summarized in Annex C. The main findings are described below.

* This chapter is largely derived from World Bank (2007a) by Stifel, Rakotomanana, and Celada (forthcoming).

⁴³ Wage employment is considered formal if the employer contributes to a pension fund or provides social protection. Non-wage employment is considered formal if the enterprise is registered with the authorities.

The probability of being in an agricultural (“bad”) job is mainly reduced by educational attainment

6.3 **Education.** The probability of working in each of the various identified employment categories is most substantially and consistently influenced by educational attainment. Regardless of gender or area of residence, a higher level of education is associated with a smaller probability of being employed in agriculture. In rural areas, for example, women are 6 percent more likely to be employed in other sectors or not employed if they have only a primary education. Those with a lower secondary education are 26 percent more likely to be employed, while those with an upper secondary education and post-secondary education are 39 percent and 53 percent more likely, respectively, not to work in agriculture. The effects are even greater for men in rural areas (from 8 percent for those with only a primary education to 59 percent for those with post-secondary education). In urban areas, the probability for both genders of working in agriculture decreases with educational attainment by around 8 percent (primary education) to approximately 37 percent (post-secondary education).

6.4 The probability of being employed in the formal sector increases substantially with higher levels of education, consistent with the assumption that formal sector jobs are more accessible to those with skills or to those who can more easily be trained. For upper secondary education, the increases in the probability of formal sector employment vary from 20 percent (urban men) to 26 percent (rural men). For post-secondary education, the increases in probability range from 33 percent (rural women and urban men) to 45 percent (urban women). There are no systematic differences in these marginal effects by gender or region.

6.5 The effect of education on the probability of informal non-agricultural employment is mixed. In urban areas, men with more education are 3 to 13 percent less likely to be employed in the informal sector, while women with only a primary education are 4 percent more likely to be in this sector. In rural areas, lower levels of education are associated with a greater probability of informal employment.

6.6 If we suppose that those with higher a educational attainment tend to reside in better-off households, the findings on the probability of non-employment by education level are consistent with the assumption posed in Chapter 2 that in the Malagasy context unemployment – or inactivity – is a luxury that can be afforded only by the better-off. Thus, the probability of non-employment is higher for those with an education than for those with no education. Unlike the relationship between education and formal sector employment, the effect of education on non-employment is not monotonic (except for women in rural areas). Indeed, the effect does increase monotonically from primary to lower secondary to upper secondary, but it drops off for post-secondary. This may follow from the availability of relatively more lucrative employment opportunities for the limited number of individuals with post-secondary education, thus raising the opportunity cost of remaining either unemployed or out of the labor force.

6.7 A word of caution on the above interpretation is, however, warranted. The findings of the analysis do not automatically imply that educational attainment improves the chances of acquiring good, well-earning employment. There seems to be, for instance, a strong intergenerational correlation of schooling levels, as youth who live in households with relatively more educated household members are more likely to attend school. As this implies that schooling is not randomly distributed across the sample used, the estimates in the above described will be biased. (Also see Behrman, 1999.) Moreover, analyses such as the one described above do not reveal the direction of any causality. While this does not pose a problem in the case of educational attainment and good jobs (as educational attainment precedes employment), in other instances the direction of causality may be less obvious, such as for instance when considering the impact of credit availability on the possibility of having a good job (or, indeed, vice versa) as described below.

6.8 **Capital city.** Since Antananarivo is the manufacturing and industrial center of the country and the seat of most central government offices, it is not surprising that in the capital men are 84 percent and women are 88 percent more likely than in other urban areas to be employed in the formal sector. They are also least likely to be employed in agriculture.

The influence of the other determinants is generally less substantial or less straightforward

6.9 **Age.** Older individuals are more likely to be employed in one form or another. For urban women this employment is primarily in non-agricultural labor (0.3 percent more likely with each year of age), while urban men are more likely to find formal sector jobs (0.5 percent more likely with each year of age). In rural areas the default sector is agriculture (0.5 percent for men and 0.2 percent for women).

6.10 **Migration.** Migration reduces the probability of working in agriculture, and in most cases increases the probability of informal sector work. Rural migrant women are the exception, as they are no more likely than non-migrant women to be employed in the informal sector. Migrants are generally not more likely than non-migrants to be unemployed or out of the labor force, except for urban migrant women, who are 4 percent more likely not to be employed.

6.11 **Non-labor income and assets.** A number of other interesting results can be derived from the inclusion of determinants that capture non-labor income and assets. For example, individuals in urban households that have successfully obtained credit are more likely to be employed in the formal sector and less likely to be employed in agriculture. Urban men are 10 percent more likely to have a formal sector job if they have access to credit. Only part of this can be explained by access to credit improving the prospects of family non-farm enterprises. From similar sets of models that were estimated for wage and non-wage non-agricultural employment choices (not included in this report), it appears that the increase in the probability of wage employment is in fact greater than the increase in the probability of non-wage employment due to access to credit. The 5 percent greater likelihood of formal sector employment among women, however, can plausibly be attributed to credit affecting non-farm enterprise profitability.

6.12 Although non-labor income appears to have no effect on employment choices, individuals in households who have accumulated agricultural assets are more likely to remain in the agricultural sector than in any other employment option. The direction of causality may go the other way with regard to these assets, however. Individuals living in agricultural households who expect to remain in agriculture are more likely to accumulate agricultural specific assets than those who expect to work in some other sector. Thus, it is the employment in agriculture that leads to the accumulation of agricultural assets, not the accumulation of these assets, which affects the probability of employment in agriculture.

6.13 **Household structure.** The effects of household structure on employment differ by gender and by area of residence. For example, the number of children under the age of 5 in rural households decreases the probability of non-employment for both men and women in rural areas by 1.7 percent, while in urban areas this percentage varies from 3.1 percent for women to 3.9 percent for men. A higher number of adults in a household increases the probability of non-employment, particularly in urban areas. Finally, the number of older persons (over 65 years of age) in a household affects employment status quite significantly. Except for urban males, the presence of older males in a household decreases the probability of informal employment by up to 11 percent (for urban females). It increases the probability of females being employed in agriculture by 5 percent (urban) to 9 percent (rural), and raises the probability of non-employment for both genders and for geographic areas (although not significantly for urban males). The presence of older women, on the other hand, has a significant (negative) effect on the probability of non-employment for rural women.

B. THE DETERMINANTS OF EARNINGS

6.14 This section moves from exploring the influence of individual and household characteristics on *employment status* to reviewing the determinants of *earnings*. For this purpose, earnings functions are estimated separately for those employed in non-agricultural wage jobs, non-agricultural non-wage jobs, and agriculture.⁴⁴ An advantage of the estimation of earnings functions over the comparisons that were made in Chapter 2 among employment types, gender, education levels, etc., is that earnings functions estimate the impact of various characteristics on individual earnings while controlling for the effects of other possible determinants. The earnings functions thus provide a clearer view of the impact of each of these characteristics.

6.15 The dependent variable used in the earnings functions is the log of real daily earnings, which means that the estimated coefficients represent the percentage change in daily earnings for a one unit change in the associated explanatory variable. The explanatory variables used are those typically found in standard Mincerian earnings functions, and include hours worked per day, work experience, education level, and gender.⁴⁵ Selection bias is controlled for by a correction method in which selectivity is modeled as a multi-nominal logit.⁴⁶ The results are shown in Table 6.1 for the year 2005 and 2001 and the difference between both years.

In each employment category earnings increase significantly with the level of education

6.16 **Education.** As in the previous section, when the level of education is related with the probability of ending up in a good or a bad employment category, the effects of education on earnings were positive and significant, and increased monotonically with the level of schooling.⁴⁷ However, the correlation between education and earnings does not necessarily represent causation, as adolescents who reside in households with more education are more likely to attend school, and thus schooling is not distributed randomly among the individuals in the sample. In other words, the returns to schooling in Table 6.1 are likely to be overestimated and should be interpreted with caution.

6.17 The returns to education were largest for wage workers. For example, while earnings were 23 percent higher for wage workers with a primary education than for those with no education, the returns to primary schooling were 12 percent for non-wage workers and 8 percent for agricultural workers. Wage workers with an upper secondary level of education earned 69 percent more than those without schooling, while those with a post-secondary education earned 105 percent more on average. For primary and lower secondary education, the returns were greater for non-wage workers than for agricultural workers. For upper secondary and post-secondary education, the returns were higher for agricultural labor than for non-wage labor. This latter finding, however, should be treated with care since the sample is small (these workers represent less than 2 percent of the entire workforce).

⁴⁴ It should be noted that the types of employment that are distinguished differ somewhat from those in the previous section, where the two non-agricultural categories were formal and informal rather than wage and non-wage jobs.

⁴⁵ Experience is difficult to measure, as it is unknown when persons started working. Experience here is calculated as the individual's age minus the number of years of schooling (plus 5 years). It is important to account for experience, as it is negatively correlated to education. Since experience is likely to contribute positively to earnings, the error terms in the model are likely to be negatively correlated with education without the inclusion of the experience variable.

⁴⁶ This method is proposed by Bourguignon, Fournier and Gurgand (2007), and is an extension of the method as proposed by Lee (1983), which deviates from probit-based selectivity models.

⁴⁷ This differs from Glick (1999), who found no statistically significant effect of primary education in Madagascar.

Table 6.1: Determinants of Daily Earnings, 2005 and 2001

	2005		2001		Difference	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Wage employed (non-agriculture)						
Hours worked per day	0.027	5.23**	0.017	3.53**	0.011	1.514
Experience	0.035	5.70**	0.017	2.60**	0.019	2.08*
Experience squared	0.000	-4.05**	0.000	-0.95	0.000	-2.02*
Education						
- Primary	0.232	5.65**	0.280	5.94**	-0.049	-0.78
- Lower secondary	0.480	11.03**	0.591	11.59**	-0.111	-1.66+
- Upper secondary	0.693	14.23**	0.720	13.20**	-0.026	-0.36
- Post secondary	1.054	21.18**	1.170	21.44**	-0.115	-1.56
Female dummy	-0.320	-10.89**	-0.285	-9.77**	-0.035	-0.84
Constant	7.572	22.31**	7.799	24.41**	-0.227	-0.49
Number of observations	2,993		2,558			
R-squared	0.29		0.32			
Non-farm non-wage						
Hours worked per day	0.025	2.73**	0.034	3.71**	-0.009	-0.70
Experience	0.012	1.26	-0.001	-0.08	0.013	0.78
Experience squared	-0.0003	-1.86 +	0.0000	-0.12	0.000	-0.92
Education						
- Primary	0.116	2.02*	0.200	2.55*	-0.084	-0.87
- Lower secondary	0.260	3.83**	0.255	2.78**	0.0005	0.04
- Upper secondary	0.428	4.71**	0.579	5.33**	-0.151	-1.07
- Post secondary	0.715	5.29**	0.758	5.75**	-0.043	-0.23
Female dummy	-0.323	-6.77**	-0.313	-5.35**	-0.009	-0.12
Constant	7.370	18.50**	8.142	13.19**	-0.771	-1.05
Number of observations	2,432		1,229			
R-squared	0.09		0.17			
Agriculture						
Hours worked per day	0.002	0.54	0.053	9.18**	-0.051	-7.61**
Experience	-0.009	-2.69**	-0.017	-3.11**	0.0008	1.19
Experience squared	0.000	3.39**	0.000	2.79**	0.000	-0.59
Education						
- Primary	0.084	5.60**	0.251	9.39**	-0.167	-5.45**
- Lower secondary	0.218	8.70**	0.371	7.23**	-0.153	-2.69**
- Upper secondary	0.438	8.75**	0.674	8.24**	-0.236	-2.46*
- Post secondary	0.877	10.64**	1.114	8.24**	-0.237	-1.50
Female dummy	-0.023	-1.78+	0.002	0.08	-0.025	-0.99
Constant	7.932	101.57**	6.942	57.64**	0.990	6.90**
Number of observations	17,266		5,077			
R-squared	0.09		0.18			

Notes: (i) Regional dummies included but not shown; (ii) the model corrects for selection bias as proposed by Bourguignon, Fournier, and Gurgand (2004).

Source: HHS 2005, 2001.

6.18 In the agricultural sector, the returns to education in 2005 were significantly lower than in 2001 for primary (17 percentage points), lower secondary (15 percentage points) and upper secondary (24 percentage points) education levels. In non-agricultural jobs the only significant fall in returns was in the wage sector for lower secondary education (11 percentage points).

6.19 **Experience.** Work experience contributed positively to wage earnings. The significance of the quadratic term for experience in the wage earnings equation for 2005 indicates that experience was associated with increases wage earnings up to the age of 40, after which earnings fell. This was considerably lower than the turning point of 78 in the 2001 model, which may have been a consequence of the deterioration in overall wage earnings affecting older workers more than younger workers. In agriculture, experience affected earnings in a negative manner up until the age of 25, after which point the returns increased. In 2001 the turning point was 10 years higher (35 years of age). Experience did not have a discernable effect on non-wage earnings.

6.20 **Hours worked.** Based on the 2005 data, earnings increased with the number of hours worked for non-agricultural workers (both wage work and non-farm enterprises) but not significantly for agricultural workers. This may be a sign of disguised employment in agriculture. In 2001 agricultural daily earnings increased significantly for each extra hour worked, by 5 percent, which was more than the increases in non-agriculture from an extra hour worked in the same year. This change in the effect on earnings of extra hours worked in agriculture may be closely related to the large influx of labor and the associated fall in labor productivity in this sector described in Chapter 3.

Differences in education and experience do not fully explain gender differences in wage earnings

6.21 **Gender.** In both wage and non-wage non-agricultural employment, women earned 32 percent less than men when we control for education, experience, and other factors determining employment selection.⁴⁸ Although the earnings estimate does not produce a significant difference in male and female agricultural earnings, this does not imply that the agricultural earnings were equal between the sexes, as the calculation of these earnings is based on the equal allocation of the larger share of agricultural income among working household members.

6.22 Table 6.2 provides some further insights into the earnings differences between the genders for the *wage* employed. For this group of workers, the results of the estimation of the earnings determinants for men and women separately confirm that the returns to both experience and education differed by gender, although only the returns to primary sector education (14 percentage points higher for men than for women) help explain the gender gap in wage earnings. Post-secondary education returns were higher for women (by 19 percentage points), but this concerns only a small share of workers: in 2005, only 2.6 percent of working adults had a post-secondary education.⁴⁹

6.23 The returns to experience for women were initially greater than for men but diminished at a faster rate. An additional year of experience for a woman with five years of experience resulted in a 4.7 percent earnings increase compared to 2.3 percent for men, but by the time men and women attained 26 years of experience the returns were similar.

⁴⁸ In calculating work experience similarly for both sexes, experience for women may be overestimated compared to experience for men, as women are more likely to have had maternity related non-working periods.

⁴⁹ These findings are supported by a simulation of the effects of education alone on the wage earnings of men and women (World Bank, 2007a). The gender gap for those without education is found to be 16 percent. For those with primary education, the gap increases to 25 percent, and then becomes smaller again for lower secondary (18 percent), upper secondary (10 percent) and post-secondary (8 percent) education.

6.24 The significant difference in the constant term (160 percent) indicates that a part of the gap remains unexplained by the model. In other words, the lower wage earnings for women compared to men are only partly explained by differences in the returns of education and experience.

Table 6.2: Determinants of Daily Wage Earnings by Gender, 2005

	Male		Female		Difference	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Hours worked per day	0.026	4.63**	0.039	4.69**	0.013	1.32
Experience	0.025	3.63**	0.055	6.56**	0.030	2.78**
Experience squared	-0.0002	-1.96*	-0.0008	-5.52**	-0.0006	-3.03**
Education						
- Primary	0.306	7.33**	0.167	3.21**	-0.139	-2.08*
- Lower secondary	0.514	11.32**	0.485	8.52**	-0.029	-0.40
- Upper secondary	0.713	14.04**	0.833	11.86**	0.120	1.38
- Post secondary	1.072	20.81**	1.264	18.20**	0.192	2.22*
Constant	7.857	27.21**	6.257	19.49**	-1.600	-3.70**
Number of observations	2,325					
R-squared	0.31					

Notes: (i) Provincial dummies included but not shown; (ii) corrected for selection bias as proposed by Bourguignon, Fournier, and Gurgand (2004).

Source: HHS 2005.

C. IS THE WAGE LABOR MARKET SEGMENTED?

Differences in wages for workers with similar characteristics can signal labor market segmentation

6.25 Much of the theoretical literature on labor markets in developing countries has in common that it emphasizes the fragmentation of labor into different segments. Although it is hard to prove empirically, there appears to be a consensus that in some contexts different parts of the labor market follow their own dynamic, particularly in terms of wage determination and employment policy, and that movement between the different segments is limited. While numerous different fragments can exist in reality, the literature regularly stylizes the labor market into a dual system, consisting of a “good” and a “bad” segment.⁵⁰ There seems to be no consensus about what exactly distinguishes the two segments. In the literature, the good segment is alternatively called the “formal,” “urban,” “modern” and/or “industrial” sector; the bad segment is referred to as “informal,” “rural,” “traditional” and/or agricultural.⁵¹ Which parts of the labor market are considered to be the good and the bad segments can differ between countries and over time.

6.26 While there may be various reasons for the existence of labor market segmentation, the general consequence is that workers with equal characteristics do not receive equal returns to labor across the segments. There are barriers to labor mobility, and the labor demand for the good segment exceeds the labor supply. In the context of this report, labor market segmentation is important in that it may lead to the greater incidence and depth of poverty by preventing workers from earning a higher income by moving to the good segment of the labor market.

⁵⁰ See Magnac (1991), and Heckman and Sedlacek (1985) for a discussion of testing labor market dualism.

⁵¹ See Fields (2004).

6.27 Segmentation models can be used to explain certain labor market developments that do not make sense under a unique labor market, such as why labor productivity can increase simultaneously with a fall in wages, why a firm can add workers without raising wages, or why urban employment creation may increase unemployment. Indeed, in Chapter 4 it was suggested that segmentation could provide an explanation for observed changes in tertiary sector earnings and labor productivity which seemed hard to reconcile with a competitive market model.

6.28 As labor market segmentation implies that comparable workers receive different earnings, an analysis of whether workers with similar characteristics receive different returns to labor in different segments could shed light on the question of whether segmentation exists. The results of such an analysis should be interpreted with caution, however, as there may be explanations other than segmentation. For example, wage differentials could be caused by differing non-pecuniary job characteristics or unobserved worker characteristics, monopsonistic power in one (or more) of the segments, or transaction costs involved with moving from one segment to the other. Thus, although it remains useful to determine whether different labor market segments reward observable worker characteristics differently, the existence of such differences does not necessarily imply that the labor market is segmented.

Returns to secondary education in the public sector are higher than in the formal private sector

6.29 To examine Madagascar's labor market for signs of segmentation, separate earnings functions were estimated in 2005 for non-agricultural wage earnings in the public, private formal,⁵² and private informal sectors. Although, unfortunately, the restriction to non-agricultural wage workers excludes a large share of the Malagasy workers, it has the advantages that wage data are believed to be more reliable than data on non-wage workers, and that all earnings that are grouped together and compared have been calculated in a similar fashion. The parameter estimates in the earnings functions will therefore more accurately reflect differences in the returns to labor rather than differences in the definitions of earnings.

6.30 Table 6.3 shows the results of tests of whether the differences between the various determinants across these three sectors were significant.⁵³ The model finds significant differences in the returns to lower and upper secondary education between wage workers in the public and private formal sectors (at the 10 percent significance level). All other identified characteristics generated similar – or at least, not statistically different – returns in each sector. The returns to both lower secondary and upper secondary education were about twice as high for public sector wage workers than for private formal sector wage workers (46 percent compared to 21 percent for lower secondary, and 53 percent compared to 27 for upper secondary education). From the simulation of the earnings of public sector workers undertaken to find out whether their returns to education were equal to those of private formal sector workers, it becomes clear that 30 percent of the earnings difference can be attributed to this difference in returns to education. Furthermore, from the rejection of the existence of different constants in both models, it can be inferred that 70 percent of the earnings differences between public and private formal sector wage workers are explained by the characteristics that are identified in the model.

6.31 The higher returns to secondary education for public sector workers compared to formal private sector workers could be a sign of labor segmentation between the two sectors. However, as previously noted, there could be other explanations. The determination as to whether the differences in returns to

⁵² A worker is considered to be employed in the private formal sector if the worker or the employer contributes to a pension fund, or if the worker receives social protection.

⁵³ Funkhouser (1998) points out that the allocation of workers across sectors is determined by the marginal worker and not the mean worker. This analysis, along with those of others (e.g., Dickens and Lang, 1985), is admittedly based on the latter.

labor are indeed the results of labor segmentation would require a more detailed review of the wage determinants and employment policies of both sectors, and of the dynamics between the two sectors.

The gender wage gap is significantly higher in the informal sector than in the formal private sector

6.32 The only variable that generates different returns when the private formal sector is compared with the private informal sector is gender. Whereas in the formal sector women on average earned 26 percent less than men with otherwise similar characteristics, this gender gap was as high as 40 percent in the informal sector. Separate estimates of earnings functions for men and women by formality status (not depicted here) further indicate that the earnings differences are not explained by differences in returns to experience or education. In addition, simulations by gender (similar to Table 6.2) for the formal and informal sectors show large differences between the constant terms, which seem to indicate an unobserved form of gender discrimination in both the private formal and the private informal wage sectors. These findings are supported by Cling et al. (2007). Based on labor force surveys that were conducted in Antananarivo since 1995, they conclude that gender discrimination in remuneration is twice as high in the (capital's) economy as a whole (including both formal and informal and wage and non-wage workers) than it is in the formal secondary sectors.

Table 6.3: Testing for Segmentation - Determinants of Daily Wage Earnings, 2005

	(1)		(2)		(3)		Difference (1-2)		Difference (2-3)	
	Public sector		Private formal sector		Private informal sector		Public minus formal		Formal minus informal	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Hours worked per day	0.024	2.86	0.010	1.00	0.028	4.28**	0.013	1.00	-0.018	-1.46
Experience	0.011	1.09	0.018	1.61	0.025	4.26**	-0.007	-0.5	-0.007	-0.55
Experience squared	0.000	0.24	0.000	-1.45	0.000	-4.29**	0.000	1.25	0.000	0.59
Education										
- Primary	0.208	1.87	0.134	1.37	0.146	3.64**	0.074	0.50	-0.012	-0.12
- Lower secondary	0.459	4.27	0.205	2.05*	0.283	6.01**	0.254	1.73+	-0.078	-0.71
- Upper secondary	0.532	5.00*	0.271	2.40*	0.454	7.05**	0.261	1.68+	-0.183	-1.40
- Post secondary	0.814	7.35**	0.735	6.62**	0.669	7.56**	0.079	0.51	0.066	0.47
Female dummy	-0.165	-3.24**	-0.259	-4.29**	-0.402	-12.37**	0.094	1.19	0.143	2.08*
Constant	8.145	14.84**	7.990	13.26**	7.289	42.11**	0.155	0.19	0.701	1.12
Number of observations	860		937		3,652					
R-squared	0.20		0.14		0.13					

Source: HHS 2005.

Estimates are corrected for selection bias by using a correction method as proposed by Bourguignon, Fournier, and Gurgand (2004).

7. CONCLUSIONS AND SUGGESTIONS FOR A WAY FORWARD

7.1 This report aims to increase the understanding of the manner in which employment and earnings help to translate economic growth (or the lack thereof) into poverty reduction in Madagascar. The main conclusions based on the findings of this report are described below. This report does not envisage providing definitive guidance on the concrete policy measures to improve the effectiveness of labor markets as such a transmission mechanism. That lies outside the scope of this report. However, these conclusions do provide a number of broad policy directions that can be used as a basis for further research and initial policy discussions for the Bank's Country Office staff. In particular:

To reduce poverty through employment, policies should focus on creating *more high-earning jobs*, rather than merely creating *more jobs*.

7.2 One policy question of importance is whether the manner in which labor markets translate growth into poverty reduction is better improved by increasing the employment intensity of growth, or by increasing earnings through, expectedly, raising labor productivity. Employment rates in Madagascar are high, with 88 percent of the adult population engaged in some kind of employment. The unemployment rate is a mere 2.6 percent. Furthermore, even in the period from 2001 to 2005, when GDP per capita declined, the number of new jobs generated (0.8 million) exceeded the growth of the working age population (0.6 million). While a large proportion of adults is somehow employed, however, a large share of them are working poor: of all those who work, two thirds live in poor households, and one third does not earn enough even to keep one individual out of poverty.

7.3 This leads to the conclusion that the creation of *better* jobs is more of an issue in Madagascar than the creation of *more* jobs. While employment is a necessary condition for poverty alleviation – helping to reduce the depth, if not always the incidence of poverty – the larger share of adults has shown to be able to find some kind of gainful employment even in times of economic adversity. The fact that many of them remain poor, however, demonstrates that *Government policies should focus on increasing earnings by increasing labor productivity*, particularly of those at the bottom of the earnings distribution. In this light, the reduction of the employment shares of the relatively high-earnings, high-productivity secondary and tertiary sectors in favor of the low-earnings, low-productivity primary sector that occurred between 2001 and 2005 should be considered a serious concern.

Further (cost benefit) analyses of potential policy interventions would help the Government to determine the most appropriate policy mix balancing the support of labor intensive output expansion of the secondary and tertiary sectors with increasing agricultural productivity.

7.4 A logical follow-up question is then whether policies should aim to increase earnings and labor productivity of the work that is currently being carried out by the poor, or whether they should

concentrate on labor intensive output expansion in the higher(er)-earnings, high(er)-productivity sectors which employ few poor, so that more of the poor can move there. In Madagascar, this question translates into determining whether policies should focus on increasing agricultural productivity (where the poor are), on generating more employment in the secondary and tertiary sectors where productivity and earnings are higher (so that the poor can move there), or a combination of both. Currently, the Government of Madagascar is committed both to agriculture oriented 'Rural Development and a Green Revolution' and to a 'High Growth Economy' which is more geared toward industry and services, without explicitly prioritizing one objective over the other.⁵⁴

7.5 The answer to the above raised question crucially depends on two factors. First, the very high labor productivity and earnings in the secondary and tertiary sectors compared to those in the primary sector. And second, the very small number of persons employed in the secondary and tertiary sectors compared to the number working in agriculture. In 2005, median monthly earnings in the primary sector were less than half of those in the other sectors. Primary sector labor productivity, defined as average output per worker, was only 8 percent and 14 percent of productivity in the secondary and tertiary sector, respectively. Considering the very substantial difference in both earnings and labor productivity between the primary sector and the other sectors, it seems unlikely that the primary sector will be able to catch up with the other sectors in the medium to short term. This implies that *efforts to alleviate poverty through labor should focus on moving workers from the low-earnings, low-productivity primary sector to the higher-earnings, higher-productivity secondary and tertiary sectors.*

7.6 The secondary and tertiary sectors, however, start from a small employment base. The tertiary sector employs 17.4 percent of the population, the secondary only 2.5 percent. The agricultural sector employs the rest, almost 8 out of every 10 working adults. Two conclusions can be drawn from this observation. First, as the tertiary sector employs almost 7 times as many workers as the secondary sector, employment intensive growth in the tertiary sector would probably generate more high(er)-earnings jobs than in the secondary sector. Policy interventions might therefore in general better focus on employment intensive growth in services than in industry (which is of course not to say that good opportunities in boosting secondary sector growth, such as currently in the mining sector, should not be taken full advantage off). Second, even when the secondary and tertiary sectors succeed in generating employment well above the rate with which the labor force increases, the share of agricultural workers that they can absorb will be relatively limited. The agricultural sector will thus in the foreseeable future remain the main sector of employment for the poor.

7.7 This continuation of the importance of the agricultural sector as an employer of the poor gives rise to the question whether, in addition to policy interventions to increase employment in the secondary and tertiary sectors, the Government should not also continue its efforts to increase primary sector productivity to improve the living standards of those who, at least for the time being, stay behind in agriculture. Particularly in the face of existing capacity and financial constraints, there is a trade-off between investing in significantly improving the living standards of a relatively limited number of households by facilitating the growth of secondary and tertiary jobs on the one hand, and in modestly improving the living standards of the larger share of the population by increasing primary sector productivity and earnings on the other hand.

7.8 The answer to the question *whether the Government should also aim to increase primary sector labor productivity depends among others on an assessment of the costs and benefits of interventions that would improve agricultural productivity compared to those that would increase secondary and tertiary sector employment.* Further analysis to help answer this question would therefore involve a review of i) which policy interventions can best boost employment intensive growth opportunities for the poor in

⁵⁴ See Madagascar Action Plan 2007-2012

industry and, particularly, services; what are the costs of these policies and what is the expected impact on poverty reduction; ii) which policy interventions can best raise agricultural productivity; what are their costs and their impact on poverty; iii) whether there are any policies, such as for instance well-targeted infrastructure projects, that at the same time help increase both agricultural productivity and employment creation in the sectors where earnings and productivity are higher; iv) what is the indirect impact of policy interventions on other sectors; for instance, policies that help move workers from agriculture to the tertiary sector may also raise average output per worker in the primary sector.

Understanding of the crisis-related departure of less productive workers from the secondary sector needs to be improved.

7.8 The observed impact of the 2002 crisis on employment and earnings allows a number of observations related to, among others, the exit of the less productive workers from the secondary sector, and the importance of agriculture as a coping mechanism.

7.9 Compared to 2001, the number of workers in the secondary sector in 2005 was reduced by half, while there were no major differences in output level (real output in 2005 was only 0.4 percent lower than in 2001). The crisis seems to have caused the departure of relatively unproductive workers, who seem to have been mainly self employed and family workers, rather than wage workers. This raises a number of yet unanswered questions, including whether any rigidities existed prior to the crisis that kept these apparently less productive workers attached to the secondary sector; why a similar development did not occur in the tertiary sector (where employment and output increased at more or less similar rates between 2001 and 2005); why the crisis triggered their departure from the sector and why, three years after the crisis, they have not (all) returned to the secondary sector. Particularly in the light of the suggested policy focus on increased employment intensive growth in the secondary and tertiary sectors, further *analysis that will improve insights in the nature of these developments in the secondary sector may provide useful in increasing understanding of how to better support the creation of high labor productivity jobs in the secondary (and tertiary) sector(s).*

The importance of the agricultural sector as a safety net should be taken into account in the design and targeting of social protection mechanisms.

7.10 The massive influx of labor into agriculture reflects the importance of agriculture as a last resort for income generation in times of crises. Particularly in a country like Madagascar, which over the past decades has experienced its fair share of economic crises, this likely has implications for the value that the Malagasy population attach to the opportunity to engage in agriculture. In other words, agriculture is not just an important economic sector, but also seems to function as a crucial safety net for a large share of the population. This is likely to add an additional perspective to any possible policy issues which would affect, for example, access to and ownership of agricultural land. Also, as most agricultural activities take place in the context of family enterprises, households without access to land lack the coping mechanism of agricultural production, and may therefore be particularly vulnerable when confronted with (economic) adversity. Therefore, *the particular vulnerability of households which cannot use (increased) agricultural production as a coping mechanism could be taken into account in the design of social protection mechanisms.*

7.11 A final observation regarding the impact of the crisis concerns the coinciding of the labor influx into agriculture with the global price increase of Madagascar's main crop, rice. Although a more detailed analysis of the impact of the changes in rice prices on poverty is forthcoming, it is likely that the agricultural sector would have been much less able to generate earnings for the substantial number of

workers who moved into agriculture if the increase in rice prices would not have occurred at the same time. In other words, the functioning of the agricultural sector as a coping mechanism during and after the 2002 crisis may have been substantially influenced by external factors, and *the extent to which the agricultural sector can function as a safety net during future crises should thus not be overestimated.*

As education and gender are the main determinants of acquiring good jobs, the Government should continue promoting equal access to education across socioeconomic groups and geographic areas, as well as gender equality on the work floor.

7.12 The poverty reducing impact of a larger availability of good jobs can be enhanced by improvements in the access to these jobs of individuals in poor and disadvantaged groups. Educational attainment and gender, as the main determinants of acquiring good jobs, are important levers through which equality of access to good jobs can be improved.

7.13 Educational attainment has shown to have a positive impact on the probability of obtaining non-agricultural, formal employment and higher earnings. *This highlights the importance of the continuing engagement of the Malagasy government in educational reforms.* As reflected in the Madagascar Action Plan (MAP), the commitment to achieve an ‘Educational Transformation’ includes the objective to increase access, quality, and effectiveness of education including for underprivileged and vulnerable population groups. The achievement of these goals is expected to positively affect the access of the poor to the available good jobs.

7.14 In the field of education, the Government is paying particular attention to the education of girls. While this is a welcome effort to promote gender equality, the analyses in this report suggest that the existing gender gap in earnings cannot be fully explained by the difference in education between male and female workers, nor by other observed factors that determine employment selection and earnings. The Government's recognition of the need for additional steps to diminish gender inequality is reflected in *the inclusion of the ‘promotion of gender equality and empowerment of women’* as one of the countries challenges in the MAP. One of the indicators of meeting this challenge is a reduction of the gender salary gap in the private sector by 50 percent by 2012. The Minister in charge of Women's Affairs is leading governmental efforts to promote female participation in economic, social, and civic affairs, as well as intensively recruit more women in the public sector at all levels.

7.15 Considering the importance of schooling and gender differences for obtaining good jobs, the Government should be encouraged to continue its efforts to improve educational attainment for the most vulnerable, and reduce gender inequality. To ensure an optimal impact of these initiatives, policies would greatly benefit from rigorous monitoring and evaluation exercises that would allow the continuous improvement of their efficiency and effectiveness.

There are a number of data issues that need to be resolved or taken into account: demographics, household surveys and national accounts, and the national poverty line.

7.16 The analyses that were conducted for the preparation of this report revealed a number of data-related issues. First, *there is an urgent need for updated demographic information.* The last population census in Madagascar was held in 1993 and does no longer serve as a reliable basis for demographic data. A comprehensive census is needed, on which the selection of participants and the weights of future household surveys can be based.

7.17 Second, a problem that is not confined to the Malagasy context is the difficulty to reconcile information from household surveys with aggregate data from the national accounts. In the context of this report, micro data on earnings are compared with average output per worker to review the linkages between returns to labor. The usefulness of the comparison is, however, limited by a number of compatibility issues between the micro and the macro data.⁵⁵ As a result, the review only allows some cautious assumptions to be made on the linkages between earnings on one hand, and labor productivity on the other. *Improvements in the consistency between household surveys and national accounts data would greatly expand the information that could be drawn from a combined analysis of the two data sources for many purposes.* Given the technical requirements of this recommendation, and considering that household surveys are regularly conducted with technical and financial assistance of donor agencies, this recommendation can likely not be affected without explicit donor recognition of the importance of improving the consistency between the two data sources.

7.18 Third, based on the national poverty line of 305,300 MGA per year in 2005, almost 70 percent of the Malagasy population lives in poverty. (Based on the \$1 a day poverty line, the 2005 poverty rate was 61 percent.) As a result, changes in the poverty rate (i.e. changes in headcount poverty) tend to occur when there is a change in living standards of the relatively better off households which are placed around the 70th percentile of the expenditures distribution. This implies that in *addition to the poverty rate, both the depth of poverty and inequality measures are particularly relevant indicators of poverty and changes in poverty in Madagascar.* The depth of poverty is important because changes in the situation of the poorest quintiles are not reflected in changes in the poverty rate, unless they concern such major improvements in expenditures that they households manage to cross the poverty line and leap from being ‘very poor’ to being ‘non-poor’. A measure of inequality helps to determine whether or not a change in headcount poverty is due to redistribution. For example, a fall in headcount poverty due to redistribution from the poorest to those around the 70th percentile is unlikely to be considered a positive development.

⁵⁵ See Robilliard and Robinson (2003) for an example of a method to reconcile HHS data with national accounts data for Madagascar.

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ANNEXES

A1. ANNEX TO CHAPTER 3: THE SHAPLEY DECOMPOSITION

A1.1 There are various ways in which the changes in employment, labor productivity, and population structure can be disentangled and related to changes in per capita GDP growth. Chapter 1 uses a Shapley approach to decompose and attribute to each of these three components a share of total observed growth, using the following identity:

$$\frac{Y}{N} = \left(\sum_{i=1}^S \frac{Y_i}{E_i} \frac{E_i}{A} \right) * \frac{A}{N}$$

Equation A.1

in which Y is total output, Y_i is the value added of sector $i = 1 \dots S$, E_i is the number of adult workers in sector i , A is the working age population, and N is the total population. Y/N is thus equal to GDP per capita, and Y_i/E_i reflects productivity per worker in sector i . E_i/A equals the share of the working age population employed in sector i , and is interpreted as a measure of employment in sector i . A/N , finally, is the share of the population that is of working age; this variable is therefore inversely related to the dependency rate.

A1.2 From the equation A.1 it is possible to decompose changes in per capita output in two consecutive periods, $\Delta Y/N$, into the marginal contribution of each of its sectoral components using a Shapley decomposition. This approach is based on the marginal effect on a variable of the sequential elimination of each of the contributory factors. The method then assigns to each factor the average of its marginal contributions in all possible elimination sequences. For example, to calculate the contribution of employment growth in the manufacturing sector to per capita GDP growth, changes in GDP per capita are calculated assuming that, in the period under observation, all variables remained unchanged except employment in manufacturing. The difference between this counterfactual per capita GDP growth and the actual growth is labeled “the contribution of changes in employment in manufacturing to per capita GDP growth.” As opposed to merely comparing growth rates of employment in manufacturing with per capita GDP growth, this approach has the advantage that the relative size of a sector is taken into account in the calculation of the contribution (see also Shorrocks, 1999).

A1.3 The decomposition can also be performed at the aggregate level. In this case, the contribution of changes in employment to per capita growth can be interpreted as a measure of the economy-wide employment intensity of growth.

A2. ANNEX TO CHAPTER 3: THE SOURCES OF CHANGE IN LABOR PRODUCTIVITY

A2.1 An understanding of the origin of changes in labor productivity (output per worker) can provide an important contribution to our insights into the causes of changes in GDP per capita. Changes in labor productivity can be the result of two different sources: increases in the capital-labor ratio, and increases in total factor productivity (TFP). Therefore, in Madagascar, where labor productivity declined during the period under observation, the question arises whether this decline was mainly due to a decline in the average capital stock per worker, or to certain inefficiencies that caused a fall in TFP.

A2.2 To answer this question, we approximate the contributions of changes in the capital-labor ratio and of changes in TFP to changes in output per worker. For this purpose, we assume a Cobb-Douglas production function with constant returns to scale,

$$Y = \Phi (K^\alpha E^{1-\alpha}) \quad \text{or} \quad \frac{Y}{E} = \Phi \left(\frac{K}{E} \right)^{1-\alpha}$$

Equation A2.1

where Y is total value added, Φ is total factor productivity, K is capital stock, E is employment, Y/E is output per worker, K/E is the capital-labor ratio, and α is the importance of physical capital in output. When an estimate of α is available, TFP can be calculated as follows:

$$\frac{Y}{E} / \left(\frac{K}{E} \right)^{(1-\alpha)} = TFP$$

Equation A2.2

A2.3 Changes in labor productivity can then be disaggregated into the contribution of changes in capital per worker and of changes in TFP:

$$\Delta\omega = \Delta k^{1-\alpha} \frac{(TFP_{t=0} + TFP_{t=1})}{2} + \Delta TFP \frac{(k^{1-\alpha}_{t=0} + k^{1-\alpha}_{t=1})}{2}$$

Equation A2.3

where $\omega = Y/E$ is total output per worker, and k is the capital-labor ratio K/E .⁵⁶

⁵⁶ In principle, this analysis can also be conducted for individual sectors. However, in the case of Madagascar, no sectoral data on capital were available.

A2.4 In Madagascar, the importance of physical capital in output α has been estimated to be 0.46.⁵⁷ Using output and capital formation data from the national accounts, and employment numbers derived from household surveys⁵⁸, the contributions of changes in the capital-labor ratio and in TFP for the period 1999-2005 are depicted in table A2.1. The results show that the decline in output per worker of 7,517 MGA (i.e. a fall of more than 10 percent) during this period was largely due to a fall in total factor productivity (MGA 7,355, or 98 percent of the total decrease in output per worker).

When reviewing the two sub-periods 1999-2001 and 2001-2005, it becomes clear that the large fall in TFP and the subsequent decline in average output per worker occurred between 2001 and 2005. From 1999 to 2001, labor productivity increased slightly (less than 0.3 percent), as a fall in the labor-capital ratio was more than offset by an increase in TFP. From 2001 to 2005, however, the capital stock increased at a somewhat faster pace than the number of workers, but the positive impact on output per worker was extinguished by the very significant negative effects of the major deterioration of total factor productivity.

Table A2.1: The contribution of changes in capital-labor ratio and TFP to changes in output per worker (1999-2005, MGA)

	Changes in:	Contribution of changes in:	
	Output per worker	Capital-labor ratio	TFP
1999-2005	-7517	-162	-7355
1999-2001	203	-614	817
2001-2005	-7720	420	-8140

Source: IMF national accounts, HHS.

While the above analysis does not reveal the reason(s) for the substantial fall in TFP, one possibility may be that it was due to inefficiencies caused by the substantial influx of labor into the low-productivity agricultural sector, particularly from workers that were previously employed in services or industry.

Caveats to estimating the contributions of changes in the capital-labor ratio and TFP to changes in labor productivity⁵⁹

There are several caveats to the above described approach, relating to the data used, the sensitivity of the analysis to these data, and to the assumptions made about the production function.

For instance, the analysis can be sensitive to the value of α (i.e. the importance of physical capital in output). For a constant returns to scale production function, it is common to assume values for α between 0.3 and 0.5. The value of 0.46, as used in the above analysis, is therefore relatively high. Moreover, it was derived by regressing output growth on input growth using an ordinary least squares estimation, which ignores existing correlation between inputs and outputs. In addition, the estimation of α was based on employment data which are quite different from those that were derived from the household surveys and that are used throughout this report; the combined application of the value of α of 0.46 with the employment numbers of this report in an analysis may therefore cause inconsistencies.

⁵⁷ Source: IMF

⁵⁸ Total employment data are derived from household survey employment rates, taking into account the population numbers and dependency rates as described in section B of chapter 1 of this report.

⁵⁹ This section draws largely on: World Bank. 2000. "Measuring Growth in Total Factor Productivity." *PREM notes Economic Policy*, Number 42.

To assess the robustness of the value of α in the above described approach, the analysis has also been carried out using values of α of 0.3 and 0.4. As the below table shows, the results for different values of α are quite similar. Although the (negative) contribution of the capital labor ratio diminishes and the (negative) contribution of TFP rises with lower levels of α , the differences are not substantial, and the contribution of changes of the capital-labor ratio remains negligible compared to the contribution of changes in TFP.

The analysis proves to be much more sensitive to assumptions concerning initial capital stock. The original analysis assumes an initial capital stock in 1960 of 1.5 times the GDP in that same year. Another approach, assuming an initial capital stock in 1980 equal to capital formation in that same year, but using similar increases in annual gross capital formation and similar depreciation rates as the original analysis, provides substantially different results.

In addition to sensitivity to the value of α and the assumed capital base, there are other considerations that should be taken into account when assessing the reliability of the above used approach. For example, the choice of the sample period can have a considerable impact on the results, as does the assumption that parameters of the production function remain constant over the sample period. Even more fundamental is the question to what extent it is appropriate to use a production function that assumes both constant returns to scale and perfect competition in developing countries.

TableA2.2: Assessing the robustness of approximations to capital stock and α

	Changes in:		Contribution of changes in:	
	Output per worker	Capital-labor ratio	TFP	
Original analysis ($\alpha = 0.46$)	-7517	-162	-7355	
Alternative α ($\alpha = 0.4$)	-7517	-141	-7376	
Alternative α ($\alpha = 0.3$)	-7517	-105	-7411	
Alternative capital base	-7515	4319	-11836	

B1. ANNEX TO CHAPTER 5: TABLES

Table B1.1: Employment Status of the Working Age Population by Quintile and Poverty Level, 2005, 2001, and 1999

	Employed	Unemployed	Inactive
2005	85.8	2.6	11.9
Q1	87.9	1.6	10.6
Q2	89.0	1.7	9.5
Q3	89.0	1.9	9.3
Q4	86.4	2.3	11.7
Q5	79.0	5.1	16.8
Poor	88.7	1.7	9.8
Non-Poor	80.8	4.4	15.5
2001	82.5	1.2	16.5
Q1	91.3	0.2	8.5
Q2	89.2	0.9	9.9
Q3	87.8	1.1	11.3
Q4	80.2	0.9	19.1
Q5	69.2	2.9	28.8
Poor	88.4	0.8	10.9
Non-Poor	71.7	2.2	26.7
1999	79.2	1.3	19.8
Q1	81.8	1.7	16.8
Q2	80.3	0.8	19.1
Q3	80.9	1.1	18.2
Q4	79.8	1.2	19.3
Q5	74.5	1.8	24.1
Poor	80.7	1.2	18.3
Non-Poor	76.1	1.6	22.7

Source: HHS 2005, 2001, 1999.

Table B1.2: Employment Status of the Working Age Employed Population by Quintile and Poverty Level, 2005, 2001, and 1999

	Wage employed	Self employed	Family labor	Total	Weekly working hours	
					1 st job	1 st and 2 nd job
2005	14.9	5.9	79.2	100	37.0	45.4
Q1	8.9	2.8	88.2	100	33.9	41.6
Q2	12.4	3.8	83.8	100	35.7	44.9
Q3	10.7	5.0	84.3	100	36.6	46.0
Q4	13.9	5.5	80.6	100	37.6	46.4
Q5	26.4	10.9	62.7	100	40.5	47.2
Poor	10.8	4.1	85.2	100	35.6	44.4
Non-Poor	22.7	9.2	68.2	100	39.7	47.1
2001	18.3	8.2	73.6	100	42.3	46.9
Q1	4.5	3.3	92.2	100	39.1	43.8
Q2	6.2	4.4	89.4	100	39.8	45.9
Q3	10.1	6.8	83.0	100	42.1	47.5
Q4	22.2	10.6	67.2	100	44.7	48.5
Q5	46.7	15.0	38.4	100	45.2	48.3
Poor	8.7	5.7	85.6	100	40.9	46.1
Non-Poor	39.8	13.7	46.5	100	45.3	48.7
1999	15.0	9.7	75.3	100	..	..
Q1	9.2	5.4	85.4	100	..	..
Q2	9.8	7.5	82.8	100	..	..
Q3	12.6	8.6	78.7	100	..	..
Q4	14.2	9.9	75.9	100	..	..
Q5	26.7	15.9	57.4	100	..	..
Poor	11.0	7.8	81.2	100	..	..
Non-Poor	23.5	13.9	62.5	100	..	..

Source: HHS 2005, 2001, 1999.

B2. ANNEX TO CHAPTER 5: THE KAKWANI, NERI AND SON DECOMPOSITION OF HOUSEHOLD LABOR INCOME

B2.1 The average labor income of household j can be written as:

$$\frac{I_j}{N_j} = \frac{I_j}{H_j} \frac{H_j}{E_j} \frac{E_j}{L_j} \frac{L_j}{N_j}$$

Equation B2.1

where I_j is the total weekly labor income of the household, N_j is the number of household members, H_j is the total number of hours worked per week by household members, E_j is the number of employed household members, and L_j is the number of household members participating in the labor force.⁶⁰

B2.2 One can then define $i_j = I_j / N_j$ as average weekly household labor income (averaged over all household members). In the same way $w_j = I_j / H_j$ is the average earnings per hour worked, $h_j = H_j / E_j$ is the average hours worked per week by those employed, E_j / L_j is the household employment rate, and $l_j = L_j / N_j$ is the household participation rate. For simplicity, equation B2.1 can thus be written as:

$$i_j = w_j h_j (1 - u_j) l_j$$

Equation B2.2

where $(1 - u_j)$ corresponds to the household employment rate, which is rewritten as one minus the household unemployment rate (u_j). By averaging each of the components of the per capita household labor income over population sub-groups, a more complete profile of labor market characteristics by, for example, income quintiles, can be obtained.

B2.3 To analyze which sources of labor income are responsible for observed changes in total labor income, the logs are taken and each component is averaged. The temporal differences in these averages then are the following:

$$\Delta \frac{1}{N} \sum_{j=1}^N \ln i_j = \Delta \frac{1}{N} \sum_{j=1}^N \ln w_j + \Delta \frac{1}{N} \sum_{j=1}^N \ln h_j + \Delta \frac{1}{N} \sum_{j=1}^N \ln(1 - u_j) + \Delta \frac{1}{N} \sum_{j=1}^N \ln l_j .$$

Equation B2.3

Dividing this equation by the left-hand side provides the portions of the average change in average household labor income which are due to changes in household hourly earnings, hours worked, unemployment, and participation.

⁶⁰ If only a small fraction of labor originates from children and/or older workers, a variable for the number of working age household members (A_j) can be included in the equation, allowing the participation rate to be calculated for working age adults only, as well as the addition of a “household dependency rate” variable (A_j/N_j).

B2.4 A next possible step (not performed in this report) would be to further decompose average hourly earnings into, for example, hourly earnings from agricultural employment, non-agricultural wage employment, and non-agricultural non-wage employment. In this case, however, log-linearization is no longer possible and one would have to perform Shapley decompositions to analyze income changes.

B2.5 A comparison of the sources of changes in household labor income between population sub-groups can shed light on the different channels which have affected the income of, for example, the poor and the non-poor. However, there may have been considerable heterogeneity in the changes in labor income sources between various employment types or economic sectors. In those cases it may be useful to further disaggregate households according to other characteristics, such as main source of household income.

B3. ANNEX TO CHAPTER 4: CHANGES IN LABOR INCOME AND SOURCES OF CHANGE IN RURAL/URBAN AREAS AND BY PROVINCE.

Changes in labor income and sources of change in rural and urban areas

B3.1 Throughout this report, various differences in labor market conditions and their changes over time have been observed between rural and urban areas. They include, for example, poverty rates, dependency on the primary sector, earnings levels, and the importance of wage work. It is thus not surprising that there also exist differences between rural and urban areas when looking at the changes in household labor income, and the sources of these changes using Kakwani, Neri, and Son decompositions.

B3.2 Between 2001 and 2005, the average per capita weekly labor income of rural households increased by 25 percent. In the same period, urban households experienced a fall in per capita labor income of 11.3 percent. Nevertheless, even in 2005, per capita weekly labor income of urban households was still around one third higher than that of rural households. In 2001, urban labor income had still been 88 percent higher. (Table B3.1.)

B3.3 In 2001, particularly the urban poor were better off than the poor in rural areas: household per capita labor income for the two poorest quintiles in urban areas was around 11 percent and 16 percent higher than labor income of the two poorest quintiles in rural areas. The average income of those in the upper 40 percent of the rural population hardly differed from that of the two richest quintiles in urban areas. Between 2001 and 2005, the lower three quintiles in both urban and rural areas experienced an increase in labor income. As the increase was higher in rural areas, the difference in labor income between the poorer rural and urban households decreased. The opposite development occurred for the upper two quintiles in urban and rural areas: both saw their labor income fall, but the fall was more substantial in rural than in urban areas. As a result, the difference in labor income between the better-off in urban areas and the better-off in rural areas increased.

Table B3.1: Weekly household per capita labor income in urban and rural areas by expenditure quintile (2005, 2001, and percentage difference, MGA)

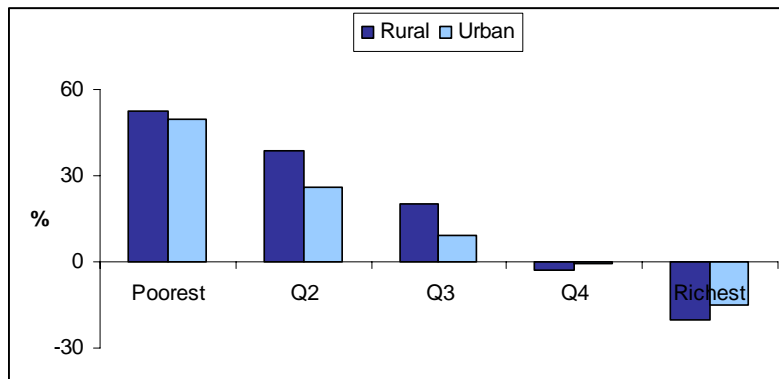
		Poorest	Q2	Q3	Q4	Richest	Poor	Non-poor	Total
2005	Urban	2256	3717	4543	6190	10951	3699	9607	5807
	Rural	2064	3511	4588	6017	10320	3424	8496	4348
	Difference (%)	9.3	5.9	-1.0	2.9	6.1	8.0	13.1	33.6
2001	Urban	1507	2946	4156	6229	12910	3508	10807	6543
	Rural	1355	2536	3820	6184	12936	2567	9958	3479
	Difference (%)	11.2	16.2	8.8	0.7	-0.2	36.6	8.5	88.1

Source: HHS 2005, 2001

B3.4 Figure B3.2 depicts the sources of the changes in average per capita weekly household labor income for the entire urban and rural populations, as well as for the poor and the non-poor population groups in rural and urban areas. The figures reflect the outcomes of Kakwani, Neri and Son decompositions that are described in section 5C of this report. Unlike Table 5.8, however, a positive value of a variable in the below figure implies that the change in this variable between 2001 and 2005 had contributed positively to the growth of weekly household per capita weekly labor income, regardless whether the overall change in labor income was positive or negative. Similarly, a negative value in all cases implies that the change in the variable has had a downward effect on labor income. For example, in

Figure B3.2, the value of 120 for urban hourly earnings reflects that if none of the other variables had changes, the average labor income of the urban population would have fallen by 120 percent.

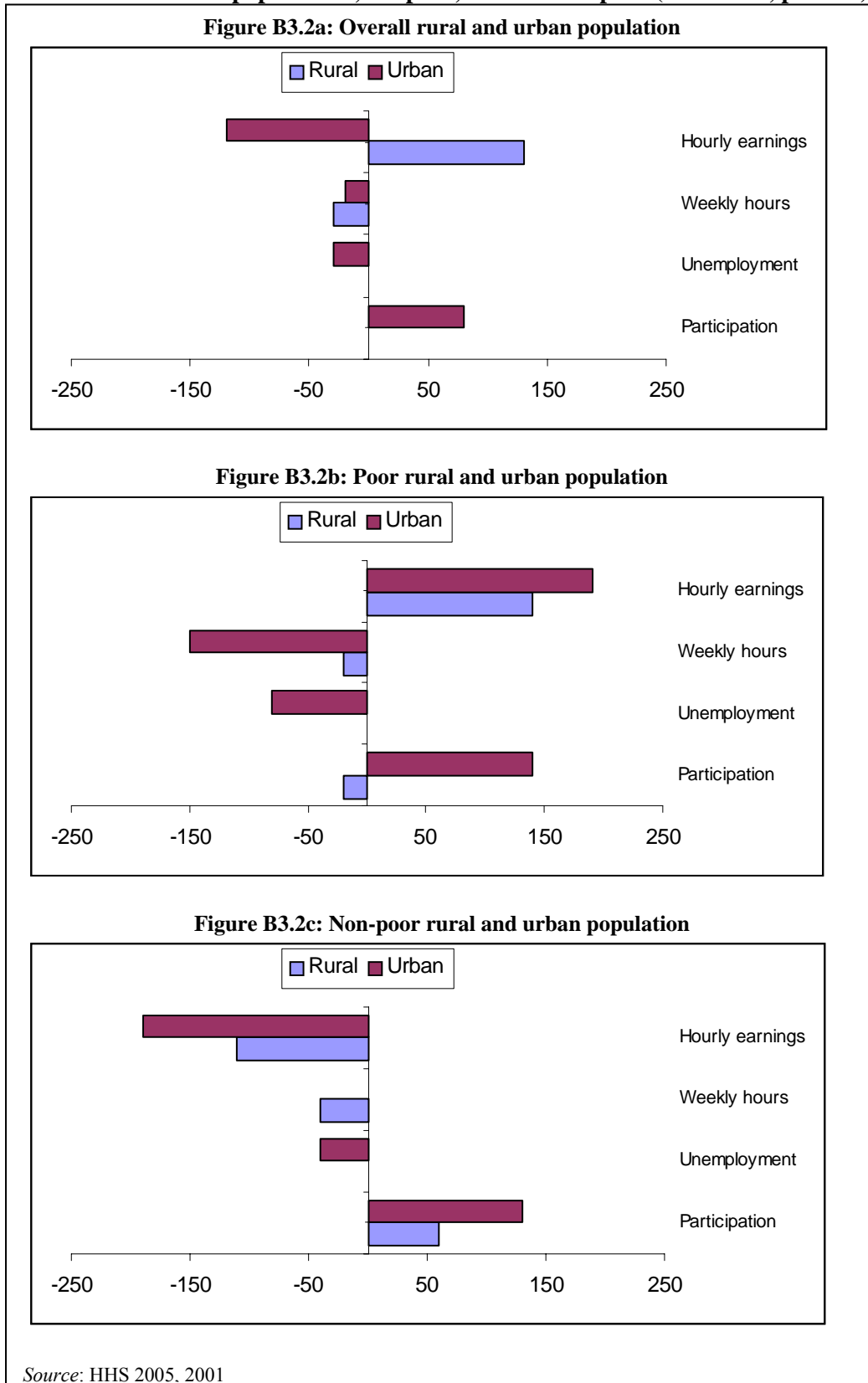
Figure B3.1: Changes in weekly household per capita labor income in rural and urban areas by expenditure quintile (2001-2005, percent)



Source: HHS 2005, 2001

B3.5 Figure B3.2 allows a number of observations concerning the differences in sources of change of labor income between rural and urban areas. First, for the rural population, the *increase* in average hourly earnings has been the main source of the (positive) change in labor income. In urban areas, the *fall* in hourly earnings was the major source of the decrease of labor income, and the effect was compounded by the impact of increased unemployment and the fall in hours worked. For urban household, only the increase in participation helped to mitigate the negative effects of the changes in the other variables. (See Figure B3.2a.) Second, as we saw earlier, labor income of the poor increased in both rural and urban areas, but figure B3.2b shows that the sources of this increase were different in both areas. In rural areas, hourly earnings were the only source of change with an upward impact on the poor's labor income. In urban areas, increased hourly earnings also had a substantial positive impact on labor income of the poor, but a participation increase had an almost equally high impact. It seems plausible to assume that unlike in rural areas, urban households felt forced to increase participation to mitigate the negative effects of the fall in hours worked. Urban households also experienced the negative impact of increased unemployment. It is not clear whether increased unemployment triggered higher participation rates, or whether the higher unemployment is due to the fact that not all extra workers who entered the labor force were able to find work. Third, with regard to the non-poor populations in urban and rural areas, the most striking observation is that the impact of the decrease in hourly earnings was much more substantial in urban households, and that this might be the reason why the urban non-poor increased their participation rate with almost 17 percent, while in rural areas the increase was around 9 percent. (Figure B3.2c.)

Figure B3.2: Sources of change in weekly household per capita labor income in rural and urban areas for the overall populations, the poor, and the non-poor (2001-2005, percent)



Changes in labor income and sources of change in Madagascar's provinces

B3.6 In addition to the distinction between rural and urban areas, changes in labor income can be compared for different geographical regions. Table B3.2 shows the average changes in per capita weekly labor income by province for the whole population, as well as for the poorest quintile, the poor, and the non-poor. Two out of six provinces, Antananarivo and Anstiranana, experienced a fall in labor income between 2001 and 2005. Other provinces saw per capita household labor income increase, up to as much as 51 percent in Fianarantsoa. (See figure B3.3 on the next page for a map of Madagascar and its provinces.)

B3.7 In all provinces, the poorest experienced an increase in labor income. Even in Antananarivo, despite overall labor income falling by 6.4 percent, labor income in the poorest expenditure quintile rose by more than 50 percent. Labor income of the poor increased in all provinces except in Anstiranana (-4.5 percent). The poor gained particularly in Fianarantsoa. There, labor income of the poor increased by 59 percent, more than 2.5 times as much as in any of the other provinces. The non-poor lost labor income in all provinces. Interestingly, the variation of the fall in labor income of the non-poor across provinces was relatively small, with the smallest decrease in Anstiranana (-5.9 percent) and the largest in Fianarantsoa (-18.5 percent).

Table B3.2: Changes in household per capita weekly labor income by province (2001-2005, percent)

	Fianarantsoa	Toamasina	Mahajanga	Toliara	Anstiranana	Antananarivo
<i>Share of employed in 2005</i>	18.1	12.4	11.4	12.7	3.4	41.9
Overall	50.8	28.4	16.8	12	-1.1	-6.4
Poorest	79.9	45.1	26.9	53.8	19.6	50.5
Poor	59.2	22.9	22.9	19.4	-4.5	19.8
Non-poor	-18.5	-12.2	-6.5	-15.5	-5.9	-14.4

Source: HHS 2005, 2001

B3.8 Moving to the sources of the changes in labor income (Table B3.3), a diverse picture arises of the explanations of the changes in labor income in the various provinces. For instance, in Fianarantsoa, the positive impact of the increase in average hourly wages was relatively modest compared to most other provinces. However, since none of the other identified sources of income affected labor income negatively, Fianarantsoa experienced the highest increase in labor income of all provinces. In Toliara, on the other hand, the rise in hourly earnings alone would have increased labor income by 260 percent, but the impact of the change in hourly earnings was all but offset by the negative impact of simultaneous changes in hours worked, unemployment, and participation, limiting the increase in labor income to 12 percent.

B3.9 More specifically, the following observations can be made with regard to the sources of changes in labor income across Madagascar's provinces:

- Changes in average hourly earnings were the main source of change in each province. Except in Antananarivo, average hourly earnings increased everywhere (between 28 and 44 percent), thus affecting labor income substantially and positively. In Antananarivo, the 8.3 percent fall in average hourly earnings had a downward effect on labor income.
- Fianarantsoa is the only province where the number of hours worked per employed person increased (by 6.4 percent, to 44.2 hours per week). This development will have reinforced the positive impact of the simultaneous rise in average hourly earnings, and may have been an important reason why the province experienced the highest increase in household per capita labor income.

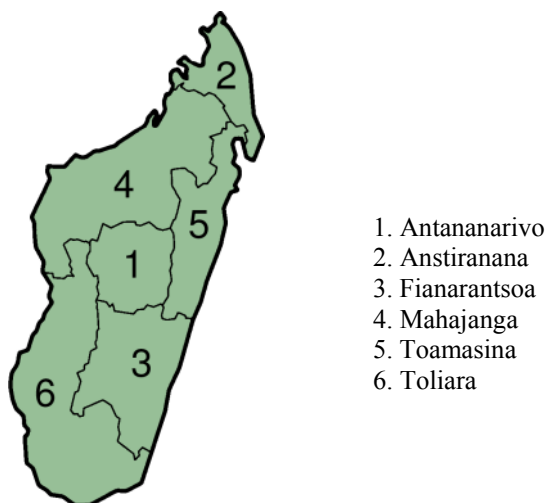
- Fianarantsoa is also the only province where changes in the household unemployment rate did not affect labor income; even though the unemployment rate increased from 0.4 to 1.5 percent, the overall impact was negligible. In all other provinces, the rise in the unemployment rate had a modest, negative effect on labor income of between 10 and 20 percent.
- The impact of changes in the household participation rate on labor income varied across the provinces. In Antananarivo, Toamasina, and Mahajanga the impact was positive, although only in Antananarivo the effect was large enough compared to changes in other variables to make a substantial difference to the changes in labor income. In Toliara and Anstiranana, falling participation had a negative impact on labor income, while in Fianarantsoa the effect on labor income of the 1.2 percent fall in the participation rate was negligible.

Table B3.3: Sources of changes in household per capita weekly labor income by province (2001-2005, percent)

	Fianarantsoa	Toamasina	Mahajanga	Toliara	Anstiranana	Antananarivo
Average hourly earnings	90	110	180	260	1750	-100
Average weekly hours	20	-20	-80	-120	-1520	-70
Household unemployment	0	-10	-10	-20	-160	-10
Household participation	0	20	10	-30	-170	70

Source: HHS 2005, 2001

Figure B3.3: The provinces of Madagascar



C. ANNEX TO CHAPTER 6: TABLES

Notes: (i) Tables C.1-C.4 show the marginal effects, which are interpreted as the average change in the probability of an individual finding him/herself in an employment category as a result of a one unit change in the independent variables. Because the average marginal effects are shown instead of the estimated coefficients, all identified employment categories (including the omitted category) can be shown. The marginal effects sum to zero across the categories. (ii) The analysis of which the outcomes are reflected in Tables C.1-C.4 included regional dummies, which are not shown in the tables.

Table C.1: Determinants of Male Rural Employment, 2005

	Formal		Informal			Agric		Not Employed		
	Marg Eff	t-value	Marg Eff	t-value		Marg Eff	t-value	Marg Eff	t-value	
Age	0.001	8.73 **	0.000	0.86		0.005	11.65 **	-0.007	-16.74 **	
Migrant										
	0.028	3.62 **	0.043	2.85 **		-0.064	-3.35 **	-0.007	-0.50	
<i>Education dummies</i>										
Primary	0.023	2.42 *	0.010	1.03		-0.081	-6.15 **	0.048	4.77 **	
Lower secondary	0.128	4.68 **	0.034	2.05 *		-0.335	-13.46 **	0.173	8.88 **	
Upper secondary	0.263	6.29 **	0.005	0.25		-0.472	-14.93 **	0.204	6.66 **	
Post secondary	0.407	7.55 **	-0.008	-0.31		-0.593	-15.91 **	0.194	3.85 **	
Non-labor income (log)	0.0000	0.00	0.0000	-0.01		0.0000	-0.03	0.0000	0.06	
Value of agricultural assets (log)	-0.001	-1.06	-0.009	-3.71 **		0.011	3.86 **	-0.001	-0.37	
Obtained credit	0.017	1.13	-0.041	-1.55		0.049	1.47	-0.025	-1.38	
<i>Household Structure</i>										
No. children < 5	-0.001	-0.24	0.008	1.81 +		0.009	1.58	-0.017	-4.12 **	
No. children 5-14	0.001	0.68	-0.006	-2.15 *		-0.003	-1.00	0.008	4.06 **	
No. men 15-64	-0.005	-2.19 *	0.000	-0.10		-0.012	-2.41 *	0.017	6.20 **	
No. women 15-64	0.003	1.12	-0.006	-1.18		-0.007	-1.06	0.010	2.79 **	
No. men 65+	0.018	1.45	-0.083	-2.73 **		0.027	0.88	0.038	3.20 **	
No. women 65+	-0.004	-0.29	0.004	0.15		-0.004	-0.15	0.005	0.27	
Antananarivo city dummy (NA)										
Percent in each category	3.5		6.6			81.1		8.8		
Number of observations								6,930		
Pseudo R-squared								0.23		

Table C.2: Determinants of Female Rural Employment, 2005

	Formal			Informal			Agric			Not Employed		
	Marg Eff	t-value		Marg Eff	t-value		Marg Eff	t-value		Marg Eff	t-value	
Age	0.001	6.10	**	0.001	3.07	**	0.002	5.24	**	-0.004	-11.83	**
Migrant	0.012	2.04	*	0.000	0.01		-0.034	-1.87	+	0.021	1.43	
<i>Education dummies</i>												
Primary	0.017	2.35	*	0.028	2.90	**	-0.061	-4.99	**	0.015	1.64	
Lower secondary	0.096	4.47	**	0.054	3.10	**	-0.260	-11.47	**	0.110	5.94	**
Upper secondary	0.244	5.45	**	0.001	0.05		-0.388	-9.65	**	0.143	3.89	**
Post secondary	0.332	5.47	**	0.056	1.21		-0.534	-9.66	**	0.146	2.60	**
Non-labor income (log)	0.0000	-0.01		0.0000	-0.01		0.0000	-0.04		0.0001	0.07	
Value of agricultural assets (log)	-0.001	-0.98		-0.009	-3.52	**	0.010	3.33	**	0.000	-0.01	
Obtained credit	0.028	1.74	+	-0.016	-0.56		-0.047	-1.17		0.035	1.09	
<i>Household Structure</i>												
No. children < 5	-0.007	-2.49	*	0.005	1.20		0.019	3.14	**	-0.017	-3.82	**
No. children 5-14	0.000	-0.14		0.000	-0.12		0.002	0.68		-0.002	-0.70	
No. men 15-64	-0.005	-2.44	*	-0.021	-4.81	**	0.017	3.08	**	0.010	2.73	**
No. women 15-64	-0.002	-1.00		-0.002	-0.46		-0.023	-4.20	**	0.027	7.03	**
No. men 65+	-0.074	-1.52		-0.058	-2.40	*	0.092	2.46	*	0.040	2.60	**
No. women 65+	-0.009	-1.07		0.018	0.82		0.027	1.03		-0.036	-2.11	*
Antananarivo city dummy (NA)												
Percent in each category	2.2			7.7			79.0			11.1		
Number of observations										7,258		
Pseudo R-squared										0.15		

Source: HHS 2005.

Table C.3: Determinants of Male Urban Employment, 2005

	Formal			Informal			Agric			Not Employed		
	Marg Eff	t-value		Marg Eff	t-value		Marg Eff	t-value		Marg Eff	t-value	
Age	0.005	19.18	**	0.002	6.72	**	0.003	8.43	**	-0.010	-26.98	**
Migrant	0.048	4.84	**	0.077	5.18	**	-0.125	-9.03	**	0.000	0.03	
<i>Education dummies</i>												
Primary	0.039	2.57	**	-0.029	-2.09	*	-0.074	-6.05	**	0.065	4.24	**
Lower secondary	0.132	5.97	**	-0.043	-2.60	**	-0.260	-18.27	**	0.171	8.42	**
Upper secondary	0.198	7.54	**	-0.099	-6.09	**	-0.349	-26.10	**	0.250	10.38	**
Post secondary	0.329	10.59	**	-0.131	-8.14	**	-0.365	-24.70	**	0.168	6.09	**
Non-labor income (log)	-0.0005	-0.62		0.0000	-0.01		0.0000	0.02		0.0004	0.65	
Value of agricultural assets (log)	-0.005	-1.90	+	-0.007	-2.00	*	0.021	7.23	**	-0.009	-3.65	**
Obtained credit	0.103	3.94	**	-0.023	-0.71		-0.103	-2.95	**	0.023	1.03	
<i>Household Structure</i>												
No. children < 5	0.003	0.71		0.017	2.72	**	0.019	3.08	**	-0.039	-7.21	**
No. children 5-14	-0.003	-1.24		-0.009	-2.46	*	0.001	0.43		0.011	3.99	**
No. men 15-64	-0.011	-2.72	**	-0.005	-1.01		-0.012	-2.33	*	0.027	7.99	**
No. women 15-64	0.006	1.38		-0.022	-3.38	**	-0.006	-1.00		0.022	5.29	**
No. men 65+	-0.015	-0.70		-0.006	-0.21		0.019	0.71		0.002	0.10	
No. women 65+	-0.027	-1.31		0.015	0.60		-0.020	-0.80		0.032	2.01	*
Antananarivo city dummy	0.840	180.37	**	-0.200	-26.93	**	-0.474	-84.55	**	-0.167	-37.59	**
Percent in each category	17.8			28.2			34.0			20.0		
Number of observations	6,810											
Pseudo R-squared	0.33											

Source: HHS 2005.

Table C.4: Determinants of Female Urban Employment, 2005

	Formal			Informal			Agric			Not Employed		
	Marg Eff	t-value		Marg Eff	t-value		Marg Eff	t-value		Marg Eff	t-value	
Age	0.003	13.15	**	0.003	7.17	**	0.001	3.72	**	-0.007	-18.73	**
Migrant	0.025	3.22	**	0.035	2.62	**	-0.101	-7.76	**	0.041	3.01	**
<i>Education dummies</i>												
Primary	0.029	2.21	*	0.036	2.59	**	-0.088	-8.04	**	0.023	1.59	
Lower secondary	0.117	5.57	**	0.022	1.29		-0.230	-18.43	**	0.092	4.89	**
Upper secondary	0.218	6.98	**	-0.019	-0.92		-0.326	-24.14	**	0.126	4.83	**
Post secondary	0.451	11.12	**	-0.068	-2.94	**	-0.381	-25.53	**	-0.002	-0.05	
Non-labor income (log)	0.0000	0.00		-0.0003	-0.30		0.0000	0.02		0.0002	0.28	
Value of agricultural assets (log)	-0.004	-1.63		-0.015	-4.37	**	0.039	13.62	**	-0.020	-5.82	**
Obtained credit	0.049	2.48	*	0.020	0.58		-0.130	-3.79	**	0.060	1.81	+
<i>Household Structure</i>												
No. children < 5	-0.004	-0.93		0.003	0.54		0.031	5.53	**	-0.031	-5.07	**
No. children 5-14	0.000	-0.23		-0.004	-1.28		0.007	2.07	*	-0.002	-0.54	
No. men 15-64	0.001	0.27		-0.045	-8.48	**	0.013	2.56	*	0.032	6.45	**
No. women 15-64	0.001	0.24		-0.007	-1.40		-0.034	-6.59	**	0.041	8.54	**
No. men 65+	-0.038	-2.31	*	-0.107	-4.40	**	0.050	2.42	*	0.096	4.68	**
No. women 65+	-0.008	-0.59		-0.003	-0.15		0.015	0.67		-0.004	-0.17	
Antananarivo city dummy	0.883	278.43	**	-0.187	-25.30	**	-0.450	-86.65	**	-0.246	-38.03	**
Percent in each category	10.0			24.0			31.4			34.6		
Number of observations	7,522											
Pseudo R-squared	0.25											

Source: HHS 2005.