



DIRECTIONS IN DEVELOPMENT
Poverty

44647

Making Work Pay in Nicaragua

Employment, Growth, and Poverty Reduction

Catalina Gutierrez, Pierella Paci,
and Marco Ranzani



THE WORLD BANK

Making Work Pay in Nicaragua

Making Work Pay in Nicaragua

Employment, Growth, and Poverty Reduction

Catalina Gutierrez

Pierella Paci

Marco Ranzani



THE WORLD BANK

EMPLOYMENT
AND INCLUSIVE GROWTH

© 2008 The International Bank for Reconstruction and Development/
The World Bank
1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org
E-mail: feedback@worldbank.org

All rights reserved.

1 2 3 4 11 10 09 08

This volume is a product of the staff of the International Bank for Reconstruction and Development/The World Bank. The findings, interpretations, and conclusions expressed in this volume do not necessarily reflect the views of the Executive Directors of The World Bank or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Rights and Permissions

The material in this publication is copyrighted. Copying and/or transmitting portions or all of this work without permission may be a violation of applicable law. The International Bank for Reconstruction and Development / The World Bank encourages dissemination of its work and will normally grant permission to reproduce portions of the work promptly.

For permission to photocopy or reprint any part of this work, please send a request with complete information to the Copyright Clearance Center Inc., 222 Rosewood Drive, Danvers, MA 01923, USA; telephone: 978-750-8400; fax: 978-750-4470; Internet: www.copyright.com.

All other queries on rights and licenses, including subsidiary rights, should be addressed to the Office of the Publisher, The World Bank, 1818 H Street NW, Washington, DC 20433, USA; fax: 202-522-2422; e-mail: pubrights@worldbank.org.

ISBN-13: 978-0-8213-7534-2
eISBN: 978-0-8213-7535-8
DOI: 10.1596/978-0-8213-7534-1

Library of Congress Cataloging-in-Publication Data

Making work pay in Nicaragua: employment, growth, and poverty reduction /
edited by Catalina Gutiérrez, Pierella Paci, Marco Ranzani.
p. cm.

Includes bibliographical references and index.

ISBN 978-0-8213-7534-1 -- ISBN 978-0-8213-7535-8 (electronic)

1. Labor market--Nicaragua. 2. Wages--Nicaragua. 3. Poverty--Nicaragua. 4. Labor productivity--Nicaragua. I. Gutiérrez, Catalina. II. Paci, Pierella, 1957- III. Ranzani, Marco, 1979-

HD5737.A6M34 2008
331.1097285--dc22

2008017702

Cover design: Candace Roberts, Quantum Think, Philadelphia, PA, United States

Contents

<i>Acronyms and Abbreviations</i>		<i>xi</i>
<i>Acknowledgments</i>		<i>xiii</i>
Chapter 1	Introduction and Overview	1
	Objectives and Scope of this Task	2
	Structure of the Report	3
Chapter 2	Country Context	7
	Macroeconomic Context	7
	Labor Market Context	10
	Labor Regulation in Nicaragua	20
Chapter 3	Output, Population, Employment, and Poverty	27
	Main Trends in Output	27
	Main Trends in Population	28
	Main Trends in Employment	30
	Main Trends in Poverty	31
	Decomposition of Per Capita Income Growth	32

	A Closer Look at the Manufacturing Sector	42
	Annex 3A. Decomposition of Per Capita Value Added Growth	48
Chapter 4	Employment and Labor Income Profile of the Population	59
	Income and Employment Profile	60
	Decomposition of Changes in Labor Income	63
	A Closer Look at Agriculture	69
	Annex 4A. Decomposition of Labor Income Growth	78
	Annex 4B. Estimation Results	81
Chapter 5	Segmentation and Skill Mismatch	87
	Labor Market Segmentation: Basic Assumptions and Literature Review	87
	Evidence of Segmentation across Different Dimensions	90
	Segmentation and Barriers to Mobility: A Qualitative Approach	103
	Skill Mismatch	107
Chapter 6	Policy Implications and Further Research	115
	<i>References</i>	119
	<i>Index</i>	125
Figures		
2.1	Investment, Exports, and Growth, 1995–2005	9
2.2	Distribution of Wages by Sector and Formality, 2001	24
3.1	Change in Population Structure, 2001–05	29
3.2	Share of Employment by Sectors, 2001 and 2005	31
3.3	Aggregate Employment and Productivity Profile of Growth, 2001–05	35
3.4	Decomposition of Changes in Output per Worker, 2001–05	37
4.1	Growth in Average Per Capita Income, by Quintile, 2001	68
4.2	Productivity of Sensitive Products by Yield per Hectare, 1990–2005	71

4.3	Relative Productivity by Product, 1990–2005	72
4.4	Area Harvested for Sensitive Products, 1990–2005	73
4.5	Production Volume for Sensitive Products, 1990–2005	74
4.6	Producer Prices Relative to Consumer Prices for Export Goods, 1999–2006	75
4.7	Relative Prices of Trade for Meat, 1999–2006	75
4.8	Relative Prices for Cereals, 1999–2006	76
4.9	Relative Prices for Sensitive Products, 2001–06	76
5.1	Hourly Earnings by Employment Category, 2001	93
5.2	Hourly Earnings by Broad Sector and Informality, 2001	94
5.3	Changes in the Skill Premium and the Relative Supply of Skills, of Total Wage Workers, 2001–05	109
5.4	Changes in the Skill Premium and the Relative Supply of Skills, of Urban Wage Workers, 2001–05	110

Tables

2.1	Main Macroeconomic Indicators, 1998–2005	11
2.2	Main Indicators of the Labor Market, 2001 and 2005	13
2.3	Earnings and Income by Employment Category, 2001 and 2005	14
2.4	Hierarchical Description of the Population Six Years of Age and Above, 2001 and 2005	16
2.5	Other Characteristics of the Employed, 2001 and 2005	18
2.6	Labor Market Flexibility, Comparative Performance	21
2.7	Issues Affecting the Investment Climate	22
2.8	Minimum Wage and Lowest Wage Paid as a Proportion of Minimum Wage, 2001 and 2005	23
3.1	Sectoral Growth, 1998–2005	28
3.2	Average Level of Education of Population Ages 25 to 64	30
3.3	Evolution of Employment by Sectors, 2001 and 2005	32
3.4	Headcount Poverty Rates of the Working-Age Population by Employment Status, 2001–05	33
3.5	Employment by Sector and Poverty Level, Shares of Total Employment, 2001 and 2005	34
3.6	Percentage Change in Selected Variables, 2001–05	35
3.7	Decomposition of Intersectoral Shifts	39
3.8	Sectoral Growth, 2001–05	39

3.9	Employment Shares and Productivity, by Sectors of Economic Activity, 2001–05	40
3.10	Total Sectoral Contribution to Growth, 2001–05	41
3.11	Wages by Sector of Economic Activity, 2001 and 2005	42
3.12	Employment Generation by Subsector, 2001 and 2005	43
3.13	Wages in the Manufacturing Sector, 2001 and 2005	44
3.14	Employment Generation in Manufacturing by Type of Employment, 2001 and 2005	44
4.1	Employment Status of the Working-Age Population by Quintile, 2001 and 2005	61
4.2	Employment Status of the Working-Age Population by Poverty Level, 2001 and 2005	61
4.3	Employment Categories by Quintile, 2001 and 2005	62
4.4	Employment Categories by Poverty Level, 2001 and 2005	62
4.5	Structure of Income by Quintile, 2001 and 2005	64
4.6	Structure of Income by Poverty Level, 2001 and 2005	64
4.7	Labor Profile of the Population by Poverty Level, 2001 and 2005	65
4.8	Labor Profile of the Population by Quintile, 2001 and 2005	67
4.9	Per Capita Household Income Changes, by Quintile, 2001–05	68
4.10	Shapley Decomposition of Per Capita Labor Income, by Quintile	70
4.11	Number of Farms, by Sensitive Product, according to Farm Size, 2001	71
4B.1	Mean and Standard Deviation, by Employment Category	81
4B.2	Mean and Standard Deviation, by Sector of Economic Activity and Formality Level	82
4B.3	Earnings Equations by Employment Category, 2001	83
4B.4	Earnings Equations by Sector of Employment, 2001	84
4B.5	Oaxaca-Blinder Decomposition: Detailed Outcomes for Sector and Informality	85
4B.6	Oaxaca-Blinder Decomposition: Detailed Outcomes for Employment Categories	86

5.1	Selection among Employment Categories, 2001	97
5.2	Selection among Sectors, 2001	98
5.3	Oaxaca-Blinder Decomposition by Employment Category	100
5.4	Oaxaca-Blinder Decomposition by Employment Sector	101
5.5	Reason for Starting a Business, by Level of Education, 2001	104
5.6	Reason for Starting a Business, by Poverty Level, 2001	105
5.7	Skills and Education of Available Workers as an Obstacle to Firms' Operation and Growth, 2003	112

Boxes

1.1	Definitions	4
2.1	Urban versus Rural Population: Possible Data Problems	19
3.1	Evolution of the Maquila Sector and Its Importance in the Employment Growth in Manufacturing	45

Acronyms and Abbreviations

BCN	Central Bank of Nicaragua
CAFTA	Central American Free Trade Agreement
CEPAL	Economic Commission for Latin America and the Caribbean
CPI	consumer price index
EMNV	National Household Living Standards Survey (Encuesta de Medición del Nivel de Vida)
EPZ	export processing zone
FAO	Food and Agriculture Organization of the United Nations
GDP	gross domestic product
HIPC	heavily indebted poor countries
IFC	International Finance Corporation
ILO	International Labour Organization
IMF	International Monetary Fund
INATEC	National Technology Institute (Instituto Nacional Tecnológico)
INEC	National Institute of Statistics and Census (Instituto Nacional de Estadísticas y Censos)

INIDE	National Institute for Development Information
MITRAB	Ministry of Labor
PRGF	Poverty Reduction and Growth Facility
RAAS	Autonomous Region of the Atlantic South (Región Autónoma del Atlántico Sur)
RRR	relative risk ratio

Acknowledgments

This report was prepared by Catalina Gutierrez, Pierella Paci and Marco Ranzani in the Jobs and Migration cluster in the Poverty Reduction and Development Effectiveness Group at the World Bank as part of a multi-year program on the role of employment for inclusive growth. It also provided background information for the Poverty Assessment of Nicaragua produced by the World Bank.

The team would like to thank very much a number of people without whom this report would not have been possible. First, the Minister of Labor of Nicaragua, Janeth Chavéz Gómez, for taking time to provide us with detailed explanations of the characteristics and peculiarities of the Nicaraguan labor market and for sharing with us her view on priority issues. Second, the staff of the Central Bank of Nicaragua, who have always responded positively to our many data and information requests. The team is particularly indebted to the Director of the Research Department, Mario Alemán, and, among his staff, Hiparco Loaisiga, Jesus Rojas, Ligia Miranda, Miguel Aguilar, and Lisbeth Laguna, who shared their knowledge and views with us in addition to providing us with invaluable data and information. The team is also grateful to Juan Rocha

of the Statistical and Census Office in Nicaragua for his help with household surveys and to Alejandro Martínez Cuenca in Fundación Internacional para el Desafío Económico Global (FIDEG), who was kind enough to share his views on the challenges faced by the Nicaraguan economy. Finally, special thanks go to Nydia Betanco in the Nicaragua World Bank Country Office for all her help and support while on mission in Nicaragua.

The report benefited greatly from the comments received from the members of the Nicaragua Poverty Assessment Team, led by Florencia Castro-Leal, and from the participants to the seminar held in Managua, March 16–17, 2007. We are particularly grateful to Florencia, Norman Hicks, Gabriel Demombynes, Diego Angel-Urdinola, Ximena Del Carpio, and José Ramón Laguna for helpful comments and advice. The many inputs of the members of the Employment and Migration team in the Poverty Reduction and Debt Effectiveness Unit at the World Bank were also invaluable. The team is extremely grateful for these inputs.

CHAPTER 1

Introduction and Overview

The degree to which growth is able to translate into poverty reduction depends on how its benefits are distributed among different segments of society. There is little doubt that growth—measured by changes in average income—contributes significantly to poverty reduction.¹ However, it is also clear that countries differ in the degree to which income growth spells have translated into poverty reduction. Although differences in the responsiveness of poverty to income growth account for a small fraction of the 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.²

There is a general consensus that the availability of employment opportunities and their characteristics constitute an essential transmission channel from growth to poverty reduction and, in this way, play a key role in poverty's response to growth. For one thing, the poor derive most of their income from work, either as self-employed or as employees, so what happens to their income and employment status seems tautologically relevant. In addition, the ease with which the poor may take up the opportunities afforded by growth may depend crucially on (i) the structure of employment, (ii) the returns to labor and their distribution, and

(iii) the existence of imperfections and frictions in the labor markets. For example, one may be inclined to believe that when the poor face flexible labor markets and low barriers to mobility across labor market segments, geographic regions, or sectors of production, they are in a better position to take the opportunities generated by growth, by moving more easily to the growing sectors. Similarly, the effectiveness of growth in reducing poverty may also depend on whether growth is unskilled labor-intensive and whether the poor have or can easily acquire the skills required by the growing sectors. Moreover, there is some evidence of strong links between labor market regulations, such as minimum wages, and the incidence of poverty in developing countries.

The concern that employment, returns to labor, and imperfections or rigidities in the labor markets play a crucial role in the poverty impact of growth has been reflected in the emphasis in the policy debate on the idea that jobless growth has been responsible for the disappointing results seen by some countries in the effectiveness of growth in reducing poverty. As a result, debates addressing how to foster employment-intensive growth have followed.³ However, it is also often recognized that poverty is less an outcome of open unemployment than of adequate levels of income, and as such, emphasis should be placed not on increasing employment levels but on increasing the productivity of the working poor (ILO 2003). The debate has also been concerned with whether policy interventions should concentrate on increasing earnings in the sectors where the poor are found (such as agriculture), or whether they should be targeted to sectors where the poor are not found, so that more of the poor can be drawn into the higher-earning sectors (Fields 2006). To date, there is very little evidence to illuminate the debate. Moreover, the questions are hard to address, because there is lack of clarity on how to achieve the alternative objectives and because it is inherently difficult to identify the costs and benefits of the possible policy alternatives.

Objectives and Scope of this Task

The objective of this report is to shed light on some of the issues discussed above in the case of Nicaragua, and to provide some policy guidelines for the fight against poverty. In particular, it hopes to be able to identify the growing sectors, as well as the constraints faced by the poor in benefiting from this growth.

The report is part of a series of studies conducted within the PRMPR to foster understanding of the role of employment earnings and labor markets in shared growth. In addition, it is intended to function as a background document for the World Bank's Nicaragua Poverty Assessment 2007.

Structure of the Report

The report is structured in six chapters. Chapter 2 briefly describes the evolution of the Nicaraguan economy, in terms of its macroeconomic indicators, employment, and poverty. The third chapter analyzes the profile of growth and the way in which it helps explain the observed behavior of poverty, using data from national accounts and employment data from household surveys. It describes growth and employment by the sector of economic activity and its employment productivity profile. The chapter goes more deeply into the evolution of the manufacturing sector and the maquila production. Chapter 4 looks at the income profile of the population, using household surveys. Segmentation and skill mismatch are explored in chapter 5, and chapter 6 provides a brief statement on policy implications and further research.

Definitions of terms used throughout the report are presented below. Workers have been classified into four occupational categories: waged and salaried workers, individual self-employed workers, family enterprise workers, and employers. These are considered qualitatively distinct types of labor. Each might constitute a segment within the labor market, with different rules for earnings determination and different employment policies for individuals of identical productivity, and workers' mobility between these employment categories might be limited. The nonwage workers are divided into the above-mentioned categories for several reasons. First, employers (those who employ paid labor) receive substantially higher income than other nonwage workers and are better educated. They often have assets that other nonwage workers do not. Second, returns to labor for family enterprise workers and the self-employed who are not working with other members of the family need different methodologies of calculation. While the income reported by the self-employed working alone is the return for labor for his or her individual work, reported income for self-employed workers working with other

Box 1.1

Definitions

Employment

Child labor	A child between 6 and 14 years of age who performed market activities for at least one hour in the week prior to the survey, or who has a permanent job.
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.
Formal employment	Employment for which social security contributions are paid by workers and firms.
Household enterprise worker, family enterprise worker	A self-declared self-employed person living in a household with other self-employed or unpaid family workers.
Inactive	A person who is neither employed nor actively looking for work.
Labor force	The sum of the working-age employed and unemployed.
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 nonwage family enterprise workers and the self-employed, who make up the largest share of workers in Nicaragua.
Maquila sector	The maquila sector comprises all production units located in the special export processing zones (EPZs), which are clearly defined zones, often within a wired complex. Production is undertaken with mostly imported materials using local labor, and all output is destined for export markets. Employment in the maquila sector is referred to as maquila employment.
Self-employed	A self-declared self-employed person, living in a household in which there are no other self-employed or unpaid family workers.
Unemployed	A working-age individual who is not employed but is actively looking for work.

(continued)

Box 1.1**(continued)**

Wage worker	A worker who has declared being salaried for his or her work. It includes those self-reported as <i>jornaleros</i> and <i>peones</i> , who work for a daily or per job rate in manual agricultural labor, often only during the harvest season.
Working-age population	The population between 15 and 64 years of age.
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. <i>Earnings</i> and <i>labor income</i> 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 (for example, when comparing earnings in the different sectors) or the sum of earnings in all reported jobs.
Earnings of the self-employed and employers	For nonagricultural work, it is calculated as declared in the survey. For agricultural work, it is calculated as net profits using the survey's agricultural enterprise module.
Household enterprise earnings	For nonagricultural work, earnings for each individual are calculated as a proportion of the sum of earnings declared in the survey of all the workers employed in the household enterprise. For 2001, each worker is assigned a portion of earnings proportional to reported hours of work. For 2005, total enterprise income is divided equally among total number of adult workers. For agricultural work, earnings are derived from the survey's agricultural enterprise module and divided by the number of adult household members reported as working in the enterprise.
Low earner	An employed individual whose earnings are below the national poverty line.
Wage earnings	Total cash and in-kind earnings as declared in the survey.

unpaid family members is the income earned by all the family members, and a methodology has to be devised to assign a proportion of household income to each member of the family. Finally, individual self-employed are more prevalent in urban areas, whereas family household enterprise workers are more prevalent in rural agricultural work.

Notes

1. 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, it accounts for as much as 97 percent.
2. For evidence on heterogeneity in the poverty impact of growth, see for example Bourguignon (2002); Kakwani, Khandker, and Son (2006); Lucas and Timmer (2005); and Ravallion (2004). 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.
3. One of the core elements of the global employment agenda, *Macroeconomic Policies for Growth and Employment*, calls for addressing four key questions, one of which is: How can the employment intensity of growth be increased? (ILO 2003).

CHAPTER 2

Country Context

This chapter briefly describes the main features of the Nicaraguan economy and its labor market. It summarizes the recent evolution of the main macroeconomic indicators, presents a broad picture of the labor market and how its structure compares with that of other countries, and discusses in some detail labor market regulation and its effects on employment generation and investment.

Macroeconomic Context

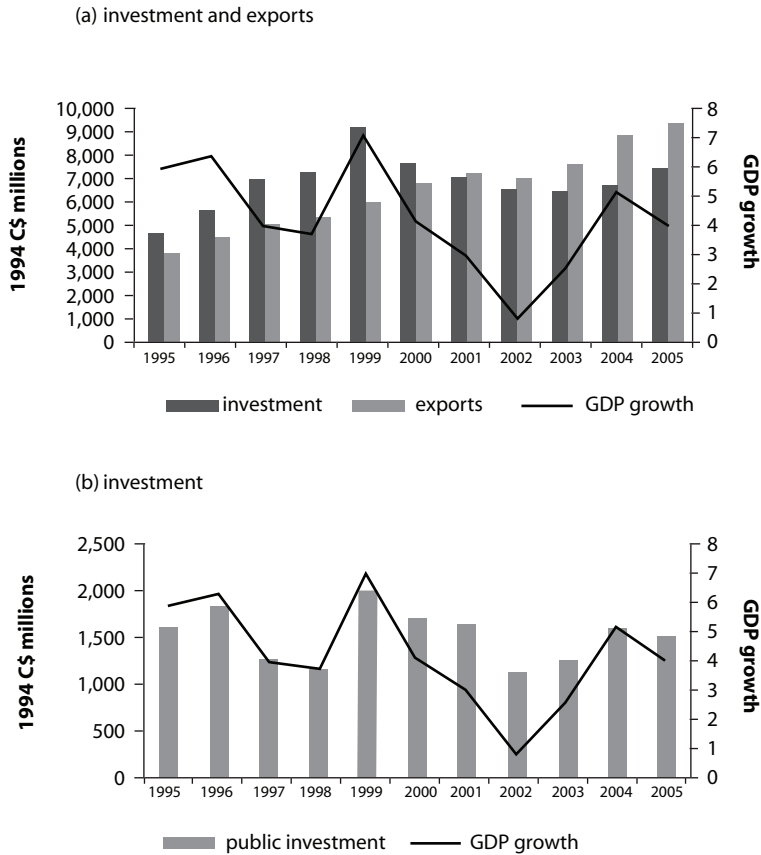
Over the past 12 years, Nicaragua has witnessed a very significant transformation: from a nation torn by war, political instability, and natural disasters with its economy plunged into chaos, it has reemerged as an inclusive democracy where the foundations for economic growth and sustainable development are being laid. Notwithstanding this progress, Nicaragua still remains among the poorest countries in the western hemisphere. It is classified as a lower-middle-income economy with a per capita gross national income of US\$1,000 in 2005, which is a third of the average value for Latin America and the Caribbean region and half the average of all lower-middle-income countries. It has a population of 5.1 million, with a life expectancy at birth of 70 years.

During the past 10 years Nicaragua has experienced modest growth rates, averaging 3.8 percent between 1998 and 2005. The country has consolidated its structural adjustment programs and completed the requirements for benefiting from the Heavily Indebted Poor Countries (HIPC) Initiative, thereby freeing the country from a debt service that amounted to 9.5 percent of GDP in 2001.

Between 1998 and 2001, GDP per capita grew at an average rate of 3.8 percent and then decelerated, averaging a per capita growth rate of 1.7 percent between 2001 and 2005. This growth has been closely tied to investment and exports (see figure 2.1). Investment has been fueled by foreign assistance. In 1998, after Hurricane Mitch struck the country, massive reconstruction efforts were undertaken. The country received US\$250 million in emergency assistance, and a further US\$1.4 billion was pledged by the international community. Until 2001, recovering from the aftermath of the hurricane was a prime policy objective, which, together with important flows of foreign assistance, led to an increase in public investment of 27 percent in 1999.

The past 10 years have also seen a consolidation in the International Monetary Fund (IMF)-led stabilization policies adopted in the early 1990s, which were concentrated in controlling hyperinflation, reducing the fiscal deficit, and privatizing public utility companies. A second wave of reforms was initiated in 2002 with the signature of the Poverty Reduction and Growth Facility (PRGF) with the IMF. Its aim was to achieve fiscal sustainability through the broadening of the tax base, the elimination of tax exemptions, improved revenue collection, more effective budgeting, and the improvement of the financial position of the Central Bank. The government also sought access to a HIPC Initiative to gain foreign debt relief. In 2004, Nicaragua reached the completion point under HIPC, and bilateral and multilateral debt relief was granted for debt incurred prior to 2005. On the international front Nicaragua has signed several trade and integration agreements with its Central American partners, and trade with El Salvador, Guatemala, and Honduras is gaining in importance, although the United States remains the main trading partner.

There have been no major changes in the sectoral structure of production and in the urban versus rural composition of the population. However, Nicaragua has experienced an important demographic transition: the share of working-age population (15–64 years) has increased faster than other age ranges, reducing the dependency ratio.¹ In addition,

Figure 2.1 Investment, Exports, and Growth, 1995–2005*percent*

Source: Authors' calculations with data from the Central Bank of Nicaragua (BCN).

the *maquila* sector (enterprises working in the export processing zones) and financial intermediation have experienced important developments.

Population growth has slowed down, and Nicaragua has started to see a change in its demographic structure. Between 1995 and 2005, the population grew at a rate of 1.6 percent annually, a number well below the projected growth rate of 2 percent. The ratio of working-age population

(15–64 years) to total population increased from 53 percent in 1998 to 55 percent in 2001 and 58 percent in 2005, significantly reducing the dependency ratio. Despite this overall demographic change, there was little gain in the share of urban population, which increased its share in total population by 1 percentage point in the past 10 years (table 2.1).

The sectoral structure of GDP remained relatively constant during these 10 years, with the secondary sector gaining only a 1-percentage-point share during the whole period. Although there were no major changes in the structure of production, within the secondary and tertiary sectors there were some important developments, namely the growth of the maquila sector and an important surge in financial intermediation.

Financial intermediation has grown at an average annual rate of 9 percent. This increase in intermediation is an important development, as Nicaragua has the smallest banking system in Central America and as it is the main source of credit for the private sector. Still, financial intermediation is weak and accounts for only 3.6 percent of GDP.

Growth in the maquila sector has had important implications in terms of the availability of foreign reserves and employment. The maquila sector, which started in the early 1990s with the development of the first public free trade zone, has experienced an amazing dynamism. Between 2001 and 2005, the share of maquila exports in total exports jumped from 32 percent to 50 percent, and the sector generated just over 53,000 new jobs during these four years. The value of transformation services in the maquila, which measure, the value of domestic inputs used in the process, reached 5.5 percent of total value added in 2005.²

Labor Market Context

The labor market profile of Nicaragua is very similar to that of low-income and low-middle-income countries and is characterized by low unemployment rates,³ low formality and wage employment rates, high shares of population working in agriculture, and relatively high child labor.

This structure of employment is mainly a reflection of the stage of industrialization of these countries. Low- and middle-income countries still have a large agricultural sector in which productivity is generally low and workers are mostly self-employed. Most of the population has very low incomes, so they cannot afford to be unemployed. Instead, an important fraction of the working-age population is self-employed in informal activities, many in agriculture. As industrialization progresses, the share of

Table 2.1 Main Macroeconomic Indicators, 1998–2005

	1998	1999	2000	2001	2002	2003	2004	2005
GDP real growth (%)	3.7	7.0	4.1	3.0	0.8	2.5	5.1	4.0
Real GDP per capita growth (%)	2.0	5.3	2.4	1.3	−0.9	0.8	3.4	2.2
Share of value added in primary sector (%)	21.3	20.8	22.3	22.1	21.8	21.6	21.3	21.2
Share of value added in secondary sector (%)	26.7	27.5	27.1	27.5	27.1	26.8	27.6	27.8
Private consumption per capita real growth (%)	3.0	4.1	3.5	3.1	2.7	0.1	1.9	1.8
Gross fixed investment real growth (%)	4.3	27.1	−16.8	−8.4	−7.1	−1.0	4.2	10.1
Consumer price inflation (year-to-year % change)	13.04	11.22	11.55	7.36	3.99	5.15	8.44	9.42
Real effective exchange rate (year 2000 = 100)	98.9	96.9	100.0	100.9	96.9	91.2	89.0	88.7
Urban population as a share of total population	54.9	55.0	55.2	55.3	55.5	55.6	55.8	55.9
Total population (thousands)	4,579	4,655	4,733	4,812	4,892	4,974	5,057	5,142

Sources: National Statistical Institute (INEC), BCN, and World Bank.

employment in the modern sectors, mainly manufacturing and services, rises. Industrialization spreads predominantly in urban areas, which leads to a process of urbanization, as rural workers leave low-productivity jobs in agriculture in search of higher paying jobs outside of agriculture.

As urbanization progresses, urban self-employment in low-productivity jobs (in many cases informal) increases. The reason behind this increase is still a matter of debate and may depend on the particulars of the labor market structure and regulation. In many cases workers who are searching or queuing for good jobs are still too poor to afford to be unemployed and must engage in self-employment “survival activities” while they seek a job. In other cases, monopsonistic behavior by firms leads to very low wages for the unskilled, so that many low-skilled migrant workers find self-employment as attractive as wage employment. With urbanization, unemployment begins to be noticeable, as higher incomes resulting from higher productivity permit the luxury of shopping for good jobs.

The development of a modern sector also comes with a rise in formalization and in the share of wage and salary employment, as modern firms grow and demand labor. The growth of the modern sector is usually also accompanied by a rise in agricultural productivity, although the links and

causalities for this are less clear. In many cases purposeful investment in agriculture frees rural labor, as more productive techniques mean that fewer workers are needed to exploit the available land. This surplus labor migrates to urban markets, providing new labor that feeds the process of urbanization and industrialization. In other cases, migration to nonagricultural jobs with higher productivity and higher pay allows households to generate savings that can translate into new investments that raise agricultural productivity.

As industrialization progresses child labor may decrease, as higher incomes mean lower opportunity costs of sending children to school. Additionally, as the demand for skill increases, so do its returns, and the benefits of acquiring an education become more evident. Thus, it is costlier not to send children to school.

In Nicaragua, unemployment as defined by the International Labour Organization (ILO) is low, slightly less than 4 percent (see table 2.2). Most of the employed work in the informal sector (82 percent), wage employment accounts for half of the employed, agriculture absorbs a high share of employment (37 percent), and child labor is relatively high (9 percent). Agriculture is still a sector with low returns, and productivity has been declining, suggesting that employment in this sector still acts as a “last resort” option for the working population. In the discussion that follows, the labor market structure is described in more detail.

Table 2.2 presents the main indicators of the labor market. It shows that unemployment rates according to the ILO definition are very low and that they remained almost constant during the period under analysis. The broad unemployment rate, which also includes discouraged workers, is slightly higher but is still low compared with other countries (less than 10 percent). The working-age population, defined as those ages 15–64, as a proportion of the total population increased 5 percent (or 3 percentage points). The number of employed as a fraction of the total working-age population also rose slightly. Child labor saw a small increase, from 8.7 percent to 9.2 percent. The poverty rate among unemployed workers stands out, at half the overall poverty rate, which suggests that unemployment is not strongly correlated with poverty.

The table also shows the number of workers affiliated with social security, which is often a measure for formalization. In Nicaragua only some 19 percent of the labor force has social security, and this ratio decreased slightly in 2005. Finally, the table shows the number of workers holding more than one job concurrently. It has been pointed out that in many cases

Table 2.2 Main Indicators of the Labor Market, 2001 and 2005

	<i>Level in 2001</i>	<i>Level in 2005</i>	<i>% change</i>
Unemployment rate ^a	3.47	3.39	-2.44
Broad unemployment rate ^b	8.07	6.87	-14.84
Ratio of employment to working-age population	62.15	62.78	1.01
Working-age population as a fraction of total population	55.30	58.22	5.27
Child labor rate	8.87	9.28	4.69
Share of long-term unemployed ^c	0.04	1.50	3,650
Poverty rate among unemployed workers (national poverty line, poor)	22.14	28.52	28.80
Poverty rate among unemployed workers (national poverty line, extremely poor)	6.96	6.69	-3.83
Poverty rate among unemployed workers (international poverty line, 1\$/day)	24.76	28.52	15.19
Share of workers holding two or more jobs concurrently ^d	9.03	8.41	-6.92
Share of workers affiliated with social security ^e	19.70	18.05	-8.40

Source: Authors' calculations using data from the National Household Living Standards Survey (EMNV 2001, 2005).

a. ILO definition of unemployment is those who are not employed but who actively searched for a job in the past week.

b. Broad unemployment rate also includes discouraged workers.

c. Ratio of long-term unemployed over total active labor force = (employed + unemployed), the questions are not strictly comparable: in 2001, How long have you been unemployed? In 2005, How long have you been searching for a job?

d. Defined as holding two jobs in the past week.

e. Affiliated with social security in main occupation.

workers cannot generate enough income from their main job and must find additional work to complement their income, so that the share of workers holding two or more jobs concurrently is often used as a measure of the (poor) quality of the jobs. The share of workers holding two or more jobs is less than 10 percent, a figure below that of low-income countries.

Agricultural jobs offer the lowest returns. Outside of agriculture, the self-employed do not earn less per hour worked than the wage employed, but they appear to earn less annually owing to shorter spells of work during the year.

Table 2.3 shows the median annual labor income and median earning rates for the different employment categories. Earnings are lower for all

Table 2.3 Earnings and Income by Employment Category, 2001 and 2005

	Level in 2001		Level in 2005		% change	
	Nonagriculture	Agriculture	Nonagriculture	Agriculture	Nonagriculture	Agriculture
Wage and salary workers						
Median annual labor income	21,064.36	10,532.18	20,844.00	11,700.00	-1.05	11.09
Median hourly earnings rate	8.32	4.22	8.52	5.06	2.41	20.01
Low earnings rate	20.57	37.76	17.66	24.86	-14.17	-34.16
Individual self-employed workers						
Median annual labor income	13,374.20	6,423.42	12,000.00	6,319.25	-10.28	-1.62
Median hourly earnings rate	11.20	3.88	6.22	—	-44.43	—
Low earnings rate	28.32	55.96	34.13	51.59	20.50	-7.81
Employers						
Median annual labor income	46,809.70	9,298.00	45,000.00	31,751.19	-3.87	241.48
Median hourly earnings rate	26.87	5.87	19.78	—	-26.39	—
Low earnings rate	3.40	45.72	6.83	9.72	100.85	-78.74
Household enterprise workers						
Median annual labor income	10,532.18	5,190.74	16,053.45	5,891.44	52.42	13.50
Median hourly earnings rate	10.75	4.12	8.40	—	—	—
Low earnings rate	23.40	64.36	56.95	57.70	143.36	-10.34

Source: Authors' calculations with data from EMINV 2001 and 2005.

Note: — indicates insufficient or missing data. Median annual labor income refers to all the occupations and includes monetary, nonmonetary, and in-kind earnings. The median hourly earnings rate is calculated from the main occupation only, except for the agricultural self-employed, agricultural employers, and agricultural family enterprises, for which it is calculated as profits per hour worked using the agricultural enterprise module. In 2005, the agricultural enterprise module did not report hours worked, and therefore the hourly earnings rate cannot be calculated for the self-employed in agriculture.

agricultural categories, and among agricultural workers the lowest income is obtained by household enterprise workers and the individually self-employed. It is also obvious that wages decreased for nonagricultural employment while they increased for agricultural workers. The self-employed in nonagricultural work have similar earning rates to the wage employed, which suggests that wage employment is not necessarily a better earning option. However, yearly earnings among the self-employed are lower, which suggests that they are employed for shorter periods or work fewer hours.

The first column lists the tiers, meaning the group and subgroup of labor force categories. The second column shows the number of persons under each tier for 2001. The third column shows the hierarchical rates, meaning the percentage of people in the subcategory (or tier) for 2001. The fourth and fifth columns show the equivalent numbers and rates for 2005. The last column gives the percent change.

The first three tiers (child population, population age 65 and above, and working-age population) illustrate the basic population structure of those 6 years of age and older. It is very evident that the share of the population between ages 6 and 14 increased its participation among the group. This has important implications for the evolution of the labor market in the coming decade, as the cohort between 6 and 14, which represents the largest fraction of the population, will enter the labor market in the coming years. The population 65 and older and the working-age population reduced their shares in the total population. The table further disaggregates the working-age population (15–64) into active and inactive. The rate of inactivity has remained almost constant at 35 percent. The inactive include the discouraged workers and the seasonally inactive. The proportion of discouraged workers as a fraction of the active population has decreased. But this is also true for the seasonally inactive (from 5 percent to 1.6 percent). Among the active population, 96 percent are employed, with very little change from 2001 to 2005.

The employed population (tier 1.3.2.2) is disaggregated into different employment categories. The bulk of the nonagricultural population is employed as wage and salary workers (43 percent in 2001). In the agricultural sector, the bulk of employment is evenly distributed between those employed in agricultural family enterprises and the wage and salary workers (11 percent each in 2001).⁴ There has been little change in this structure. Under each employment category, the share of low earners is shown. These are the workers who earn incomes below the poverty line.

Table 2.4 Hierarchical Description of the Population Six Years of Age and Above, 2001 and 2005

	2001 level (in millions)	Hierarchical rates	2005 level (in millions)	Hierarchical rates	% change
1. Total population 6 years and above	4,154,983	100.00	4,486,708	100.00	7.98
1.1 Child population (6–14 years of age)	1,031,158	24.82	1,185,578	26.42	14.98
1.1.1 Child laborers	91,443	8.87	110,071	9.28	20.37
1.2 Population 65+ years of age	257,459	6.20	265,742	5.92	3.22
1.2.1 Employed	92,816	36.05	97,448	36.67	4.99
1.3 Working age population (15–64 years of age)	2,866,365	68.99	3,035,387	67.65	5.90
1.3.1 Inactive ^a	1,020,727	35.61	1,062,846	35.02	4.13
1.3.1.1 Discouraged	92,206	9.03	73,723	6.94	-20.05
1.3.2.1 Temporarily inactive	48,292	4.73	16,798	1.58	-65.22
1.3.2 Active	1,845,638	64.39	1,972,540	64.98	6.88
1.3.2.1 Unemployed	64,099	3.47	66,837	3.39	4.27
1.3.2.2 Employed ^b	1,781,538	96.53	1,905,703	96.61	6.97
1.3.2.2.1 Wage and salaried agriculture	196,348	11.02	209,395	10.99	6.64
With low earnings	72,922	37.14	52,064	24.86	-28.60
1.3.2.2.2 Wage and salaried nonagriculture	771,318	43.30	785,037	41.19	1.78
With low earnings	143,963	18.66	138,619	17.66	-3.71
1.3.2.2.3 Individual self-employed agriculture	59,854	3.36	67,048	3.52	12.02
With low earnings	32,950	55.05	33,440	49.88	1.49
1.3.2.2.4 Individual self-employed nonagriculture	200,874	11.28	253,125	13.28	26.01
With low earnings	58,200	28.97	86,386	34.13	48.43
1.3.2.2.5 Employers agriculture	35,707	2.00	23,957	1.26	-32.91
With low earnings	13,592	38.07	1,315	5.49	-90.32
1.3.2.2.6 Employers nonagriculture	36,764	2.06	57,493	3.02	56.38
With low earnings	2,288	6.23	3,925	6.83	71.51

	2001 level (in millions)	Hierarchical rates	2005 level (in millions)	Hierarchical rates	% Change
1.3.2.2.7 In household enterprises agriculture ^a	193,377	10.85	300,639	15.78	55.47
With low earnings	79,136	40.92	94,246	31.35	19.09
1.3.2.2.8 In household enterprises nonagriculture ^a	122,007	6.85	183,949	9.65	50.77
With low earnings	32,071	26.29	104,763	56.95	226.66
1.3.2.2.9 Others	165,286	9.28	25,055	1.31	-169.20

Source: Authors' calculations with data from EMINV 2001 and 2005.

a. The survey does not allow for a distinction between discouraged workers who are willing to work and those who are not. Temporarily inactive workers are those waiting to start a job or waiting for the harvest season to begin.

b. Employed workers are subclassified according to the main occupation. The category does not sum to total employed because other employed are classified as members of cooperative enterprises.

c. Includes unpaid family members.

The highest number of low earners can be found among those individually self-employed in agriculture (55 percent have low earnings) and those that work in household family enterprises in agriculture (40 percent have low earnings). Employment in all agricultural categories has increased. As will be discussed further, it is unclear how much of this increase might be due to errors in the urban-rural weights of the 2001 survey.

Finally, table 2.5 shows the sector of employment and level of education of the employed population. The tertiary sector absorbs most of the employed population, namely, more than two-thirds of the employed. This share decreased slightly between 2001 and 2005 because of the increase in employment in the primary and secondary sectors. Finally, the low level of education of the labor force stands out, as 42 percent of the employed have an incomplete primary education or less in 2005, and only 10 percent have a completed secondary education.

In summary, between 2001 and 2005 Nicaragua's labor markets saw either no change or very subtle changes in this labor market profile. Perhaps the important events have been the increase in the share of the working-age population as a fraction of the total population and the increase in employment in the agricultural sector. In general, as industrialization progresses, the share of the population in the rural sector tends to decrease. In very few cases increases in the rural population are seen as

Table 2.5 Other Characteristics of the Employed, 2001 and 2005

	<i>Share of total employment 2001</i>	<i>Share of total employment 2005</i>
Sector of activity (primary occupation)		
Primary	18.45	20.60
Secondary	11.90	12.56
Tertiary	69.64	66.84
Formal schooling attainment		
No school	20.30	17.63
Incomplete primary	26.89	24.13
Primary	13.72	14.79
Incomplete secondary	21.45	22.50
Secondary	8.23	10.17
Tertiary	9.41	10.78

Source: Authors' calculations with data from EMNV 2001 and 2005.

a response to urban crisis. However, this has not been the case in Nicaragua; thus the reason for this increase is yet to be determined. One possible explanation is that the population weights used in the 2001 survey were not in accordance with the census behavior of the population (see box 2.1). However, it is not clear to what extent this may be affecting the results.

Box 2.1

Urban versus Rural Population: Possible Data Problems

The table below shows the population calculated from the census and the surveys. According to the surveys, urban population increased substantially from 1998 to 2001, from 54 percent to 58 percent, and then decreased between 2001 and 2005, from 58 percent to 55 percent. It is hard to estimate whether the behavior in the surveys is actually true. It is surprising that urbanization increased substantially and then reversed in such a short time. The available census information suggests that there was an increase of 1 percentage point between 1995 and 2005, but there are no data points in between to illustrate the intercensus behavior. Moreover, the 2001 population estimations used in the 2001 survey overestimate the population growth. The present report corrects the weights for this overestimation but makes no adjustments for regional or urban-rural composition, as no data were available to do that. It is unlikely that the population overestimation was uniform across regions or urban and rural populations.

	Percentage of regional population				
	Census		Survey		
	1995	2005	1998	2001	2005
Managua	25.10	24.56	26.06	24.83	24.54
Pacific Urban	17.38	17.13	16.75	17.37	16.95
Pacific Rural	14.16	12.34	15.57	14.34	12.38
Central Urban	10.79	12.21	10.51	12.74	12.28
Central Rural	20.30	19.83	20.82	18.67	19.85
Atlantic Urban	3.89	4.37	5.05	5.50	4.39
Atlantic Rural	8.39	9.56	5.25	6.55	9.62
Overall Urban	54.41	55.92	54.35	58.33	55.83

Labor Regulation in Nicaragua

The largest share of nonlabor costs paid by employers corresponds to social security contributions, which amount to 15 percent of the wage. Workers contribute 6.25 percent of their wage for social security. Workers are entitled to one month of paid vacations and an annual bonus that is equivalent to one month of work. They are also entitled to seniority bonuses. In addition to these costs, employers have to pay 2 percent of the total payroll for INATEC, the technological training institute. Moreover, there are minimum wages, by sectors, and strong support for unionization. Firms are allowed to hire temporary workers and can extend this type of contract indefinitely. The workweek consists of six days and it can be extended up to 50 hours. Termination of the employment contract is authorized with no third-party involvement, and workers are entitled to severance pay upon termination, which varies with tenure.

Nicaragua conducted an enterprise survey for 2003, in conjunction with the World Bank. Enterprise surveys collect information among firms regarding constraints to growth and business activities.⁵ The information is often used for the analysis of the investment climate in different countries. Although a complete investment climate assessment is outside the scope of this report, the survey can be used to pinpoint the main bottlenecks that are present and that may be hampering growth and employment generation.

The information collected includes the level of nonwage labor costs and the perception among firms of the rigidity of labor regulation. Using this information, the Enterprise Survey Unit at the International Finance Corporation constructs relative hiring and firing rigidity indexes. Table 2.6 compares the results for Nicaragua with other countries in the region (and elsewhere) and with its main trading partners (shown in gray). As can be seen, Nicaragua does not appear particularly rigid when compared with other countries in the region. In fact, it appears to be one of the least rigid economies, ranking only below Jamaica and the Dominican Republic and having an overall performance equal to Chile's and El Salvador's. It is relatively low compared with the United States, one of its main trading partners but also the most flexible economy in the world.

Other information collected can be used to assess the main constraints to investment faced by different firms. Table 2.7 shows the percentage of firms responding that a particular constraint was severely hampering business functioning and growth. Responses show that labor regulation and the skills of the labor force are among the least problematic constraints,

Table 2.6 Labor Market Flexibility, Comparative Performance

<i>Region or economy</i>	<i>Difficulty of hiring index</i>	<i>Rigidity of hours index</i>	<i>Difficulty of firing index</i>	<i>Rigidity of employment index</i>
United States	0	0	0	0
Jamaica	11	0	0	4
Dominica	11	20	20	17
Chile	33	20	20	24
El Salvador	33	40	0	24
Nicaragua	11	60	0	24
Colombia	22	40	20	27
Uruguay	33	60	0	31
Latin America and the Caribbean	34	35	27	32
Costa Rica	56	40	0	32
OECD	27	45	27	33
Guatemala	61	40	0	34
South Asia	42	25	38	35
Middle East and North Africa	30	45	33	36
Honduras	67	40	0	36
Mexico	33	40	40	38
Brazil	67	60	0	42
Dominican Republic	56	40	30	42
Sub-Saharan Africa	44	52	45	47
Ecuador	44	60	50	51
Bolivia	61	60	100	74
Venezuela, R. B. de	67	60	100	76

Source: World Bank, Investment Climate Surveys.

Note: The United States is the baseline for comparison; numbers are normalized to zero.

and macroeconomic stability and uncertainty and credit issues are severely constraining business functioning and growth.

Minimum wages are set by the Minimum Wage Commission, in which representatives of the unions, the government, and the private sector negotiate their levels. Minimum wages are differentiated according to sector of economic activity in an attempt to take into account the level of education of the labor force in each sector (see table 2.8).

Assessing whether the minimum wage is binding in Nicaragua is a hard task. The fact that there are 12 different minimum wages implies that a researcher would have to determine separately for each sector of economic activity whether the wage is binding or not, and this would reduce the sample size and thus the reliability of any estimate. This report instead

Table 2.7 Issues Affecting the Investment Climate

<i>Ranking</i>	<i>Investment climate issue</i>	<i>Percentage of firms answering that it is a very severe problem</i>
1	Corruption	38.3
2	Cost of credit	34.2
3	Macroeconomic and regulatory uncertainty	31.4
4	Access to credit	28.7
5	Macroeconomic stability	27.0
6	Noncompetitive practice	26.8
7	Availability of credit	26.7
8	Efficiency of justice administration and conflict resolution	19.7
9	Crime and violence	18.8
10	Transport	17.3
11	Electricity	17.3
12	Taxes	14.6
13	Red tape on taxes	8.4
14	Property rights	5.5
15	Skills of the labor force	5.5
16	Access to land	5.1
17	Import taxes regulation	4.9
18	Telecommunications	4.7
19	Permits and operating licenses	4.4
20	Labor regulation	3.1
21	Trade regulation	3.0

Source: Authors' calculations using data from World Bank Enterprises Surveys.

analyzed minimum wages in the four largest sectors in terms of employment: agriculture, manufacturing, commerce, and community services.

A first step in analyzing minimum wages is to plot kernel density estimates of wage earnings and explore whether the distribution of earnings displays a kink at the minimum wage.

Figure 2.2 illustrates the results for the log of hourly wage earnings for 2001, for both formal and informal wages. The vertical line is the corresponding log of the hourly minimum wage for the sector. In the case of the manufacturing sector, there are three different minimum wages. The lowest (C\$670) corresponds to the manufacturing non-maquila sector. The middle wage (C\$895) corresponds to the maquila sector, and the highest (C\$1,010) corresponds to utilities (electricity, gas, and water).

As expected, the distribution of formal wages is to the right of the distribution of informal wages. From the figure, there is some evidence of a

Table 2.8 Minimum Wage and Lowest Wage Paid as a Proportion of Minimum Wage, 2001 and 2005

C\$

Sector	Minimum wage		Lowest paid wage as a proportion of minimum wage	
	2001	2005	2001	2005
Agriculture	542	736	1.23	1.17
Fishing	—	—	—	—
Mining	942	1,377	2.12	1.53
Manufacturing	664	988	1.58	1.24
Electricity, gas, and water	887	1,242	1.63	1.73
Construction	1,001	1,410	1.71	1.32
Commerce	1,292	1,752	1.01	0.98
Transport and communications	1,001	1,410	1.39	1.22
Financial intermediation	1,001	1,410	1.18	1.26
Community services	1,110	1,752	0.88	0.70
Municipal and central govt.	778	1,066	0.79	0.90

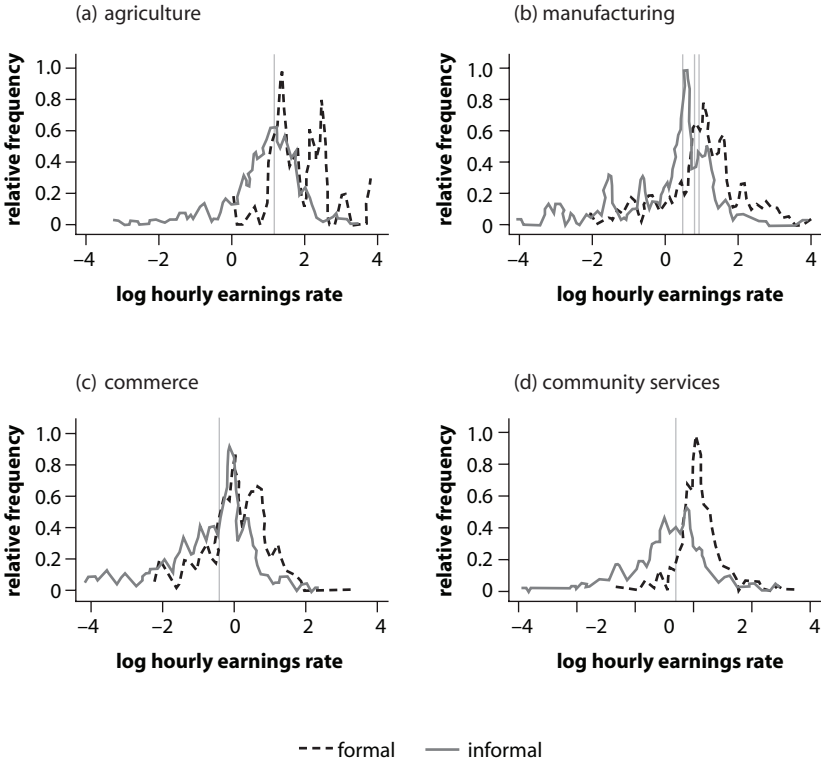
Source: Authors' calculations based on data from the Ministry of Labor and BCN.

Note: — indicates insufficient or missing data. Monthly average minimum wage was calculated as a weighted average of ongoing minimum wages during the year.

kink around the minimum wage in formal agriculture, while in the informal agricultural sector minimum wages do not seem to have any effect. The maquila minimum wage is binding in manufacturing, but the non-maquila minimum wage seems to be setting the standard for minimum pay in the informal sector, although not in the form of a kink, but rather by affecting the mode. The effects of minimum wages on commerce are unclear; there seems to be a slight kink for the formal sector, but results are sensitive to the assumption about hours worked (calculation assumes a 48-hour workweek). Again, there does not seem to be any effect on the informal sector.

Minimum wages in the community services sector have no effect on either formal or informal wages; although both distributions show a kink, it is located at a higher level than the minimum wage. In any case, the distribution of wages does not show important distortions around the minimum wage when compared with other Latin American countries. Moreover, there is no evidence of important effects of minimum wages on the informal sector. In many Latin American countries, minimum

Figure 2.2 Distribution of Wages by Sector and Formality, 2001



Source: Authors' calculations with data from EMNV 2001 and 2005, and BCN.

Note: The vertical line is the corresponding log of the hourly minimum wage for the sector. The manufacturing sector has three different minimum wages.

wages have been shown to leak to informal markets, suggesting that both segments are more integrated than previously thought. This phenomenon does not seem to occur in Nicaragua, which opens the possibility that minimum wages in Nicaragua are acting as a barrier to formal job creation and may be contributing to an informal sector that does not comply with minimum wage regulation. The magnitude and importance of this effect merits further study.

It is unclear whether the current structure of minimum wages provides much benefit over a unique minimum wage. If the idea of sectoral minimum wages is to take into account the different average skill levels of the labor force in each sector, it might be better to set a minimum wage by level of education (for the low skilled) rather than by sector. The current structure of the minimum wage might be introducing unnecessary distortions into the labor market, and might be segmenting the market according to skills. This might explain the behavior of maquila factories, which face a higher minimum wage than overall manufacturing and, as a response, may restrict employment to those with a secondary or higher education. If the analysis assumes that more productive firms have larger profits and a higher share of skills (as is often the case), the current minimum wage-setting mechanism is acting more as a central collective bargaining mechanism to distribute profits between low-skilled workers and firms, rather than as a mechanism for setting the lowest paid wage. But even if this were the objective of having a differential minimum wage by sectors, it is unclear what the advantages of this centralized bargaining system would be over a decentralized (firm level) bargaining system.

When firms make hiring decisions they compare the marginal cost of labor, that is, the minimum wage, with the marginal product, that is, the value of output produced by one additional worker. More productive firms are usually more competitive, account for larger shares of employment, and grow faster. If firms differ in productivity, and minimum wages are higher for the most productive firms, then low-skilled workers (for which minimum wages are binding) will be excluded from the most dynamic and productive sectors of the economy. Instead, a minimum wage by skill level will mean that more productive firms will have an advantage with respect to low-productivity firms when hiring low-skilled workers. Relative to the marginal cost (that is, the minimum wage), the marginal benefit of having an unskilled worker is larger. Therefore, high-productivity firms might be more inclined to increase the use of unskilled labor (that is, increase the unskilled-labor intensity of the production process), while workers will be equally off (for a given level of education) in any sector or firm. Understanding the employment effects of minimum wages and the impact of its sectoral structure on employment, plus the relative demand for unskilled labor, is beyond the scope of this report. But it is an area that merits further research.

Notes

1. The dependency ratio is the ratio of total population to working age population, and it indicates, on average, how many people a working adult has to support.
2. The value of transformation services corresponds to the difference between the value of imported raw materials and the value of final exports and corresponds mostly with the cost of labor and utilities.
3. ILO defines *unemployed* as those who are not employed and who actually looked for a job in the past week.
4. The individually self-employed are the self-employed who do not work with other family members. The employers are those who are self-employed but have paid workers. The household enterprise workers are the self-employed who work with unpaid family members or unpaid helpers.
5. The International Finance Corporation of the World Bank Group provides comprehensive data for productivity analysis in emerging markets at its Enterprise Surveys Web site: <http://www.enterprisesurveys.org/>.

CHAPTER 3

Output, Population, Employment, and Poverty

This chapter describes the labor and productivity profile of growth and links it to poverty reduction. It also takes a closer look at the manufacturing sector and the maquila sector. The first section describes the main trends in output, poverty, and employment; the second section decomposes growth into sectoral employment and productivity changes; the final section takes a closer look at manufacturing.

Main Trends in Output

Value added grew at an average annual rate of 4.2 percent between 1998 and 2005. Between 1998 and 2001 growth reached 5.42 percent. Growth decelerated dramatically between 2001 and 2005, reaching an average annual growth rate of 3.24 percent (table 3.1). Agriculture, construction, and services suffered the largest growth losses. Only transport and the financial sector kept their growth pace, but these sectors are small in terms of employment and output. Furthermore, the share of the poor employed in these two sectors is less than 4 percent. Despite this strong deceleration of economic activity, the manufacturing sector managed to grow at an average annual rate of 4.4 percent. This has important implications for poverty reduction, as discussed later. Overall growth was fueled in part by

Table 3.1 Sectoral Growth, 1998–2005

	<i>Average annual growth</i>		
	<i>1998–2001</i>	<i>2001–05</i>	<i>1998–2005</i>
Agriculture	6.84	2.37	4.26
Mining and utilities	5.23	3.00	3.95
Manufacturing	5.71	4.42	4.97
Construction	11.30	1.11	5.36
Commerce, restaurants, and hotels	4.17	3.66	3.88
Transport and communications	4.29	4.67	4.51
Services	6.22	3.07	4.41
Government	1.55	1.67	1.62
Financial	8.51	9.76	9.22
Total	5.42	3.24	4.17

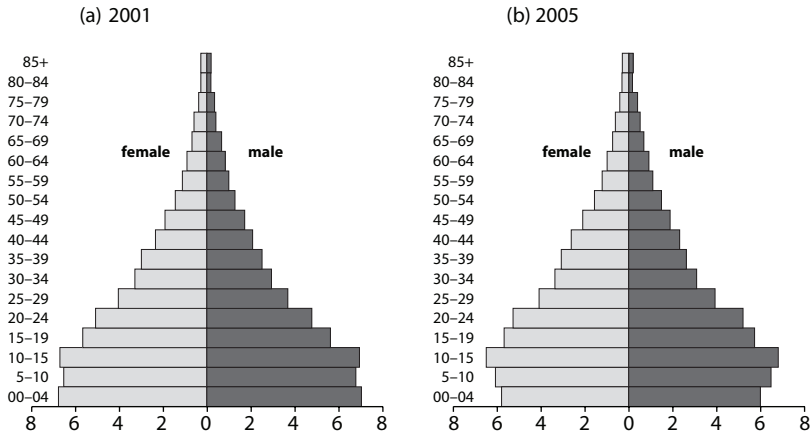
Source: Authors' calculations based on data from Central Bank of Nicaragua (BCN) and the National Household Living Standards Survey (EMNV).

reconstruction efforts after Hurricane Mitch struck the country in 1998. These reconstruction efforts meant that the construction sector grew at an average of 11 percent per year, although most of this growth was concentrated in the year after the hurricane, in which construction grew 36 percent. Manufacturing, agriculture, and services also registered growth rates above the average. Growth in these sectors has important implications for both employment and poverty, as 60 percent of total employment is concentrated in these sectors, and 76 percent of the poor earn their livelihood in these three sectors.

As discussed in chapter 2, between 2001 and 2005, Nicaragua began to see an important change in the population structure, with the working-age population (between 15 and 64 years of age) increasing its share in the total population. The working-age population grew at an average annual rate of 2.7 percent per year, compared with a 1.7 percent average annual population growth (see figure 3.1).

Main Trends in Population

This population change presents both challenges and opportunities for poverty reduction. On the one hand, a larger fraction of the population will have to find jobs. Between 2001 and 2005 the economy had an inflow of about 350,000 new workers. Had these new workers not been able to find jobs, poverty would have increased. On the other hand, each working adult now has to support fewer dependents, which provides an

Figure 3.1 Change in Population Structure, 2001–05

Source: Authors' calculations based on Nicaragua census data

opportunity for poverty reduction if these new working adults are able to find sufficiently well-paid jobs.

Furthermore, the cohort ages 10–15, which will have completed the transition to the working age within the next five years, will imply an additional 590,000 workers in the labor market.¹ Thus the opportunities and challenges offered by this population transition will continue to be present in the next decade.

Unfortunately, the level of education of this new labor force has not shown much improvement. Although higher primary completion rates were observed in 2005 compared with 2001, the share of the employed working-age population with an incomplete secondary education or less decreased only 3 percentage points (from 68 percent to 65 percent). This means that each year the share of the employed population with a less-than-complete secondary education decreased by only 1 percent or, equivalently, the share of the employed working-age population with a completed secondary education or above increased by 1 percent. At this rate it would take 23 years to reach a stage at which at least 50 percent of the population had the level of complete secondary education or above.

Nicaragua has one of the lowest education levels in Latin America and Central America. It ranks only above Guatemala in terms of the education

levels of its urban and rural populations (table 3.2). If the population transition is to lead to poverty reduction, two policies will need to be at the front of the agenda: increasing good employment opportunities and accelerating educational achievement.

Main Trends in Employment

Using data from household surveys of 2001 and 2001, it is possible to analyze the main trends in employment. All sectors, with the exception of the mining and utilities sector and construction, experienced positive employment growth. The average annual total employment growth was 4 percent. Moreover, the growth in employment was greater than the growth in the labor force (3 percent).

Between 2001 and 2005, the growing labor force was absorbed by the agriculture, manufacturing, and commerce sectors. These sectors accounted for about 67 percent of total employment, and they all experienced average annual growth rates above 2.5 percent, thus accounting for 84 percent of total employment growth (table 3.3). On the other hand, community services, which is the other important sector in terms of its

Table 3.2 Average Level of Education of Population Ages 25 to 64

<i>Country</i>	<i>Year</i>	<i>Urban</i>	<i>Rural</i>
Guatemala	2004	6.5	2.4
Nicaragua	2001	6.9	3.1
Honduras	2003	7.5	3.5
Brazil	2005	7.8	3.8
El Salvador	2004	8.6	3.8
Bolivia	2004	8.9	4.9
Venezuela, R. B. de (national total)	2005	8.9	...
Dominican Republic	2005	9.1	6.2
Mexico	2005	9.6	6.0
Costa Rica	2005	9.6	6.8
Colombia	2005	9.7	..
Uruguay	2005	9.9	..
Ecuador	2005	10.4	5.6
Peru	2003	10.6	5.3
Panama	2005	11.1	7.0

Sources: Nicaragua: Authors' calculations based on 2005 survey. Other countries: Economic Commission for Latin America and the Caribbean (CEPAL).

Note: .. indicates negligible value.

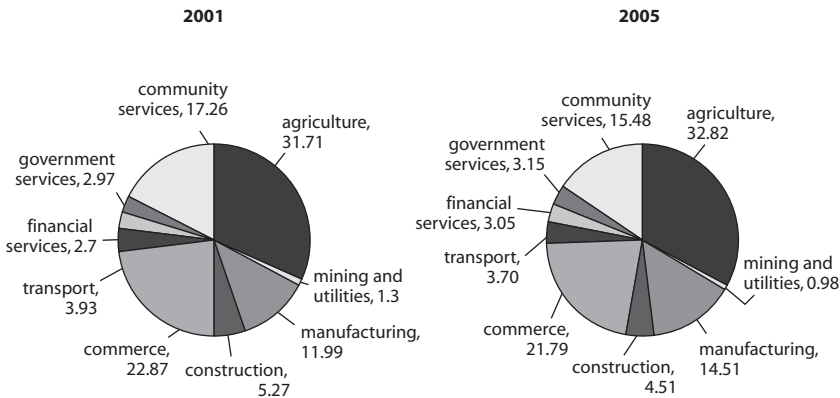
employment size, was stagnant, growing at an average annual rate of 1 percent. This meant that its contribution to total employment generation was 5 percent. Figure 3.2 illustrates the sectoral shares of employment for 2001 and 2005.

Although commerce absorbed an important fraction of the new labor force, its growth rate was lower than aggregate employment growth, thus losing its participation in total employment (see table 3.3). The gain of 2.5 percentage points in manufacturing employment and of 1.1 percentage points in agricultural employment stands out. These sectors are looked at in more detail later in this chapter.

Main Trends in Poverty

Despite the increase in the working-age population and in the share of working-age population who are employed, headcount poverty did not change (see table 3.4). The number of poor among the working-age population, according to the national poverty line, stayed at 46 percent, and those in extreme poverty stayed at 15 percent. In 2005, poverty in the urban sector was substantially lower than poverty in the rural sector (29 percent and 68 percent, respectively). The incidence of poverty (the poverty gap) decreased a little less than 1 percentage point.

Figure 3.2 Share of Employment by Sectors, 2001 and 2005



Source: Authors' calculations based on data from BCN and EMNV.

Table 3.3 Evolution of Employment by Sectors, 2001 and 2005

	<i>Average annual employment growth (%)</i>	<i>Share of total employment generation (%)</i>	<i>Change in the share of total labor force (percentage points)</i>
Agriculture	4.80	39.5	1.11
Mining and utilities	-3.25	-1.0	-0.32
Manufacturing	8.99	29.8	2.52
Construction	-0.04	-0.1	-0.76
Commerce	2.65	15.2	-1.09
Transport	2.35	2.3	-0.23
Financial services	7.18	5.2	0.36
Government services	5.39	4.2	0.17
Community services	1.13	4.8	-1.77
Total employment	3.90	100.0	0.02
Labor force	2.98		

Source: Authors' calculations based on data from EMNV.

Table 3.4 shows the changes in poverty rates of the working-age population by area of residence and employment status (from 41 percent to 42 percent between 2001 and 2005). It is clear that poverty rates decreased among the employed and increased among the unemployed and the inactive (defined as discouraged workers and the seasonally unemployed, among others). The increase in poverty among the rural unemployed was particularly strong, but the unemployed in the urban sector make up less than 1 percent of the total working-age population, so this increase does not affect the overall poverty rate in any significant way. Thus, while the poverty rate among the rural employed decreased, it was more than compensated for by an increase in poverty among the rural inactive.

Table 3.5 shows the evolution of employment by sector and poverty level. The table clearly shows that the poor are overrepresented in agriculture, and this share may have increased from 2001 to 2005.² It also calls attention to the increase in the share of the poor employed in manufacturing, from 8.8 percent to 11 percent, while they are losing their share in community services and commerce.

Decomposition of Per Capita Income Growth

The aim of this section is to show how growth is linked to changes in employment, productivity (output per worker), and population structure at the aggregate level and by sector. The main idea is to profile growth in

Table 3.4 Headcount Poverty Rates of the Working-Age Population by Employment Status, 2001–05

	2001	2005
Employed		
Rural	63	62
Urban	25	25
Unemployed		
Rural	48	61
Urban	18	22
Inactive		
Rural	66	69
Urban	27	28
Total working age		
Rural	64	65
Urban	26	26
Total	41	42
National poverty level		
Rural	64	68
Urban	29	29
Total	46	46

Source: Authors' calculations based on data from EMNV.

per capita value added, to see whether growth has been accompanied by productivity or employment increases and, if so, in which sectors.

The change in per capita value added between 2001 and 2005 is decomposed into (i) changes in the demographic composition of the population, (ii) changes in productivity, and (iii) changes in the share of working-age population employed. The decomposition is performed at the aggregate level and by sectors. Per capita value added can change from one year to another if any of these components changes. For example, if there is an exogenous increase in productivity (value added per worker) for the same number of workers and for a constant population structure, the higher productivity per worker will imply more value added per person. Equally, there might be a change in the structure of the population so that each working person has fewer dependents; if productivity and employment do not change, then value added will increase because more workers are producing for the same total population. In reality, however, many factors are changing at the same time, so it is difficult to disentangle what has happened to each component of per capita value added for

Table 3.5 Employment by Sector and Poverty Level, Shares of Total Employment, 2001 and 2005

	<i>Poor</i>		<i>Nonpoor</i>		<i>Total</i>	
	<i>2001</i>	<i>2005</i>	<i>2001</i>	<i>2005</i>	<i>2001</i>	<i>2005</i>
Agriculture	53.57	55.66	16.98	17.25	31.71	32.82
Mining and utilities	0.95	0.76	1.54	1.13	1.30	0.98
Manufacturing	8.85	11.04	14.10	16.89	11.99	14.51
Construction	5.09	3.83	5.39	4.98	5.27	4.51
Commerce	12.99	11.85	29.53	28.56	22.87	21.79
Transport	1.86	1.90	5.33	4.93	3.93	3.70
Financial services	1.15	1.03	3.74	4.44	2.70	3.05
Government services	1.24	1.40	4.14	4.34	2.97	3.15
Community services	14.30	12.54	19.25	17.49	17.26	15.48
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Authors' calculations based on data from EMNV.

a given observed growth. There are several techniques for decomposing and attributing to each component a share of total observed growth. The result described used Shapley decompositions, which are described in appendix A in more detail.

Decomposition of per capita value added

Table 3.6 shows the change in value added per capita and in its main components. Per capita value added saw a growth of 7 percent for the period, while employment grew almost 17 percent, the population share of the working age population grew almost 4 percent, and value added per worker (productivity) decreased about 2 percent. This means that the new labor force was absorbed by employment, but at a lower productivity level (a lower level of output per worker).

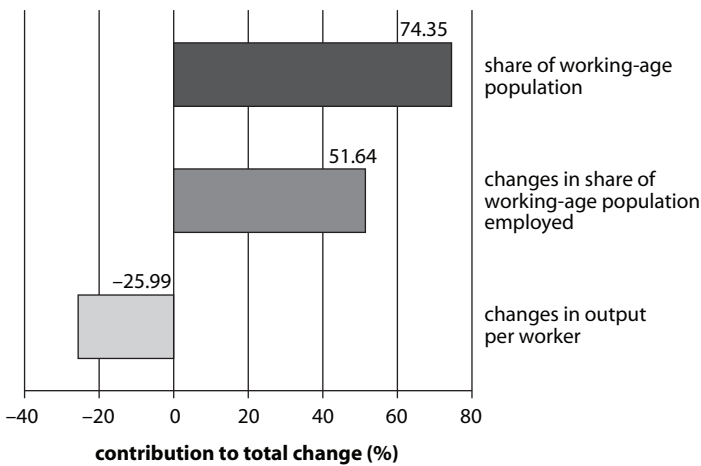
Figure 3.3 illustrates the results for the decomposition at the aggregate level. It shows that 74 percent of the change in per capita value added can be linked to changes in the structure of the population. In other words, had everything else stayed the same, the sole change in the number of dependents per working-age person would have generated growth equivalent to about 74 percent of the actual observed growth (that is, a total growth for the period of 5 percent). Changes in employment were also important, accounting for some 51 percent of observed growth. This means that if productivity had stayed the same and the number of dependents per working-age member had also remained constant, the

Table 3.6 Percentage Change in Selected Variables, 2001–05

	% change	Average annual growth (%)
Value added	14.47	3.44
Value added per capita	7.14	1.74
Population	6.85	1.67
Population of working age	12.47	2.98
Employment	16.54	3.90
Employment of working-age population	3.62	0.89
Value added per worker	-1.78	-0.45

Source: Authors' calculations based on data from BCN and EMNV.

higher rate of employment would have generated a growth of almost 4 percent. Unfortunately, changes in productivity acted in the opposite direction (-25.99 percent). Had productivity not changed, observed growth would have been 9 percent, but decreases in productivity meant that growth was 1.6 percentage points lower.

Figure 3.3 Aggregate Employment and Productivity Profile of Growth, 2001–05

Source: Authors' calculations based on data from BCN and EMNV.

Decomposition of changes in output per worker

The key question, then, is why did output per worker decrease? There are many reasons why output per worker might have decreased. Workers might have moved to a sector where marginal productivity is lower, total factor productivity (TFP) might have decreased, or the capital-to-labor ratio may have been reduced as a result of the large inflow of workers into the economy. These possible alternatives can be explored further by decomposing the changes in aggregate output per worker into changes that result from any of these three causes. Figure 3.4 shows the result of the decomposition of changes in output per worker for the aggregate economy. Total output per worker decreased 1.78 percent. Of this decrease, intersectoral employment shifts exerted a positive effect on output per worker (half a percentage point) or 6.72 percent of total productivity growth. The capital-to-labor ratio also increased, contributing 1.68 percentage points to output per worker; however, TFP suffered an important reduction, which explains 3.66 percentage points of the decrease in output per worker. These data clearly show that TFP changes are responsible for the decrease in output per worker.

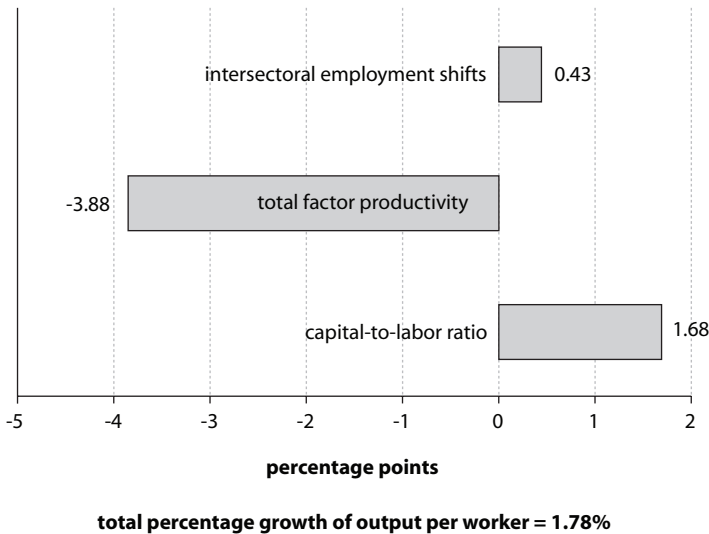
To understand possible reasons for the observed decrease in TFP, it is important to understand that TFP was calculated as a residual (see appendix A), which means that it will capture all factors affecting output per worker other than capital and intersectoral shifts. Among the factors that are likely to affect this residual in an important way are changes in the average skill of the labor force, which comprises both experience and education, and changes in the structure of employment by employment categories (rather than by sectors). Reductions in the skills of the labor force would be reflected in lower TFP. Changes in the structure of employment—characterized by increases in the number of workers employed in low-productivity categories—will also be reflected in lower TFP. For example, if an important increase of total employment is concentrated among family enterprises or the self-employed, which have lower-than-average productivity, then TFP will decrease.

As pointed out in chapter 2 (see table 2.5), the average years of education of the labor force increased, so the explanation for TFP decreases does not lie on the level of education (at least if quality did not change). Tables 2.3 and 2.4 showed that employment had increased disproportionately among household enterprise workers and the individual self-employed, which are the categories with lowest earnings. If household enterprise workers and the individual self-employed are also those cate-

gories with the lowest productivity (as is most likely the case), then this increase in the share of employed in low earning categories might account for part of the TFP decrease. New entrants to the labor market also have less experience and as such may have lower productivities.

An additional explanation for the reduction in TFP might lie in the movement of workers across sectors with different productivities. For example, in a segmented labor market, where marginal products differ between sectors, it is possible that as workers move from low marginal product sectors to high marginal product sectors, the average product of labor falls in the sector where employment rises as marginal decreasing returns to labor set in. Unfortunately, no data are available for decomposing changes in output per worker by sector, to see whether capital-labor ratios decreased in the expanding sectors or whether TFP changes explain these decreases. However, changes in overall productivity and employment by sectors can be examined, as well as intersectoral shifts, to further describe the aggregate behavior.

Figure 3.4 Decomposition of Changes in Output per Worker, 2001–05



Source: Authors' calculations based on data from national accounts and EMNV.

Decomposition of intersectoral shifts

It is possible to understand how changes in the share of employment in the different sectors help explain the overall contribution of intersectoral shifts to per capita growth. Important literature has found that structural change—the movement of labor force shares from low-productivity sectors to high-productivity sectors—is an important factor in growth. Increases in the share of employment in sectors with above-average productivity will increase overall productivity and contribute positively to the intersectoral shifts. By the same token, movements out of sectors with above-average productivity will have the opposite effect. Thus, increases in the share of employment in sectors with below-average productivity should reduce growth, while reduction in their shares should contribute positively to growth.

Table 3.7 shows the results of decomposing intersectoral shifts using the above intuition (see appendix A for details and formulas). The results show that the increasing shares of employment in manufacturing and government explain most of the positive effect of intersectoral shifts and that movements into agriculture and out of mining and utilities exerted a negative effect on overall per capita growth.

In other words, had employment growth been proportionally distributed among all the sectors, per capita value added growth would have been 6 percent lower (that is, the contribution of intersectoral shifts to total per capita growth). However, because employment growth was disproportionately concentrated in manufacturing, a sector with high productivity, it spurred total growth.

Sectoral decomposition

Table 3.8 shows changes in total value added by sector as well as changes in the share of each sector in total value added. All sectors experienced positive growth, and overall employment growth was 14.5 percent for the whole period. Manufacturing, commerce, transport, and “other” saw a value added growth that was above average and thus gained shares in total value added. The sector referred to as “other” combines community and enterprise services as well as financial services, but the latter has a very small share of the total. Agriculture reduced its share. Overall changes in shares were relatively small: manufacturing gained a 1-percentage-point share while agriculture lost a 1-percentage-point share.

Table 3.9 shows changes in productivity and employment shares by sectors. All sectors experienced positive employment growth, but growth

Table 3.7 Decomposition of Intersectoral Shifts

<i>Sectoral contributions</i>	<i>Direction of employment share in shift</i>	<i>Contribution to intersectoral shifts (%)</i>
Agriculture	Movements into	-84.72
Mining and utilities	Movements out of	-161.67
Manufacturing	Movements into	279.11
Construction	Movements out of	6.39
Commerce	Movements out of	46.14
Transport	Movements out of	-48.24
Government	Movements into	49.52
Other	Movements out of	13.48
Total contribution of intersectoral shifts		100.00

Source: Authors' calculations using data from national accounts and EMNV.

Table 3.8 Sectoral Growth, 2001–05

	<i>Total value added growth 2001–05</i>	<i>Share of total value added</i>		
		<i>2001</i>	<i>2005</i>	<i>% change</i>
Agriculture	9.80	22.1	21.2	-4.08
Manufacturing	18.91	19.0	19.8	3.87
Mining and utilities	12.55	3.6	3.5	-1.69
Construction	4.52	4.9	4.5	-8.69
Commerce	15.45	18.2	18.3	0.85
Transport	20.03	7.1	7.4	4.85
Government	6.86	7.0	6.6	-6.65
Other	18.39	18.1	18.7	3.42
Total	14.47	100.0	100.0	

Source: Authors' calculations based on data from BCN.

was disproportionately concentrated in manufacturing and agriculture. Value added per worker decreased in both manufacturing and agriculture, which were the sectors that experienced the highest increases in employment. It is also worth noting that all sectors that saw an increase in employment also saw a decrease in productivity, while sectors that experienced an increase in productivity had a decrease in their share of employment. There may be several explanations for this. One possible

Table 3.9 Employment Shares and Productivity, by Sectors of Economic Activity, 2001–05

	<i>Output per worker (1994 C\$)</i>			<i>Employment/working-age population (%)</i>		
	<i>2001</i>	<i>2005</i>	<i>% change</i>	<i>2001</i>	<i>2005</i>	<i>Absolute change</i>
Agriculture	10,973	9,988	-8.97	19.21	20.60	1.39
Manufacturing	25,032	21,097	-15.72	7.26	9.11	1.85
Mining and utilities	43,097	55,364	28.47	0.79	0.62	-0.17
Construction	14,701	15,393	4.70	3.19	2.83	-0.36
Commerce	12,505	13,005	4.00	13.86	13.68	-0.18
Transport	28,418	31,084	9.38	2.38	2.32	-0.06
Government	37,223	32,239	-13.39	1.80	1.98	0.17
Other	14,308	15,643	9.33	12.09	11.64	-0.45
Total	15,757	15,477	-1.78	60.59	62.78	2.19

Source: Authors' calculations based on data from BCN and EMNV.

explanation is that changes in employment mainly capture new entrants to the labor market and these new entrants have lower productivity than more experienced workers. The sectors that have a stronger increase in employment growth absorb most of this new labor force and thus have a stronger negative effect on average productivity. Alternatively, as explained above, the inflow of workers into these sectors implied a lower capital-labor ratio, as decreasing marginal returns to labor set.

Decreases in productivity and increases in employment were concentrated in agriculture and manufacturing. Increases in the relative size of the manufacturing sector (in terms of employment) account for an important share of growth. Table 3.10 illustrates the contribution of each sector to total per capita value added growth for 2001–05. Sectoral contributions are decomposed into the (i) contribution of changes in output per worker, (ii) contribution of the sector to employment rate growth, and (iii) contribution of the sector to the intersectoral shift component of total changes in output per worker (see appendix A for details). Overall, manufacturing, commerce, transport, and other services contributed positively to growth, while agriculture, mining and utilities, construction, and government had a negative contribution.

Despite the enormous employment growth in manufacturing, the decrease in output per worker was so large that it more than offset the

Table 3.10 Total Sectoral Contribution to Growth, 2001–05

<i>Sectoral contributions</i>	<i>Contribution of changes in output per worker (%)</i>	<i>Contribution to total employment rate changes (%)</i>	<i>Contributions of intersectoral shifts (%)</i>	<i>Total (%)</i>
Agriculture	-29.53	32.78	-5.30	-2.05
Mining and utilities	13.03	-4.11	-10.12	-1.20
Manufacturing	-48.47	43.48	17.48	12.49
Construction	3.14	-8.44	0.40	-4.90
Commerce	10.39	-4.23	2.89	9.05
Transport	9.46	-1.37	-3.02	5.08
Government	-14.19	4.11	3.10	-6.97
Other	23.89	-10.59	0.84	14.14
Subtotals	-32.26	51.64	6.26	25.64
Demographic component	—	—	—	74.36
Total				100.00
Total % change in output per capita 2001–05				7.14

Source: Authors' calculations based on data from BCN and EMNV.

Note: — insufficient data.

employment growth. However, shifts of labor into manufacturing and away from other sectors of lower productivity more than compensated for this effect, so that in the aggregate, manufacturing contributed 12 percent of total per capita growth. Other services accounted for a significant 14 percent of observed growth of output per capita, and commerce and transport contributed with 9 percent and 5 percent of the growth, respectively. In all three sectors the effect was mostly due to increases in output per worker.

Agriculture, on the other hand, contributed negatively to per capita growth, with two different effects. First, it saw a decrease in output per worker; second, it increased its share of total employment. Given that it has below-average productivity, this shift toward agriculture reduced growth.

These results suggest that, had productivity in agriculture and manufacturing not decreased, then value added per worker would have been 5 percentage points higher. The next section tries to provide an understanding of what was happening in manufacturing. A closer look at the agricultural sector will be undertaken in a later section.

The behavior of wages

The effects of changes in employment and productivity on poverty depend on how they affect earnings. Table 3.11 presents the median wages by sector of economic activity, calculated from the household surveys. The table shows that, in real terms, wages in agriculture increased 17 percent while wages in manufacturing decreased 2 percent between 2001 and 2005. As will be seen, lower value added per worker in agriculture was compensated by higher producer prices, which may have prevented the falls in productivity from translating into lower wages. In the case of the manufacturing sector, wages did decrease, but much less than productivity, so that productivity falls were not totally passed on to wages.

A Closer Look at the Manufacturing Sector

Table 3.12 shows employment generation by subsector. In an analysis of which sectors absorbed most of the employment generation, 66 percent of the employment growth was in the food and beverage sector and the clothing sector. The tobacco sector contributed to an additional 8 percent of employment generation. The last row of the table shows employment generation by maquila, which contributed an amazing 32 percent of employment generation between 2001 and 2005, most of which was clothing (see box 3.1).

Table 3.13 shows the median wages for these sectors. The two sectors that generated most of the employment growth in manufacturing (food

Table 3.11 Wages by Sector of Economic Activity, 2001 and 2005

	<i>Median wage C\$ 2001</i>		
	<i>2001</i>	<i>2005</i>	<i>Real growth (%)</i>
Agriculture	6,840	8,018	17.2
Mining and utilities	20,000	23,495	17.5
Manufacturing	12,600	12,364	-1.9
Construction	10,080	10,000	-0.8
Commerce	13,329	13,364	0.3
Transport	18,900	18,327	-3.0
Financial services	18,175	21,238	16.9
Government services	23,665	25,833	9.2
Community services	12,179	14,118	15.9

Source: Authors' calculations based on data from EMNV.

Table 3.12 Employment Generation by Subsector, 2001 and 2005

	<i>Total number of employed</i>		<i>Employment growth (number of new jobs)</i>	<i>Employment growth (%)</i>	<i>Share of total employment generation</i>
	<i>2001</i>	<i>2005</i>	<i>2001–05</i>	<i>2001–05</i>	<i>2001–05</i>
Food and beverage	69,754	100,398	30,644	43.93	38.54
Tobacco	1,118	7,394	6,276	561.35	7.89
Textiles	4,305	6,472	2,167	50.34	2.73
Clothing	62,811	84,989	22,178	35.31	27.89
Wood products	8,766	10,571	1,805	20.59	2.27
Paper and prints	2,455	5,210	2,755	112.25	3.47
Petroleum	469	622	153	32.52	0.19
Chemicals	1,752	2,926	1,174	67.02	1.48
Plastic and rubber	1,441	1,362	-79	-5.46	-0.10
Other nonmetallic mineral products	10,917	13,461	2,544	23.31	3.20
Metal and metal products	14,597	16,460	1,864	12.77	2.34
Machinery and equipment	1,945	3,695	1,750	89.99	2.20
Transport equipment	443	634	190	42.96	0.24
Other	15,271	21,355	6,084	39.84	7.65
Total manufacturing	196,043	275,549	79,506	40.56	100.00
Maquila employment	35,565	61,000	25,435	71.52	31.99

Source: Authors' calculations based on data from EMNV.

and clothing) saw differing behavior. In the food sector, median wages decreased, while wages in the clothing sector increased.

Another way of looking at the types of jobs generated is to see which type of employment showed more growth. In Nicaragua the lowest income is observed in those working in household family enterprises, followed by the individual self-employed, while the highest income corresponds to employers, followed by waged and salaried workers. Table 3.14 shows that 32 percent of the employment generated in manufacturing was concentrated in family enterprise workers, 17 percent was in the individual self-employed, and 55 percent was in the waged and salaried categories. This means that 48 percent of the jobs created in manufacturing were low income.

It is worth noting that the maquila sector may have played an important role in counteracting the negative effect of the growing number of employed in family enterprises and the decreasing wages in the food

sector. No data are available on wages for the maquila sector, but most of that sector is concentrated in the clothing sector, which saw an overall wage increase of 17 percent. If the maquila sector participated in this wage increase, then it may have had important positive effects on income generation, since this sector contributed to 32 percent of total employment (see box 3.1)

Table 3.13 Wages in the Manufacturing Sector, 2001 and 2005

	<i>Median annual income (C\$ 2001)</i>		
	<i>2001</i>	<i>2005</i>	<i>Real growth (%)</i>
Food and beverage	13,800	12,364	-10.4
Tobacco	16,960	9,848	-41.9
Textiles	9,960	8,379	-15.9
Clothing	11,495	13,424	16.8
Wood products	11,700	11,455	-2.1
Paper and prints	19,840	14,773	-25.5
Chemicals	30,805	20,606	-33.1
Plastic and rubber	16,350	18,038	10.3
Other nonmetallic mineral products	10,032	11,882	18.4
Metal and metal products	11,970	15,273	27.6
Machinery and equipment	7,036	16,743	138.0
Other	4,944	17,438	252.7

Source: Authors' calculations based on data from BCN and EMNV.

Table 3.14 Employment Generation in Manufacturing by Type of Employment, 2001 and 2005

	<i>Total number of employed</i>		<i>Employment growth (number of new jobs)</i>	<i>Employment growth (%)</i>	<i>Share of total employment generation</i>
	<i>2001</i>	<i>2005</i>	<i>2001-05</i>	<i>2001-05</i>	<i>2001-05</i>
Waged and salaried workers	127,748	171,355	43,607	34.14	54.85
Individual self-employed	33,153	46,837	13,683	41.27	17.21
Employers	12,443	10,850	-1,592	-12.80	-2.00
Family enterprise workers	22,277	47,526	25,249	113.34	31.76
Other	421	—	-421	—	-0.53
Total	196,043	276,569	80,526	41.08	101.28

Source: Authors' calculations based on data from BCN and EMNV.

Note: — insufficient data.

The main picture that emerges from this chapter is as follows. Growth was mainly concentrated in the manufacturing sector. Employment growth was concentrated in both manufacturing and agriculture. Unfortunately, this growth had a limited impact on the income opportunities of the poor. On the one hand, despite the fact that wages in agriculture increased, returns in this sector still offer the lowest income generation, so that growing employment in this sector is not likely to reduce poverty. On the other hand, employment generated in manufacturing was divided evenly between family enterprise employment and wage employment. Family enterprise employment has a very low income-generation potential. Wage employment has a better potential, but its benefits to the poor seem to have been limited by two main factors: (i) wages decreased in the food sector, which saw most of the employment growth in manufacturing; and (ii) clothing, which was the other important sector in terms

Box 3.1

Evolution of the Maquila Sector and Its Importance in the Employment Growth in Manufacturing

The first maquila factories started in 1990, with the establishment of the first publicly owned export processing zone (EPZ), Las Mercedes. In 1994 the EPZ law was reformed to allow private ownership by both foreign and domestic investors and an expansion of EPZ to other regions in the country, with the particular aim of providing employment opportunities for poorer areas. Currently, there is the zone of Las Mercedes. The rest are distributed in 30 industrial parks, which are private EPZs. The main investors are from Taiwan, the United States, the Republic of Korea, Nicaragua, Italy, Honduras, Belize, and Mexico.

Initially, EPZ firms were not allowed to use domestic raw materials, which limited their spillover effects to those of employment generation, but with the signing of the Central American Free Trade Agreement, these restrictions were removed. EPZs have a 100 percent exemption on corporate income tax for the first 15 years of operation. They are exempt from capital gains on real estate; all corporate taxes; excise, sales, and municipal taxes; and import duties on machinery, inputs, and equipment. Currently there are 84 firms, of which the large majority are in the clothing sector.

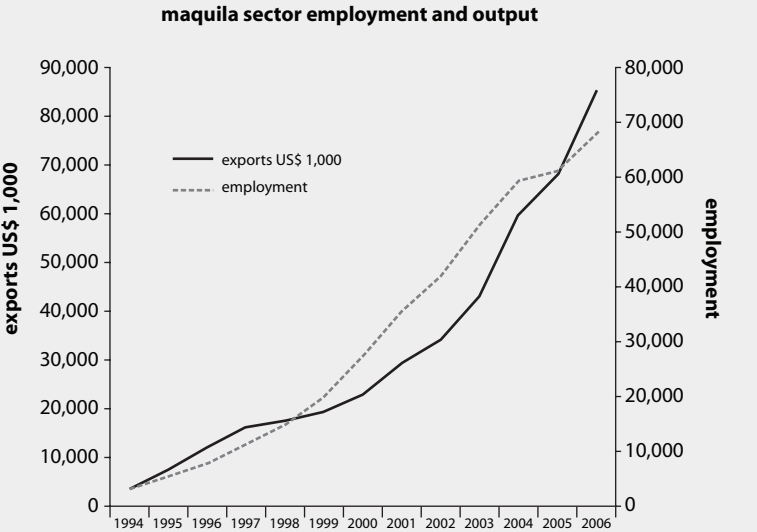
(continued)

Box 3.1

(continued)

In 2006 there were 68,300 employees in the EPZs, which corresponds to just over 3 percent of total employment, 18 percent of formal employment, and 64 percent of formal employment in manufacturing. This employment is mostly female (90 percent). EPZ firms have to comply with all labor regulations. There is a special minimum wage for the EPZs, which is above the manufacturing minimum wage. The rationale for this is that labor force quality in the EPZ is higher than that in the average manufacturing labor force. Apparently, to be a worker in the maquila sector, employees have to have completed secondary education, which substantially reduces access to this employment for the very poor. The fact that the minimum wage is higher for the maquila sector may contribute to this selection.

For 2005, maquila exports represented 50 percent of total exports, and the value of transformation services (which corresponds to the sum of wages, utilities, and services paid) was equivalent to 24 percent of value added in manufacturing. The graph below illustrates the evolution of employment and output in the maquila sector.



of job creation, offered limited employment access for the poor because of its skill requirements (secondary education or above).

Notes

1. This increase is net of those ages 60–64 who will be exiting the labor market.
2. The Household Survey for 2001 (EMNV 2001) shows a rural share of the population that is inconsistent with the census. According to the survey, the share of rural population increased between 2001 and 2005. The census shows the opposite. Apparently the survey of 2001 underestimated the rural population. If this is the case, the increase in the share of employed in agriculture might be exclusively due to the under-representation of rural households in the survey of 2001.

Annex 3A Decomposition of Per Capita Value Added Growth

Step 1: Decomposing aggregate growth

A simple way of understanding how growth has translated into increases in productivity and employment at the aggregate level and by sectors (or regions) is to perform a simple decomposition of growth in per capita GDP. To do so, we use the fact that per capita GDP, $Y/N = y$ can be expressed as:

$$\frac{Y}{N} = \frac{Y}{E} \frac{E}{A} \frac{A}{N}$$

or:

$$y = \omega * e * a$$

where Y is total value added, E is total employment, A is the total population of working age, and N is total population. In this way, $Y/E = \omega$ is total output per worker, E/A is the share of working-age population (i.e., the labor force) employed, and A/N is the labor force as a fraction of total population.

Thus, changes in per capita value added can be decomposed into changes in output per worker, changes in employment rates, and changes in the size of the labor force. Using Shapley decompositions, total changes in per capita value added will be equal to:

$$\begin{aligned} \Delta y = & \Delta \omega \left[\frac{e_{t=1} a_{t=1} + e_{t=0} a_{t=0}}{3} + \frac{e_{t=1} a_{t=0} + e_{t=0} a_{t=1}}{6} \right] \\ & + \Delta e \left[\frac{\omega_{t=1} a_{t=1} + \omega_{t=0} a_{t=0}}{3} + \frac{\omega_{t=1} a_{t=0} + \omega_{t=0} a_{t=1}}{6} \right] \\ & + \Delta a \left[\frac{\omega_{t=1} e_{t=1} + \omega_{t=0} e_{t=0}}{3} + \frac{\omega_{t=1} e_{t=0} + \omega_{t=0} e_{t=1}}{6} \right] \end{aligned}$$

The first term in the summation will be the contribution of changes in output per worker, the second term the contribution of changes in the employment rate, and the third term the contribution to changes in the demographic component.

With this information we can present aggregate growth in terms of each of these components, where:

$$\bar{\omega} \equiv \Delta \omega \left[\frac{e_{t=1} a_{t=1} + e_{t=0} a_{t=0}}{3} + \frac{e_{t=1} a_{t=0} + e_{t=0} a_{t=1}}{6} \right] / \Delta y$$

will be the fraction of growth that can be linked to changes in output per worker,

$$\bar{e} \equiv \Delta e \left[\frac{\omega_{t=1} a_{t=1} + \omega_{t=0} a_{t=0}}{3} + \frac{\omega_{t=1} a_{t=0} + \omega_{t=0} a_{t=1}}{6} \right] / \Delta y$$

will be the fraction of growth that can be linked to changes in the employment rate, and

$$\bar{a} \equiv \Delta a \left[\frac{\omega_{t=1} e_{t=1} + \omega_{t=0} e_{t=0}}{3} + \frac{\omega_{t=1} e_{t=0} + \omega_{t=0} e_{t=1}}{6} \right] / \Delta y$$

will be the fraction of growth that can be linked to changes in the share of total population that is of working age, and where the bar denotes the fraction of growth explained by the component. In this way percentage growth between two periods can be expressed as follows:

$$\frac{\Delta y}{y} = \bar{\omega} \frac{\Delta y}{y} + \bar{e} \frac{\Delta y}{y} + \bar{a} \frac{\Delta y}{y}$$

Once we have decomposed aggregate employment growth we can go further and understand, first, the role played by different sectors in changes in employment, and second, the role of capital, total factor productivity (TFP), and intersectoral shifts in explaining changes in output per worker, both at the aggregate level and by sectors. This amounts to doing a stepwise decomposition, first decomposing aggregate growth into employment and productivity changes, and then decomposing employment and productivity changes by sectors.

Step 2: Understanding which sectors contributed most to employment generation

To understand which sectors contributed to most of the employment generation, we can further decompose employment growth (Δe) by sectors. The easiest is of course to express the total growth in employment as the sum of employment generation in each sector, as follows:

$$\Delta e = \sum_{i=1}^s \Delta e_i$$

where

$$\Delta e_i = \Delta \frac{E_i}{A}$$

is just the change in employment in sector i as a share of total working-age population. Let

$$\bar{e}_i^e \equiv \Delta e_i / \Delta e$$

denote the fraction of the aggregate employment rate change that can be linked to changes in employment in sector i . The suprindex e will make explicit that it is the contribution to employment growth (as opposed to total per capita growth).

Step 3: Decomposing changes in output per worker by sectors and between and within components

We can further decompose output per worker into sectoral employment shifts and changes in output per worker by sectors by noting that:

$$\frac{Y}{E} = \sum_s \frac{Y_i}{E_i} \frac{E_i}{E}$$

or equivalently:

$$\omega = \sum_{i=1}^S \omega_i s_i$$

where Y_i is value added of sector $i = 1 \dots S$, E_i is employment in sector i , and E is total employment. This means that

$$\omega_i = \frac{Y_i}{E_i}$$

will correspond to output per worker in sector i , and

$$s_i = \frac{E_i}{E}$$

is the share of sector i in total employment. This equation just states that changes in output per worker are the weighted sum of changes in output per worker in all sectors, where the weights are simply the employment share of each sector.

Using the Shapley approach, changes in aggregate output per worker can be decomposed as:

$$\Delta\omega = \underbrace{\Delta\omega_1 * \left(\frac{s_{1,t=0} + s_{1,t=1}}{2}\right) + \Delta\omega_2 * \left(\frac{s_{2,t=0} + s_{2,t=1}}{2}\right) + \dots + \Delta\omega_i * \left(\frac{s_{i,t=0} + s_{i,t=1}}{2}\right)}_{\Delta\omega_w} + \underbrace{\sum_{i=1}^S \Delta s_i * \left(\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2}\right)}_{\Delta\omega_B}$$

Each term

$$\Delta\omega_i * \left(\frac{s_{i,t=0} + s_{i,t=1}}{2}\right)$$

is the change in output per worker that can be linked to changes in output per worker in sector s . The last term in the equation, $\Delta\omega_B$, is the change in output per worker due to intersectoral employment changes (i.e., between sectors). That is, employment movement from low-productivity sectors to high-productivity sectors should increase total output per worker, and the flows from high-productivity sectors to low-productivity sectors should reduce aggregate output per worker. If this last term is negative, the reallocation of employment by sectors was detrimental to overall productivity growth. Finally, the term $\Delta\omega_w$ corresponds to total changes in output per worker net of relocation effects (this component is also referred to as the “within” component in the decomposition literature).

We can then denote the fraction of aggregate output per worker growth that can be linked to growth in output per worker in sector i as

$$\bar{\omega}_i^\omega \equiv \Delta\omega_i * \left(\frac{s_{i,t=0} + s_{i,t=1}}{2}\right) / \Delta\omega$$

where again the bar denotes the fact that we are referring to contributions, and the supraindex denotes the fact that it is a contribution to aggregate output *per worker* growth ω , rather than a contribution to output *per capita* growth y .

Similarly, we can define the contribution of within-sector productivity growth as

$$\bar{\omega}_w^\omega \equiv \Delta\omega_w / \Delta\omega$$

and the contribution of intersectoral shifts as

$$\bar{\omega}_B^\omega \equiv \Delta\omega_B / \Delta\omega$$

Step 4: Understanding the sources of changes in output per worker (net of intersectoral shifts) at the aggregate level and by sectors

The terms ω and ω_i will capture changes in output per worker, but their interpretation is not so straightforward. Increases in output per worker can come from three different sources: (i) increases in the capital-labor ratio, (ii) increases in TFP, and (iii) relocation of jobs from bad jobs sectors (low productivity) to good jobs sectors (high productivity). To see the first two sources, note that under constant returns to scale, if $Y_t = \phi_t f(E_t, K_t)$, where K_t is the capital stock and ϕ_t is a technological parameter also known as total factor productivity, then output per worker can be expressed as $Y_t/E_t = \phi_t f(l, K_t/E_t)$. Therefore, output per worker, Y_t/E_t , will depend on changes in capital-labor ratio and in TFP growth. Note that it may also capture cyclical behavior of output: firms operating in economic downturns may have underutilized capital, so when the demand rises again it will be reflected as rise in output per worker. The third source is simply the result of workers moving from a low-productivity sector (or firm) to a high-productivity sector (or firm), so that in the aggregate, average output per worker will rise. From step 3 we found that it is possible to isolate the effect of intersectoral shifts. The term $\Delta\omega_w$ is just changes in output per worker net of intersectoral shifts.

If data on capital stock are available, then we can assume a particular functional form for the production function and separate the contribution of higher capital-labor ratios and TFP. For example, if we are willing to assume that the production function is Cobb-Douglas, then:

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

In competitive markets, $1-\alpha$ is the share of payments to capital in total value added. It is usually available from national accounts data or, if there are enough time series, then it can be estimated by taking logs and estimating:

$$\ln \frac{Y}{E} = \ln \Phi + (1-\alpha) \ln \left(\frac{K}{E} \right) + t + \mu$$

where t is an (optional) time trend capturing technological change and μ is a residual. Once we have a value of α , we can proceed to decompose changes in output per worker, net of intersectoral shifts, into changes in TFP and changes in the capital-labor ratio.

Once we have an estimate of α , we can calculate TFP as a residual. In the first period it will be:

$$\left(\frac{Y}{E} \right)_{t=0} / \left(\frac{K}{E} \right)_{t=0}^{(1-\alpha)} = TFP_{t=0}$$

To calculate TFP in the second period, however, we need to take into account that part of the change in output per worker that was a consequence of relocation shifts. This means that TFP in the second period has to be calculated as:

$$\left[\left(\frac{Y}{E} \right)_{t=1} - \Delta \omega_B \right] / \left(\frac{K}{E} \right)_{t=1}^{(1-\alpha)} = TFP_{t=1}$$

The term in square brackets is just output per worker in the second period ($t = 1$) net of relocation effects.

Once we have calculated TFP for both periods, we are able to calculate whether changes in output per worker net of relocation effects are the result of increases in capital per worker or in TFP. To do so we can use the following formula:

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

where k is simply the capital-labor ratio. The first term in the right-hand side is the contribution of changes in the capital-labor ratio to growth in output per worker net of relocation effects, and the second term is the contribution of changes in TFP.

This means that changes in total output per worker can be expressed as the sum of changes in TFP, changes in the capita-labor ratio, and intersectoral shifts:

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

As before, let

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

denote the share of output per worker that can be linked to changes in the capital labor ratio,

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

denote the share of growth in output per worker that can be linked to TFP changes, and

$$\bar{\omega}_B^\omega \equiv \Delta\omega_B / \Delta\omega$$

denote the share of changes in output per worker that can be attributed to intersectoral employment shifts.

Step 5: Understanding the role of each sector on intersectoral shifts

It is possible to understand further how changes in the share of employment in the different sectors help explain the overall contribution of intersectoral shifts to per capita growth. Important literature has found that structural change, which is movements of labor force shares from low-productivity sectors to high-productivity sectors, is an important factor behind growth. Increases in the share of employment in sectors with above-average productivity will increase overall productivity and contribute positively to the intersectoral shift term that captures the relocation effects, $\Delta\omega_B$. On the contrary, movements out of sectors with above-average productivity will have the opposite effect. By the same token, increases in the share of employment in sectors with below-average productivity should reduce growth, while a reduction in the share of employment in sectors with below-average productivity should contribute positively to growth.

Using the above intuition, we can rewrite the intersectoral shift as:

$$\Delta\omega_B = \sum_{i=1}^S \Delta s_i \left(\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right)$$

The term in parentheses is the difference between a sector i 's productivity (averaged between the two periods),

$$\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2}$$

and the average productivity of all the economy (averaged over the two periods; note there is no sectoral subindex),

$$\frac{\omega_{t=0} + \omega_{t=1}}{2}$$

Therefore, the contribution of sector i to the intersectoral shifts term will be:

$$\Delta s_i \left(\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right)$$

Thus, if sector i has productivity below the average productivity, and increases its share s_i , its contribution will be positive, that is outflows from this low productivity sector have contributed to increase output per worker. If on the other hand, if the sector sees an increase in its share, these inflows into this low productivity sector will decrease output per worker and thus have a negative effect on the intersectoral shift term. The magnitude of the effect will be proportional to: i) the difference of the sector's productivity with respect to the average and ii) the magnitude of the employment shift.

As before, we can denote the share of intersectoral shift that is explained by sector i as:

$$\bar{s}_i^{\omega_B} = \Delta s_i \left(\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right) / \Delta\omega_B$$

Step 6: Putting everything together

Once the above steps are completed, the percent contribution of each factor to total changes in GDP per capita can be obtained as follows:

Contribution of demographic shifts

$$\bar{a} \equiv \Delta a \left[\frac{\omega_{t=1} e_{t=1} + \omega_{t=0} e_{t=0}}{3} + \frac{\omega_{t=1} e_{t=0} + \omega_{t=0} e_{t=1}}{6} \right] / \Delta y$$

As in step 1

Aggregate changes in output per worker

$$\bar{\omega} \equiv \Delta \omega \left[\frac{e_{t=1} a_{t=1} + e_{t=0} a_{t=0}}{3} + \frac{e_{t=1} a_{t=0} + e_{t=0} a_{t=1}}{6} \right] / \Delta y$$

As in step 1

Contribution of changes in the employment rate

$$\bar{e} \equiv \Delta e \left[\frac{\omega_{t=1} a_{t=1} + \omega_{t=0} a_{t=0}}{3} + \frac{\omega_{t=1} a_{t=0} + \omega_{t=0} a_{t=1}}{6} \right] / \Delta y$$

As in step 1

Contribution of increases in sectoral employment

$$\begin{aligned} \bar{e}_i &= \bar{e}_i^e * \bar{e} \\ &= [\Delta e_i / \Delta e] * \bar{e} \end{aligned}$$

It is calculated as the contribution of changes in employment in sector i to total employment rate changes (step 2), times the contribution of employment rate changes to changes in total GDP per capita (step 1)

Contribution of changes in output per worker within sectors

$$\begin{aligned}\bar{\omega}_w &= \bar{\omega}_w^\omega * \bar{\omega} \\ &= \left[\left(\sum_{i=1}^S \Delta\omega_i * \left(\frac{S_{i,t=0} + S_{i,t=1}}{2} \right) \right) / \Delta\omega \right] * \bar{\omega}\end{aligned}$$

It is the contribution of within changes in output per worker to total changes in output per worker (step 3) times the contribution of aggregate output per worker to GDP per capita (step 1)

Contribution of intersectoral employment shifts

$$\begin{aligned}\bar{\omega}_B &= \bar{\omega}_B^\omega * \bar{\omega} \\ &= \left[\sum_{i=1}^S \Delta s_i * \left(\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} \right) / \Delta\omega \right] * \bar{\omega}\end{aligned}$$

It is the contribution of between changes in output per worker to total changes in output per worker (step 3) times the contribution of aggregate output per worker to GDP per capita (step 1)

Within changes in output per worker in sector *i*

$$\begin{aligned}\bar{\omega}_i &= \bar{\omega}_i^\omega * \bar{\omega} \\ &= \left(\Delta\omega_i * \left(\frac{S_{i,t=0} + S_{i,t=1}}{2} \right) / \Delta\omega \right) * \bar{\omega}\end{aligned}$$

It is the contribution of sector *i* to within changes to total changes in output per worker (step 3) times the contribution of output per worker to changes in per capita GDP (step 1)

Contribution of shifts in the share of employment witnessed by sector i

$$\begin{aligned}\bar{s}_i &= \bar{s}_i^{\omega_B} * \bar{\omega}_B \\ &= \left[\Delta s_i \left(\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right) / \Delta \omega_B \right] * \bar{\omega}_B\end{aligned}$$

It is the contribution of sector i to the between component of changes in output per worker (step 5) times the contribution of the between employment shifts component to total GDP per capita (calculated as above, in number 6)

Contribution of TFP (net of intersectoral shifts)

$$\begin{aligned}\overline{TFP} &= \overline{TFP}^{\omega} * \bar{\omega}_w \\ &= \left[\Delta TFP \frac{(k_{t=0}^{1-\alpha} + k_{t=1}^{1-\alpha})}{2} / \Delta \omega \right] * \bar{\omega}_w\end{aligned}$$

It is the contribution of TFP growth to changes in output per worker net of intersectoral shifts (step 4) times the contribution of within changes in output per worker to total GDP (calculated as above in number 5)

Contribution of capital-labor ratio

$$\begin{aligned}\bar{k} &= \bar{k}^{\omega} * \bar{\omega}^w \\ &= \left[\Delta k^{1-\alpha} \frac{(TFP_{t=0} + TFP_{t=1})}{2} / \Delta \omega \right] * \bar{\omega}^w\end{aligned}$$

It is the contribution of changes in the capital-labor ratio to changes in output per worker net of intersectoral shifts (step 4) times the contribution of within changes in output per worker to total GDP (calculated as above in number 5)

CHAPTER 4

Employment and Labor Income Profile of the Population

Some background knowledge of how labor income and its components affect household poverty is useful to an understanding of what the priority policies should be. A labor profile of the population should inform policy makers as to how households are distributed among sectors, what their status in employment is, and what the determinants of per capita household labor income are. This can be done by dividing the population into the poor and the nonpoor—defined according to national and international poverty lines—or by using income quintiles. Another method for understanding how labor markets have affected household welfare is to disentangle the sources of labor income growth that are responsible for the observed changes in total labor income.

This chapter is structured as follows: the first section sketches a labor profile of the population; the second focuses on the decomposition of household labor income growth through the use of the panel component of the 2001 and 2005 surveys; the final section is concerned with the agriculture sector.

Income and Employment Profile

Table 4.1 and table 4.2 show the employment status of the working-age population by quintile and poverty level. There has been an increase in total working-age population among the poor, which means that there are fewer dependent people within a household and there are potentially better employment and income opportunities for the household as a whole. Among poor households, not all the members of working age looked for a job (the inactive members increased from 39 percent in 2001 to 40 percent in 2005), but most of those who sought a job actually found one. The proportion of unemployed remained almost constant, while the number of employed increased by almost 1 percentage point.

The 2001 household survey asks the reasons for inactivity. Discouraged workers represent 11 percent among the poor and 8 percent among the nonpoor. Those who are temporarily inactive (who have occasional jobs, are waiting for the harvest season, or are waiting to start a new job) correspond to 3 percent of the inactive among the poor and 2 percent among the nonpoor. The largest shares of the inactive are homemakers and students: 52 percent and 34 percent are homemakers among the poor and the nonpoor, respectively; 14 percent and 32 percent are studying (among the poor and nonpoor, respectively).

Benefits from formal employment among the poor and nonpoor

Table 4.3 and table 4.4 describe the structure of employment by quintile and poverty level. The fraction employed in each category is shown as a proportion of employed individuals. As discussed above, wage employment in the formal sector is very small; only 17 percent of the employed have formal jobs, most of which are held by the nonpoor (14 percent). This close relationship between poverty and formal employment does not have an immediate interpretation. Either poverty is a consequence of the lack of formal employment, or being poor hampers access to formal employment. Alternatively, both informal employment and poverty may be a consequence of lack of education and skills. It would be important to look further into this relationship, to assess the importance of generating formal employment in relation to removing barriers to employment mobility among the poor, including access to education.

The number of wage workers employed in the informal sector decreased by 7.8 percent. What is more important is that the decrease was even greater among the poor than among the nonpoor (-13 percent compared with -3.78 percent). The individual self-employed with no

Table 4.1 Employment Status of the Working-Age Population by Quintile, 2001 and 2005

	Q1		Q2		Q3		Q4		Q5		Total	
	2001	2005	2001	2005	2001	2005	2001	2005	2001	2005	2001	2005
Employed	9.3	10.4	10.4	11.6	12.4	12.2	13.6	13.4	16.4	15.2	62.2	62.8
Unemployed	0.2	0.2	0.2	0.3	0.5	0.4	0.5	0.7	0.8	0.6	2.2	2.2
Inactive	6.1	6.7	6.5	6.9	6.6	7.4	8.2	6.6	8.2	7.4	35.6	35.0
Total	15.6	17.3	17.1	18.7	19.6	20.1	22.3	20.7	25.5	23.2	100	100

Source: Authors' calculations based on data from National Household Living Standards Survey (EMNV).

Table 4.2 Employment Status of the Working-Age Population by Poverty Level, 2001 and 2005

	Poor		Nonpoor		Total	
	2001	2005	2001	2005	2001	2005
Employed	59.7	60.6	61.2	64.4	60.6	62.8
Unemployed	1.3	1.5	3.0	2.7	2.3	2.2
Inactive	38.9	37.9	35.8	32.9	37.1	35.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' calculations based on data from EMNV.

Table 4.3 Employment Categories by Quintile, 2001 and 2005

	Q1		Q2		Q3		Q4		Q5		Total	
	2001	2005	2001	2005	2001	2005	2001	2005	2001	2005	2001	2005
Waged employed private formal sector	0.5	0.6	1.4	1.5	2.8	2.7	4.6	5.0	7.6	7.7	16.9	17.4
Waged employed private informal sector	6.4	5.4	6.6	6.2	8.2	7.2	6.7	6.9	6.5	6.3	34.5	32.0
Waged employed public sector	0.1	0.2	0.3	0.2	0.4	0.3	0.9	0.9	1.5	1.7	3.1	3.4
Self-employed with no paid employees	2.5	2.2	3.2	3.3	3.8	3.6	4.2	4.4	5.1	5.0	18.7	18.5
Employers with paid employees	0.3	0.1	0.8	0.4	0.8	0.6	1.3	1.3	2.4	2.6	5.7	5.1
Family enterprise workers	5.1	6.0	4.5	4.7	4.0	4.9	4.4	3.8	3.2	4.3	21.2	23.6
Total	14.9	14.5	16.7	16.2	20.0	19.4	22.0	22.3	26.3	27.7	100.0	100.0

Source: Authors' calculations based on data from EMNV.

Table 4.4 Employment Categories by Poverty Level, 2001 and 2005

	Poor		Nonpoor		Extremely Poor		Total	
	2001	2005	2001	2005	2001	2005	2001	2005
Waged employed private formal sector	2.5	2.7	14.4	14.7	0.2	0.4	16.9	17.4
Waged employed private informal sector	15.3	13.5	19.2	18.5	4.8	4.1	34.5	32.0
Waged employed public sector	0.4	0.5	2.6	2.9	0.1	0.2	3.1	3.4
Self-employed with no paid employees	6.9	6.4	11.8	12.1	1.9	1.4	18.7	18.5
Employers with paid employees	1.4	0.6	4.2	4.4	0.2	0.0	5.7	5.1
Family enterprise workers	10.7	12.1	10.5	11.5	3.9	4.3	21.2	23.6
Total	37.3	35.9	62.7	64.1	11.1	10.4	100.0	100.0

Source: Authors' calculations based on data from EMNV.

paid employees and also employers with paid employees decreased their share among the poor, while the number of family enterprises—often associated with low income generation—rose by about 1 percentage point for both the poor and the nonpoor. The number of poor employed in the public sector remained almost constant.

Increases in public transfers and remittances

Public transfers increased for the poor, while remittances increased for the entire population (but less so for the poor). Table 4.5 and table 4.6 show the earnings profile of the population by quintile and by poverty level. No significant differences are evident in the income structure of the population. For all levels of income, wage employment is the main source of income, accounting for a little over 45 percent of total income. The main difference is that poor wage earners receive their earnings from agriculture. This share decreased slightly for all income levels as remittances and public transfers increased. Remittances for the nonpoor showed the largest increase, while public transfers showed the greatest increase for the poor, and among them, for the extremely poor. It is worth noting that in 2001 public transfers were regressive in the sense that the poor received fewer transfers as a proportion of their total income. In 2005 this situation changed and public transfers became progressive.

Decomposition of Changes in Labor Income

A traditional way to understand how labor markets have affected welfare is to disentangle the sources of household per capita labor income that are responsible for observed growth or decreases in average household income.¹ Per capita household labor income—that is, the total income that the household earns from labor divided by the number of members in the household—can change for several reasons: because income per employed member increases, because unemployment decreases, because the number of members that actively participate in the labor market rises, or because the dependency rate decreases.

This section discusses the main source of per capita labor income growth between 2001 and 2005. The panel component of the survey is used to decompose, for each household, how much of the change in labor income was attributed to changes in each of the components mentioned above (see appendix B for the methodology). In addition, the method differentiates between four types of employment: wage work in agriculture,

Table 4.5 Structure of Income by Quintile, 2001 and 2005

Income source	Q1		Q2		Q3		Q4		Q5	
	2001	2005	2001	2005	2001	2005	2001	2005	2001	2005
Wage employment agriculture	29.2	26.0	15.1	14.5	12.7	9.1	5.9	5.5	3.0	3.3
Wage employment nonagriculture	18.1	15.0	29.1	26.7	35.4	32.3	37.0	36.7	40.0	34.1
Self-employment agriculture	22.3	27.6	17.3	21.4	13.7	14.3	8.5	8.6	3.6	5.6
Self-employment nonagriculture	8.8	7.2	16.4	12.5	17.0	16.7	21.9	21.4	25.2	22.1
Public transfers	1.9	6.8	0.8	5.4	1.6	4.4	2.6	3.1	2.3	3.0
Family remittances (internal)	3.6	3.3	4.0	3.3	2.1	3.5	4.3	3.9	2.6	3.4
Family remittances (external)	0.9	1.4	1.3	2.6	2.6	4.2	2.6	4.9	4.4	8.8
Other nonlabor sources	15.3	12.7	15.9	13.7	15.0	15.6	17.1	15.9	18.9	19.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' calculations based on data from EMNV.

Table 4.6 Structure of Income by Poverty Level, 2001 and 2005

Income source	Poor		Nonpoor		Extremely Poor	
	2001	2005	2001	2005	2001	2005
Wage employment agriculture	20.7	18.6	5.9	5.0	30.8	28.2
Wage employment non agriculture	24.6	22.2	38.6	35.1	16.4	14.0
Self-employment agriculture	19.0	23.2	7.3	8.2	22.2	27.4
Self-employment nonagriculture	13.8	10.5	22.1	21.1	8.7	6.4
Public transfers	1.4	6.0	2.3	3.2	1.8	6.6
Family remittances (internal)	3.6	3.3	3.1	3.6	4.0	3.4
Family remittances (external)	1.4	2.4	3.4	6.4	0.9	1.2
Other nonlabor sources	15.6	13.7	17.4	17.5	15.2	12.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' calculations based on data from EMNV.

wage work in nonagriculture, self-employment in agriculture, and self-employment in nonagriculture. This means that, in addition to the share of income growth that was due to increases in employment, the discussion can include (i) whether this employment growth took place in any of the employment categories mentioned above and (ii) which categories had increases in earnings (income per employed member).

The decomposition uses a sample of 1,250 households whose members are classified according to their occupation (waged and salaried workers versus the self-employed) and their sector of employment (agriculture and nonagriculture).² Labor income growth is decomposed into four main terms: income in sector j to total employment, the employment rate (which is equal to one minus the unemployment rate), the activity rate, and the share of working-age people within a household. Furthermore, the first component is disaggregated into four subterms, which represent productivity gains and employment shares in each sector of employment. Table 4.7 presents the labor profile of the population by poverty level.

Several features are worth noting. First, wage employment in nonagriculture is the highest earnings option in agriculture for both the poor and the nonpoor. It should also be noted that the nonpoor have a lower earnings rate than the poor in agriculture, most likely because the nonpoor

Table 4.7 Labor Profile of the Population by Poverty Level, 2001 and 2005

	<i>Poor</i>		<i>Nonpoor</i>	
	<i>2001</i>	<i>2005</i>	<i>2001</i>	<i>2005</i>
Average annual labor income per worker (C\$, 2001)				
Employed in wage work, agriculture	2,104	2,220	1,079	1,264
Employed in wage work, nonagriculture	6,235	6,227	21,476	18,219
Self-employed in agriculture	5,898	6,032	2,942	3,279
Self-employed in nonagriculture	3,133	3,840	12,552	12,152
Share of employment (%)				
Waged employed in agriculture	11.2	12.4	2.5	2.9
Waged employed in nonagriculture	31.9	31.7	57.8	54.8
Self-employed in agriculture	41.0	39.8	9.2	9.9
Self-employed in nonagriculture	15.9	16.0	30.1	31.7
Employment rate (%)	98.4	98.0	96.5	96.1
Activity rate (%)	63.1	65.0	66.5	68.9
Share of working-age members within a household (%)	52.9	59.0	64.2	67.1
Average per capita labor income, annual (C\$, 2001)	3,588	4,522	9,989	10,085

Source: Authors' calculations based on data from EMNV.

work fewer hours in agricultural activities, not because they earn less per hour. Employment rates are very high among both the poor and the nonpoor, but they are slightly higher for the poor, which merely reflects the fact that they cannot afford to be unemployed. Conversely, participation rates are slightly higher for the nonpoor, and dependency rates are substantially higher for the poor: for 2005 the poor showed 59 percent of their members of working age; among the nonpoor this ratio was 67 percent.

There have been some important changes in the labor profile for the years analyzed. First, dependency rates among the poor decreased substantially, even more than for the nonpoor. Second, there was an important increase in income per worker in self-employment for both agriculture and nonagriculture. On the other hand, the share of the employed in each employment category remained almost constant, with a slight increase in waged agricultural employment.

Table 4.8 shows by quintile the same labor profile as in table 4.7, which permits a clearer understanding of labor profiles and their changes among the poor and nonpoor households. Two important phenomena stand out. First, for the poorest 20 percent, income from nonagricultural wage employment is not the highest earnings option, whereas for all other quintiles it is. For the poorest 20 percent, income from self-employment is the best earnings option. Two different effects might be responsible for this: the poor might work fewer hours as wage employees in nonagriculture, and the poor might earn less per hour worked. For the poorest 20 percent, the highest earnings option is self-employment in agriculture. The second phenomenon is the increase in income for the very poor households.

Table 4.9 shows the average change in per capita household income by quintile. Between 2001 and 2005 the poor benefited more from economic growth because their labor income grew substantially more than labor income for the other groups. For the poorest quintile the annual per capita labor income growth rate was 14 percent. It was about 5 percent in the second quintile, and it became negative in the last quintile (-1 percent). It is interesting to note that agriculture was the sector in which the poor, both the waged and salaried workers and the self-employed, saw their income decreasing, while the income of the poor working in other sectors showed a substantial increase. Despite the important growth in the per capita income of the lowest quintile, it was not sufficient to bring them above the poverty line. In 2001 the poorest 20 percent had an average per capita income of C\$2,609; the 14 percent increase still left it well below the C\$5,241 of the poverty line. Figure 4.1 illustrates this growth.

Table 4.8 Labor Profile of the Population by Quintile, 2001 and 2005

	Q1		Q2		Q3		Q4		Q5	
	2001	2005	2001	2005	2001	2005	2001	2005	2001	2005
Average annual labor income per worker (C\$, 2001)										
Waged agricultural employment	3,057	2,742	1,716	1,773	1,243	1,904	458	970	1,474	1,242
Waged nonagricultural employment	3,841	3,633	7,864	7,328	9,303	10,551	15,495	14,482	33,683	24,955
Agricultural self-employment	5,175	6,878	6,623	6,107	4,321	4,621	2,792	3,859	2,579	1,955
Nonagricultural self-employment	1,511	1,536	3,564	3,929	5,789	7,043	10,221	11,459	18,723	15,809
Share of employed (%)										
Waged agricultural employment	15.6	18.1	9.8	9.1	4.8	6.7	1.4	2.8	2.2	1.4
Waged nonagricultural employment	20.6	22.5	39.0	33.6	49.4	47.6	56.8	53.6	60.6	59.2
Agricultural self-employment	53.3	49.4	36.7	38.6	20.9	22.2	8.6	9.1	3.5	4.2
Nonagricultural self-employment	10.6	9.8	14.5	18.7	24.4	23.5	33.0	34.4	33.2	33.5
Employment rate (%)	98.4	97.8	98.2	98.1	97.2	96.8	96.5	97.3	96.5	95.0
Activity rate (%)	63.9	64.6	61.2	65.5	65.6	65.8	65.9	69.6	67.7	69.7
Share of working-age members within a household (%)	49.0	55.9	55.2	59.5	55.9	62.8	62.4	65.7	70.7	70.8
Average per capita labor income, annual (C\$, 2001)	2,598	3,459	4,022	5,041	4,705	5,977	6,978	8,201	15,906	13,696

Source: Authors' calculations based on data from EMNV.

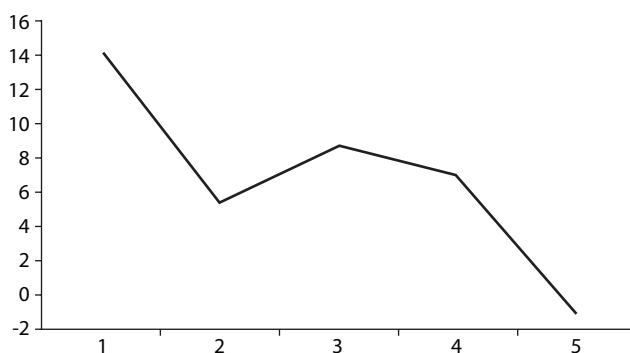
Table 4.9 Per Capita Household Income Changes, by Quintile, 2001–05

Quintile	Annual growth rate of per capita household income (%)	Level of per capita household income (C\$ 2001)
1	14.22	2,608.90
2	5.36	3,844.40
3	8.71	4,862.36
4	6.98	7,015.59
5	-1.00	14,897.57

Source: Authors' calculations based on data from EMNV.

Note: 2005 poverty line in C\$, 2001: 5,241

Finally, the decomposition results are shown in table 4.10. The table shows the contribution of each component to the observed change in per capita labor income by quintile. Two factors were most important in raising the income of the poorest 20 percent of the population: (i) the observed increase in income per employed worker in agricultural self-employment (44 percent of the total increase in per capita household income), and (ii) the important increase in the share of working-age peo-

Figure 4.1 Growth in Average Per Capita Income, by Quintile, 2001

Source: Authors' calculations based on data from EMNV.

Note: The data reflect the panel component of the survey.

ple within a household (38 percent of the observed change in per capita household income). Participation rates also made an important contribution (11 percent).

For the second quintile the main source of income growth came from lower dependency rates and higher participation rates. The larger fraction of employed household members in nonagricultural wage jobs also contributed to the higher labor income.

Decreases in the number of dependents per working age person were seen in all but the richest 20 percent, and they were an important opportunity for poverty reduction. In all but the richest 20 percent, participation rates also increased, and in all but the middle quintile employment rates increased, contributing positively to poverty reduction.³

It should be noted that increases in agricultural wages for the panel sample seem to be relatively small compared with the wage increases seen for the whole sample. It is unclear from this exercise whether agricultural wages may have played a more important role in reducing the incidence of poverty.

A Closer Look at Agriculture

Household survey data show a sizable increase in real per capita labor income for the self-employed in agriculture, which points to a need to understand where this gain came from: was it driven by relative prices, quantities, or productivity?

Data from the Food and Agriculture Organization of the United Nations (FAO) and the Central Bank of Nicaragua (BCN) can be used to disentangle the effect of each component of the increase in agricultural production, which represents 26 percent of total Nicaraguan production. A useful measure is goods produced by the poor (precisely, by the self-employed among the poor), even if none of them could be considered as contributing to a large proportion of the GDP or generating a large number of jobs. In addition, the analysis considers the behavior of export products that might have affected agricultural wages. The products considered are beans, coffee, beef, milk, rice, and corn. The first two items are export goods: beans and coffee represented 8.5 percent and 35.5 percent, respectively, of agricultural GDP in 2001. The rest are considered “sensitive” goods, according to the definition used by the Monge-González,

Table 4.10 Shapley Decomposition of Per Capita Labor Income, by Quintile

	Q1	Q2	Q3	Q4	Q1
Income per waged worker in agriculture	-0.90	-17.10	-1.55	1.29	-3.30
Share of employed in waged agriculture	5.15	-2.44	-1.17	2.76	-9.80
Income per waged worker in nonagriculture	3.45	19.13	33.21	-3.69	289.27
Share employed in waged nonagriculture	2.70	-32.69	3.02	-8.71	77.70
Income per self-employed worker in agriculture	44.64	-5.14	-14.72	-3.39	55.61
Share of self-employed agriculture	-14.00	3.38	-7.47	-4.90	-20.84
Income per worker self-employed in nonagriculture	10.29	-20.86	3.28	30.82	136.31
Share of self-employed in nonagriculture	-0.96	14.07	6.76	1.05	-31.38
Employment rate	0.53	4.50	-3.74	5.46	4.00
Participation rate	11.14	63.99	16.40	42.49	-342.18
Inverse of dependency	37.94	73.17	65.96	36.83	-55.39
Total	100	100	100	100	100

Source: Authors' calculations based on data from EMNV.

Note: Table shows the percentage share of the contribution of each component to the observed change in per capita labor.

Castro-Leal, Saavedra Gutiérrez (2004). The report states that sensitive goods “are those with high tariff protection, are economically vulnerable and possess significant socio-economic importance.” This means that they are produced by small and medium-scale farmers (see table 4.11). Beef production represents the largest share of GDP (4 percent in 2001), and the production of white corn generates the largest number of jobs (175,000), or 9 percent of total employment. Figure 4.2 to figure 4.5 look at productivity (yields), area harvested, and relative producer prices.

As for productivity changes, figure 4.2 shows the evolution of absolute productivity measured as yield per hectare. Productivity remained constant for the period under analysis for beans, coffee, and milk, while rice and maize saw increases in productivity of about 13 percent.

The United States and some Central American countries (Costa Rica, El Salvador, and Honduras) are the main trade partners of Nicaragua, so this analysis compares relative productivity (in relation to U.S. productivity) across these countries. For all products analyzed (except for dry beans), Nicaragua seems to be the least efficient country among the four countries in figure 4.3. In some cases, relative productivity, measured as yield per hectare of cultivated land with respect to U.S. productivity, decreased over the 15-year period analyzed, as well as over the years of

Table 4.11 Number of Farms, by Sensitive Product, according to Farm Size, 2001

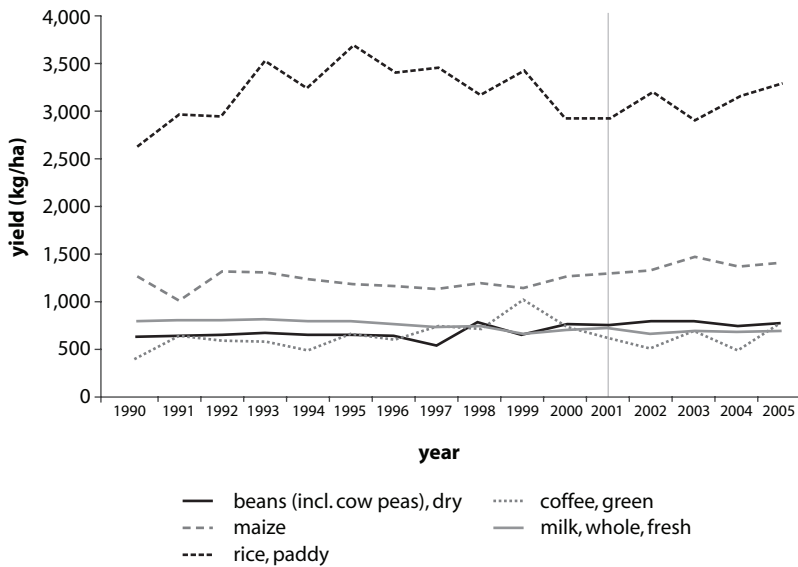
Product	Small	Medium	Large	Total
Rice	6,714	4,873	5,742	17,329
Corn	58,378	53,087	29,919	141,384
Milk	64,855	26,391	5,718	96,964
Beef	64,855.00	26,391.00	5718	96,964.00

Sources: Nicaraguan Agriculture and Central American Free Trade Agreement (CAFTA) 2004; Monge-González, Castro-Leal, Saavedra Gutiérrez, 2004.

the surveys (2001–05). Relative productivity actually decreased for three products out of a total of four (figure 4.3), the exception being coffee. The relative gains in productivity were modest.

Despite these low levels of productivity and the decreases in relative productivity, the observed gains in absolute productivity for maize and rice may have helped the small farmers of these products.

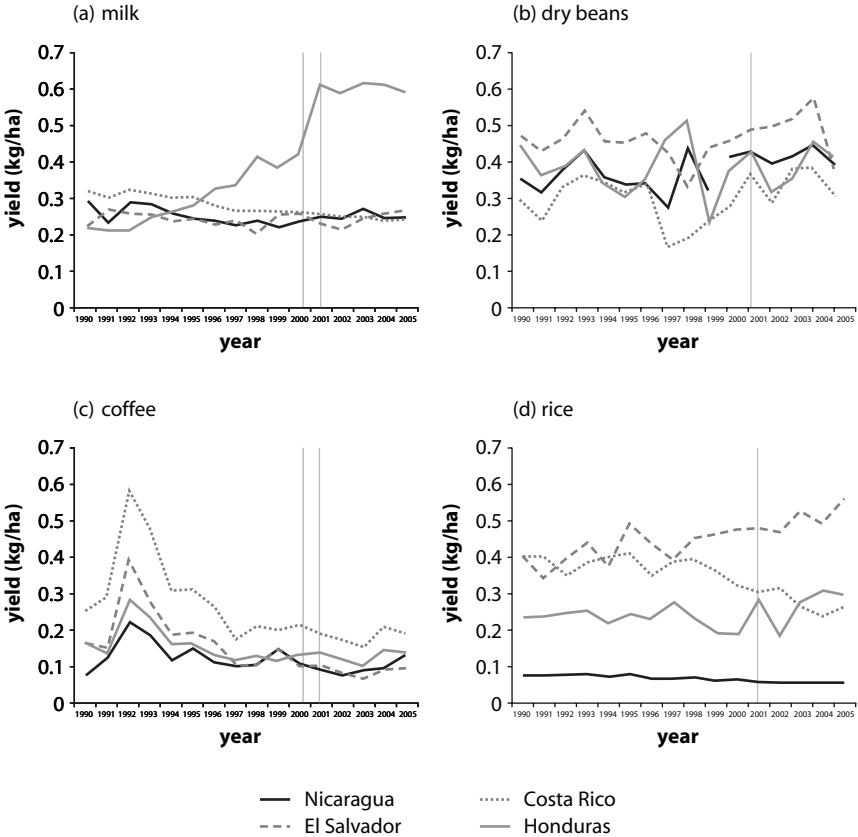
Figure 4.2 Productivity of Sensitive Products by Yield per Hectare, 1990–2005



Source: Authors' calculations based on FAO data.

Note: Because survey data refer to 2001 and 2005, the line is used to highlight the first year of survey data.

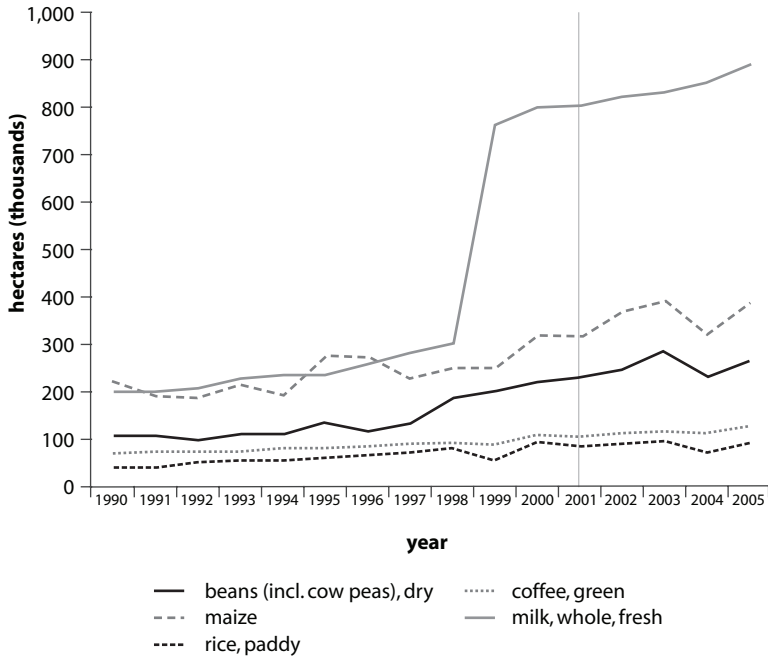
Figure 4.3 Relative Productivity by Product, 1990–2005



Source: Authors' calculations based on data from FAO.
 Note: Graphs report Nicaraguan productivity relative to U.S. productivity.

Between 2001 and 2005, the area harvested increased for three of the products analyzed (milk, maize, and beans), while for the others the area remained relatively constant (figure 4.4). Given that land productivity remained almost constant, this was the main source of the production increases seen for all of the goods considered (figure 4.5). In the case of maize, the increase in output was close to 30 percent, while for the other products it was less than 15 percent. In any case, and despite the impor-

Figure 4.4 Area Harvested for Sensitive Products, 1990–2005

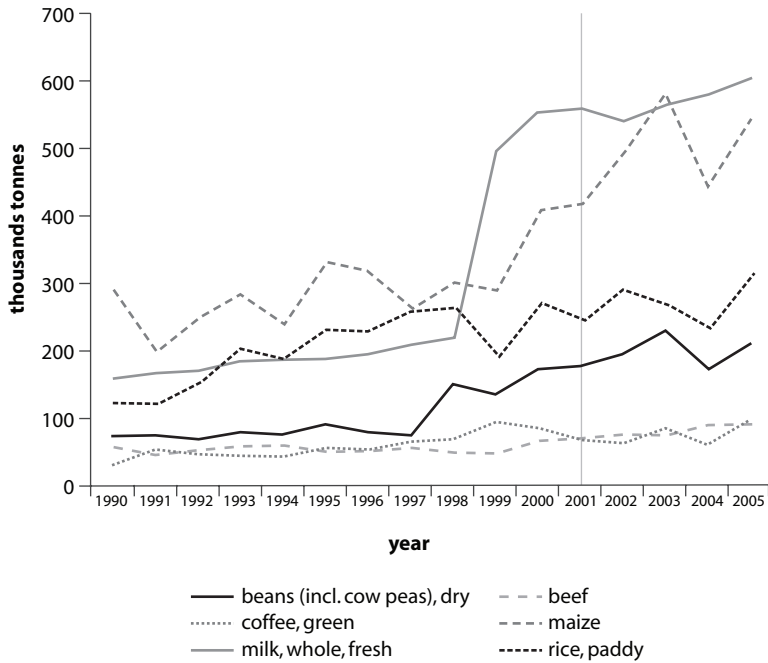


Source: Authors' calculations based on FAO data.

tant increases in output, it is unlikely that aggregate output growth was above the observed employment growth of 21 percent for the whole period, which would explain the decrease in value added per worker reported in chapter 2.

In regard to prices, the pattern of producer price indexes for three baskets of goods as they are computed by the Central Bank of Nicaragua is presented. The three aggregates are cereals, export goods, and meat. A significant price increase for all the products over the survey years can be observed (figure 4.6 to figure 4.9). Looking at the producer prices of each single good shows an increase for all the goods considered, except for milk (according to the Central Bank data).

This increase in producers' prices suggests that the terms of trade improved for agricultural producers, as the producer prices increased more than the overall consumer price index (CPI). The case of export

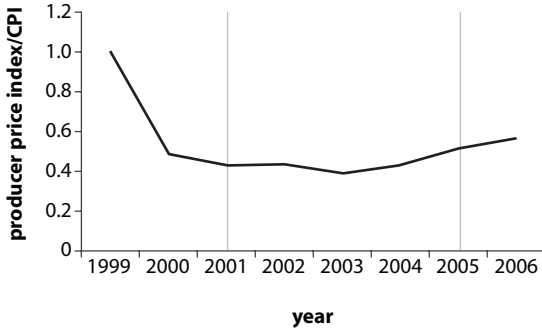
Figure 4.5 Production Volume for Sensitive Products, 1990–2005

Source: Authors' calculations based on FAO data.

goods (figure 4.6) deserves special attention; after 1999, the basis year, the producer price index dropped dramatically. This may be attributed to the 2000 crisis in coffee prices in the world market that affected the price of green coffee, which is the producer price of coffee but not the price of coffee in grains.

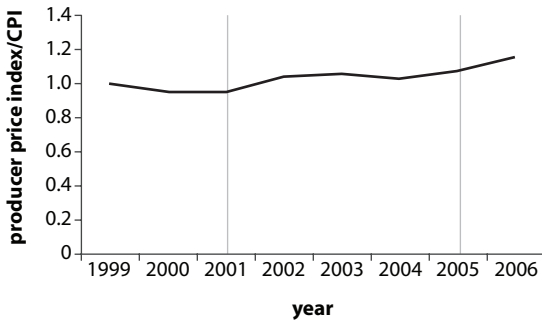
Thus, it seems that the gains made by the self-employed in agriculture between 2001 and 2005 are due to the evolution of the terms of trade (that is, relative prices). Increases in the area harvested were important but were probably not sufficient to keep value added per worker from falling in response to the apparent inflow of workers to agriculture. Rises in agricultural production may also explain the increases in agricultural wages seen for the overall sample.

Figure 4.6 Producer Prices Relative to Consumer Prices for Export Goods, 1999–2006



Source: Authors' calculations based on data from BCN.

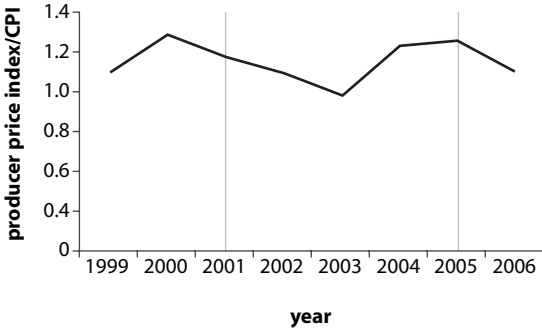
Figure 4.7 Relative Prices of Trade for Meat, 1999–2006



Source: Authors' calculations based on data from BCN.

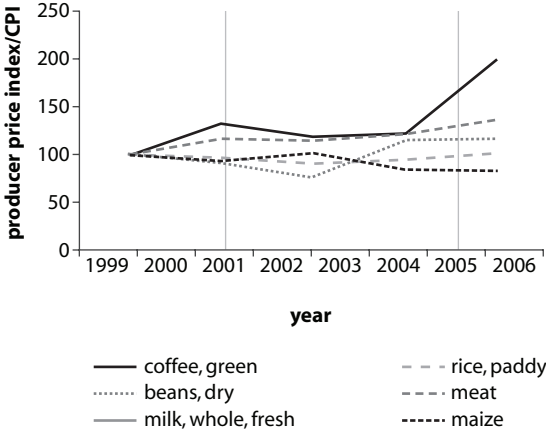
The observed decrease in productivity (for two out of a total of four goods) relative to the United States poses a considerable challenge for Nicaragua with respect to its main trade patterns. Nicaragua needs investments in order to recover productivity and to fill the gap with the main trade partners. This is particularly important, because income for rural households appears to be tied to price variations, which increases the vulnerability of this population to price shocks.

Figure 4.8 Relative Prices for Cereals, 1999–2006



Source: Authors' calculations based on data from BCN.

Figure 4.9 Relative Prices for Sensitive Products, 2001–06



Source: Authors' calculations based on data from BCN.

Notes

1. See Kakwani, Neri, and Son (2006) for an application of this decomposition to the analysis of pro-poor rates of growth.
2. Some methodological clarifications are important. First, people of working age are selected by dropping child laborers and the working elderly. This might imply overestimating productivity and underestimating employment shares and thus their contribution to total labor income growth. This is not a serious issue as they represent less than 2 percent and 7 percent, respectively, of the total working population (average over the two years of the survey). Second, a little over one-third of the sample is dropped in both 2001 and 2005 because there is no correspondence between workers and reported income within households. Some households report income in a sector where no one is employed and vice versa. It might be an issue of misreported income for some of the households. Additionally, in many cases it seems that many people reporting earnings from agricultural self-employment are actually receiving rents from farms and are not directly employed in agriculture. Because this is not labor income but rents, these households are dropped from the sample. Finally, the analysis drops a small number of households that report a jump in the employment rate from 0 to 1, as they have an analogous increase in income and therefore a growth rate of income that goes to infinity. The selection is completely neutral across quintiles because it drops proportionally more poor than rich households as they are more likely to suffer from misreported income in agricultural business.
3. An interpretation is risky given the small number of households in each quintile. For these estimations the analysis excluded the 2.5 percent in the tails of changes in total labor income, and results change when these outliers are included. Additionally, the sample selected shows no increase in wages except for the third and fourth quintiles, and agricultural wage increases are lower than for the whole sample.

Annex 4A

Decomposition of Labor Income Growth

The labor income profile is best described at the household level. A simple and useful characterization of households in terms of labor indicators can be obtained by noting that the average labor income of household j can be written as (borrowing from Kakwani, Neri, and Son 2006):

$$\frac{I_j^L}{N_j} = \frac{I_j^L}{H_j} \frac{H_j}{E_j} \frac{E_j}{L_j} \frac{L_j}{A_j} \frac{A_j}{N_j} \quad (\text{A-1})$$

where I_j^L is the total labor income of household j ; H_j is the total hours worked by working-age members of household j ; E_j is the total number of employed in the household; L_j is the number of participants in the labor market; and A_j is the number of working-age members. In this way $\bar{\omega} = I^L/H$ corresponds to average earnings per hour worked, $h = H/E$ corresponds to average hours worked, E/L is the employment rate, $l = L/A$ is the participation rate, and $a = A/N$ is the ratio of working-age members to total household members, or the dependency rate. For simplicity, let the above equation be rewritten as:

$$i_j^L = \bar{\omega} h_j (1 - u_j) l_j a_j \quad (\text{A-2})$$

where $(1 - u_j)$ corresponds to the employment rate of household j , which can be rewritten as 1 minus the household's unemployment rate u_j . Note that $\bar{\omega}$ (omega bar) is different from ω (simple omega) which refers to output per worker in the decomposition of GDP per capita.

In many contexts there is an important fraction of child laborers and elderly workers, and calculating earnings per hour worked by the employed of working age is overestimating real household productivity. In these cases, it might be better to abstract from the structure of the household according to working age (A_j in equation A1) and calculate dependency rates as the number of participating individuals over the total of working household members (A_j/L_j). Define E_j as the number of working individuals irrespective of whether they are of working age or not and define hours worked, H_j , as total hours worked for all employed individuals irrespective of age.

By averaging each of the components of the household's per capita labor income over subgroups of population, we can obtain a full profile of labor market characteristics. For example, if we divide households by quintile of income, it will describe the average labor market characteristics of each quintile. Let Ω denote the subset of households belonging to a particular quintile. It is possible to compare deciles by average dependency rates,

$$\frac{1}{N_{\Omega}} \sum_{j \in \Omega} a_j,$$

average participation rates,

$$\frac{1}{N_{\Omega}} \sum_{j \in \Omega} l_j,$$

average hours worked,

$$\frac{1}{N_{\Omega}} \sum_{j \in \Omega} h_j,$$

incidence of unemployment,

$$\frac{1}{N_{\Omega}} \sum_{j \in \Omega} u_j,$$

and earnings per hour worked

$$\frac{1}{N_{\Omega}} \sum_{j \in \Omega} \bar{\omega}_j.$$

A traditional way to understand how labor markets have affected welfare is to disentangle the sources of labor income growth that are responsible for observed changes in total labor income.¹

From equation A2, the average per capita labor income of the subset Ω of households (whether poor or nonpoor households, or households falling within an income range or with particular demographic characteristics) will then be:

$$\frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln t_j^L = \frac{1}{N_{\Omega}} \left(\begin{array}{l} \sum_{j \in \Omega} \ln \bar{\omega}_j + \sum_{j \in \Omega} \ln h_j + \sum_{j \in \Omega} \ln(1 - u_j) \\ + \sum_{j \in \Omega} \ln l_j + \sum_{j \in \Omega} \ln a_j \end{array} \right) \quad (A-3)$$

It is thus possible to decompose the change in the average per capita household labor income of group Ω into changes in its different components: changes in average log earnings per hour worked, changes in average of log hours worked, changes in average log unemployment rates, and so forth. In particular:

$$\begin{aligned} \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln v_j^L &= \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln \bar{\omega}_j + \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln h_j \\ &+ \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln(1 - u_j) + \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln l_j + \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln a_j \end{aligned} \quad (\text{A-4})$$

In this way we can easily see whether growth in the average labor income of the poor (or any group Ω) was due to changes in employment rates, participation rates, hours of work, or earnings per hour worked.

We can go a step further and decompose average earnings per hour into earnings per hour from self-employment (π_j) and earnings per hour from wage employment (w_j):

$$\bar{\omega}_j^L = h_j^w w_j + h_j^{\pi} \pi_j,$$

with h_j^w corresponding to the share of wage employment in total hours worked and h_j^{π} corresponding to the share of self-employment. In this case, however, log-linearization of equation A2 is no longer possible, and we would have to perform Shapley decompositions to analyze income changes.

Comparing changes in average incomes of the poor, and their components, with changes in average incomes of the nonpoor can shed some light on what the channels are through which a growth process is affecting the income of the poor. In many cases, however, there might be considerable heterogeneity among employment sectors. In these cases it is useful to perform these decompositions by disaggregating households according to other characteristics: for example, dividing households depending on their main occupation (e.g., differentiating between rural farmers, rural nonfarm workers, sector of occupation of household head, and so forth).

Note

1. See Kakwani, Neri, and Son (2006) for an application of this decomposition to the analysis of pro-poor rates of growth.

Annex 4B Estimation Results

Table 4B.1 Mean and Standard Deviation, by Employment Category

Variable	Wage Workers		Employers		Self-Employed		Household Enterprises	
	Agriculture	Nonagriculture	Agriculture	Nonagriculture	Agriculture	Nonagriculture	Agriculture	Nonagriculture
Earnings	6.073	13.240	29.293	48.983	16.367	15.787	8.071	15.039
Age	31.244	32.716	42.320	42.627	36.367	39.438	44.708	44.896
Years of education	3.121	8.407	3.339	8.027	2.654	5.375	1.729	4.039
Gender	0.916	0.537	0.949	0.781	0.885	0.393	0.930	0.696
No. of children < 6 years	1.370	0.878	0.976	0.740	1.323	0.904	1.319	0.927
No. of children ages 7–15	1.502	1.296	1.506	1.118	1.281	1.346	2.276	1.556
Number of adults	3.326	3.549	3.509	3.299	2.879	3.146	3.589	3.326
Number of elderly	0.116	0.200	0.127	0.183	0.169	0.133	0.072	0.109
Nonlabor income	3.210	10.529	5.857	15.076	3.653	8.364	4.481	7.597
Managua	0.082	0.431	0.000	0.312	0.046	0.383	0.007	0.234
Pacific region	0.329	0.303	0.270	0.361	0.208	0.348	0.227	0.360
Central region	0.468	0.197	0.580	0.247	0.520	0.211	0.509	0.288
Atlantic region	0.121	0.070	0.150	0.080	0.226	0.058	0.257	0.117

Source: Authors' calculations based on National Household Living Standards Survey (EMNV).

Table 4B.2 Mean and Standard Deviation, by Sector of Economic Activity and Formality Level

<i>Variable</i>	<i>Primary</i>		<i>Secondary</i>		<i>Tertiary</i>	
			<i>Formal</i>	<i>Informal</i>	<i>Formal</i>	<i>Informal</i>
Earnings	11.492	15.899	10.776	21.421	15.697	
Age	37.235	32.350	34.513	35.486	37.011	
Years of education	2.672	8.249	5.631	10.649	6.268	
Gender	0.916	0.609	0.710	0.517	0.456	
No. of children < 6 years	1.299	0.833	1.025	0.760	0.893	
No. of children ages 7–15	1.660	1.036	1.452	1.174	1.376	
Number of adults	3.318	3.419	3.516	3.470	3.358	
Number of elderly	0.118	0.128	0.176	0.211	0.168	
Nonlabor Income	3.969	10.870	6.461	14.664	9.107	
Managua	0.045	0.571	0.274	0.485	0.374	
Pacific region	0.268	0.254	0.396	0.275	0.329	
Central region	0.504	0.150	0.248	0.170	0.224	
Atlantic region	0.184	0.025	0.082	0.070	0.074	

Source: Authors' calculations based on EMNV.

Table 4B.3 Earnings Equations by Employment Category, 2001

Variable	Wage Workers		Employers		Self-Employed		Household Enterprises	
	Agriculture	Nonagriculture	Agriculture	Nonagriculture	Agriculture	Nonagriculture	Agriculture	Nonagriculture
Age	0.0234***	0.0261***	-0.0034	-0.0126	0.0043	-0.0015	-0.0344***	0.0065
Years of education	0.0667**	0.1279***	0.1374*	0.0324	0.1144*	0.0731***	0.0692	0.0221
Gender	0.053	0.2296***	-1.319	-0.8265**	-0.3815	0.4915***	-0.8999***	0.4435***
Pacific	-0.5601*	-0.1525*	-1.383	-0.5319	-1.36*	0.0715	0.3933	-0.6348**
Central	-0.4818	-0.1692*	-1.057	-0.6464**	-0.4303	0.1019	0.3589	-0.0477*
Atlantic	-0.0964	-0.0079	0	-0.0989	0.4632	0.4823**	0.7036	-0.3808
λ_1	-0.0317							
λ_2		0.2883						
λ_3			-1.996					
λ_4				-1.72**				
λ_5					0.3646			
λ_6						-0.6512**		
λ_7							-0.8981***	
λ_8								0.2035
Constant	0.8791	-0.1851	7.793	7.476***	1.151	2.306***	4.293**	1.381
No observations	409	1,939	159	234	283	873	356	245
R-squared	0.1471	0.2465	0.1379	0.3532	0.1685	0.0539	0.0965	0.0908

Source: Author's calculations based on EMMV.

Note: * significant at 10%; ** significant at 5%; *** significant at 1%; lambdas standard errors are bootstrapped standard errors (λ_1 - λ_8).

Table 4B.4 Earnings Equations by Sector of Employment, 2001

<i>Variable</i>	<i>Primary</i>	<i>Secondary</i>		<i>Tertiary</i>	
		<i>Formal</i>	<i>Informal</i>	<i>Formal</i>	<i>Informal</i>
Age	0.0045	0.014	0.0354***	0.027***	0.0253***
Years of education	-0.0356	0.1181***	0.0649***	0.177***	0.0715***
Gender	0.8978*	0.2768	0.1972	0.2212**	0.1668
Pacific region	0.0546	-0.3224*	-0.3854***	-0.2501**	-0.0094
Central region	0.8212	-0.1309	-0.405***	-0.3088*	-0.063
Atlantic region	1.399**	-0.5493	-0.1137	-0.0783	0.2034
$\hat{\imath}_1$	1.109*				
$\hat{\imath}_2$		1.066*			
$\hat{\imath}_3$			-0.0587		
$\hat{\imath}_4$				0.7258	
$\hat{\imath}_5$					0.1745
Constant	-1.017	-1.189	0.4249	-1.142	0.3396
No observations	1,210	219	569	693	1,812
R-squared	0.0814	0.2304	0.159	0.2732	0.1097

Source: Authors' calculations based on EMNV.

Note: * significant at 10%; ** significant at 5%; *** significant at 1%; lambdas standard errors are bootstrapped standard errors.

Table 4B.5 Oaxaca-Blinder Decomposition: Detailed Outcomes for Sector and Informality

	Secondary Informal vs. Secondary Primary		Tertiary Informal vs. Tertiary Primary		Secondary Formal vs. Secondary Informal		Tertiary Formal vs. Tertiary Informal	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Net difference	1.326	0.083	1.234	0.018	1.598	0.171	0.110	0.856
Endowments								
Age	-0.012	0.245	-0.001	0.257	0.030	0.158	0.041	0.000
Years of education	-0.105	0.549	-0.128	0.549	-0.309	0.000	-0.775	0.001
Gender	-0.184	0.097	-0.413	0.097	0.028	0.098	-0.013	0.010
Pacific region	0.007	0.902	0.003	0.902	-0.046	0.074	-0.014	0.045
Central region	-0.210	0.212	-0.230	0.212	-0.013	0.660	-0.016	0.050
Atlantic region	-0.143	0.038	-0.154	0.038	-0.031	0.164	0.000	0.545
Total	-0.648	0.150	-0.922	0.170	-0.341	0.002	-0.778	0.002
Coefficients								
Age	1.150	0.000	0.774	0.000	0.692	0.060	-0.060	0.802
Years of education	0.268	0.102	0.286	0.075	-0.439	0.064	-1.123	0.060
Gender	-0.642	0.210	-0.670	0.190	-0.048	0.716	-0.028	0.731
Pacific region	-0.118	0.343	-0.017	0.888	-0.016	0.783	0.066	0.131
Central region	-0.618	0.069	-0.446	0.185	-0.041	0.407	0.042	0.207
Atlantic region	-0.278	0.031	-0.220	0.081	0.011	0.326	0.020	0.122
Constant	1.442	0.302	1.356	0.301	1.614	0.116	1.481	0.240
Total	1.205	0.110	1.065	0.058	1.773	0.135	0.398	0.512
Interaction								
Age	-0.084	0.000	-0.005	0.001	0.046	0.061	-0.003	0.802
Years of education	0.297	0.102	0.385	0.075	0.139	0.064	0.462	0.060
Gender	0.144	0.210	0.336	0.190	-0.008	0.716	0.003	0.731
Pacific region	-0.057	0.343	-0.004	0.888	-0.009	0.783	0.013	0.131
Central region	0.314	0.069	0.248	0.185	-0.027	0.408	0.013	0.208
Atlantic region	0.154	0.032	0.132	0.081	0.025	0.326	0.001	0.143
Total	0.769	0.090	1.092	0.108	0.167	0.174	0.490	0.049

Source: Authors' calculations based on EMNV.

Table 4B.6 Oaxaca-Blinder Decomposition: Detailed Outcomes for Employment Categories

	WNAG/WAG		WNAG/EAG		WNAG/ENAG		WNAG/SAG		WNAG/SNAG		WNAG/FAG		WNAG/FNAG	
	Coeff.	P> z	Coeff.	P> z	Coeff.	P> z	Coeff.	P> z	Coeff.	P> z	Coeff.	P> z	Coeff.	P> z
Difference	0.342	0.445	4.083	0.259	4.409	0.001	0.914	0.289	1.122	0.001	0.703	0.130	0.127	0.909
Endowments														
Age	0.034	0.008	0.250	0.000	0.258	0.000	-0.016	0.644	0.175	0.000	0.312	0.000	-0.079	0.641
Years of education	0.353	0.013	-0.648	0.000	-0.049	0.000	0.658	0.049	-0.388	0.000	-0.854	0.000	0.097	0.364
Gender	-0.020	0.851	0.095	0.000	0.056	0.000	0.133	0.399	-0.033	0.000	0.090	0.000	-0.071	0.008
Pacific region	0.015	0.084	0.005	0.062	-0.009	0.059	-0.129	0.090	-0.007	0.058	0.012	0.058	0.037	0.025
Central region	0.131	0.155	-0.065	0.091	-0.009	0.092	0.139	0.628	-0.002	0.094	-0.053	0.091	0.044	0.093
Atlantic region	0.005	0.771	-0.001	0.938	0.000	0.939	-0.072	0.613	0.000	0.938	-0.001	0.938	0.018	0.234
Total	0.517	0.093	-0.364	0.006	0.248	0.000	0.713	0.297	-0.255	0.000	-0.494	0.002	0.045	0.853
Coefficients														
Age	0.084	0.787	-0.964	0.277	-1.264	0.024	0.791	0.039	-0.900	0.000	-1.979	0.000	0.880	0.182
Years of education	0.191	0.040	0.080	0.895	-0.802	0.031	0.036	0.820	-0.461	0.003	-0.494	0.242	0.427	0.000
Gender	0.162	0.539	-0.831	0.299	-0.567	0.002	0.541	0.181	0.141	0.145	-0.606	0.001	-0.149	0.227
Pacific region	0.134	0.219	-0.373	0.864	-0.115	0.267	0.251	0.134	0.068	0.132	0.165	0.531	0.174	0.101
Central region	0.146	0.377	-0.175	0.903	-0.094	0.159	0.136	0.770	0.053	0.116	0.104	0.547	0.089	0.307
Atlantic region	0.011	0.799	0.001	0.999	-0.006	0.799	-0.106	0.609	0.034	0.042	0.050	0.441	0.044	0.267
Constant	-1.064	0.079	7.978	0.429	7.661	0.001	-1.336	0.406	2.491	0.000	4.478	0.008	-1.566	0.345
Total	-0.336	0.480	5.715	0.348	4.813	0.002	0.312	0.724	1.425	0.000	1.718	0.116	-0.102	0.928
Interaction														
Age	0.004	0.787	-0.283	0.277	-0.383	0.024	-0.079	0.039	-0.185	0.000	-0.725	0.000	-0.239	0.182
Years of education	0.323	0.040	-0.048	0.895	0.036	0.033	0.078	0.820	0.166	0.003	0.392	0.242	0.462	0.000
Gender	-0.067	0.539	-0.638	0.299	-0.258	0.002	-0.213	0.181	-0.038	0.145	-0.444	0.001	0.034	0.227
Pacific region	-0.011	0.221	0.040	0.865	-0.022	0.267	0.115	0.134	0.010	0.132	-0.042	0.532	-0.028	0.102
Central region	-0.085	0.377	-0.340	0.903	-0.024	0.160	-0.084	0.770	0.004	0.119	0.165	0.547	-0.028	0.307
Atlantic region	-0.005	0.799	0.001	0.999	-0.001	0.800	0.074	0.609	-0.006	0.044	0.133	0.441	-0.018	0.267
Total	0.160	0.617	-1.268	0.717	-0.652	0.004	-0.11085	0.873	-0.048	0.580	-0.521	0.461	0.184	0.497

Source: Authors' calculations based on EMNV.

Note: WAG = wage agriculture, WNAG = wage nonagriculture, ENAG = employers nonagriculture, EAG = employers agriculture, SAG = self-employed agriculture, SNAG = self-employed nonagriculture, FAG = family enterprises agriculture, FNAG = family enterprises nonagriculture.

CHAPTER 5

Segmentation and Skill Mismatch

The objective of this chapter is twofold. The first objective is to identify the relevant dimensions across which the labor market is segmented (in other words, which are the good jobs sectors and which are the bad jobs sectors). The second objective is to analyze the role of skills in employment and earnings and to see whether skills are posing a constraint to employment growth in the good jobs sector.

The chapter is organized as follows. The first section briefly describes basic assumptions of a model of labor market segmentation, the second considers whether there is any evidence of segmentation and, if so, across which dimensions. It also points toward the possible causes of segmentation. The third section discusses the barriers to mobility. The last section deals with skill mismatch and the role of skills in earnings and employment.

Labor Market Segmentation: Basic Assumptions and Literature Review

There is a growing consensus that labor markets in developing countries are segmented, and that this segmentation has important implications for the extent to which the poor benefit from growth and from earnings

opportunities.¹ At the core of this model are the following premises regarding the country's markets:

- The labor market consists of various segments that offer qualitative, distinct types of employment for individuals with identical productivity endowments—that is, the good jobs sector and the bad jobs sector.²
- There is limited mobility between sectors and barriers of access to good jobs, so that not all those seeking work in the good jobs sector can find it.
- Of good job and bad job sectors, wage and employment levels are not competitively determined in at least one of the sectors. There are differences in marginal productivity between those two sectors.

The bad jobs sector is a free-entry sector, that is, no skills or capital and no special connections or qualities are needed to enter. Returns to labor in this sector are low, and households that earn a living in the sector are more likely to be poorer than other households.

However, there is no consensus as to which are the segments of the labor market and, among them, which segments should be of concern regarding pro-poor employment and labor market policies. Is the market segmented across the formal-informal divide? Or is it segmented across the self-employment–wage-employment divide? Are labor markets segmented between urban and rural areas or between agriculture and nonagriculture, or both? And which of these segments are most relevant for the poor?

Moreover, it is not easy to prove segmentation empirically because it is hard to distinguish whether workers are in a particular sector because of choice or lack of other employment options. For example, Maloney (2004) finds evidence that in Argentina, Brazil, and Mexico many workers are in the informal sector because they value the implied flexibility and the ability to report a higher job status. These workers place a low value on social security benefits because they do not believe that the governments will reliably deliver these benefits. If the analysis controls for skills, earnings in the informal sector do not differ substantially from those in the formal sector. This has led to the conclusion that workers opt for the informal sector because, given their level of skills, it offers them the highest returns.

In addition to the difficulty of identifying whether markets are segmented and, if so, across which dimensions, it can be difficult to disen-

tangle the causes of segmentation. In many cases segmentation that results from noncompetitive wage-setting mechanisms may be intertwined with extensive barriers to moving between good and bad jobs. For example, job location, skills requirements, or ethnic or gender discrimination may play a role.

In addition to segmentation, the size of the bad jobs sector (whether it is informal or formal) might be affected by “skill mismatch,” that is, by the fact that the available skills of the workforce do not match the skills demanded by the good jobs sector. For example, it has been widely noted that technological change increases the relative demand for skills. This usually increases skill premiums, which may widen the income gap between the good jobs sector and the bad jobs sector (as has happened in other Latin American countries). In this case, the gap is not due to segmentation but to differences in the individual characteristics of those employed in each sector, with the good jobs sector reducing its share of unskilled workers and the redundant labor force being shed to the bad jobs sector. In extreme cases, the lack of skills can become a binding constraint to growth.

In general, the relationships between education and skills, employment, and poverty under segmented labor markets are complex and are not reduced to the role of skill mismatch. In segmented labor markets, if jobs are rationed, it is tempting to conclude that increasing the level of education of the labor force may not help those employed in the bad jobs sector to get a job. Because there are no jobs, jobs are by definition rationed. However, jobs may be rationed for the low skilled but not for the skilled. For example, non-market-clearing wages like minimum wages may affect the unskilled but not the skilled labor force; and barriers to mobility due to lack of information may be stronger for the unskilled. If this is the case, increasing the level of education of the labor force may reduce the size of the bad jobs sector by pulling people out of the rationed market and into the unrationed market.

Education might also be important if marginal returns to labor are higher for the more educated. For example, there is evidence that literacy is correlated with increasing yields per hectare in agriculture. Better-educated laborers are better positioned to apply successfully available technologies and to produce for the market rather than for self-consumption. Moreover, there might be externalities to education, so that an increase in the share of workers with adequate skills increases overall productivity of the economy, as well as its competitiveness. Both may trans-

late into higher wages for everybody, as the size of product markets expands. But increasing the level of education of the labor force also entails risks. Large inflows of skilled labor (abundant supply) may depress wages and thus dampen the earning potential of educational expansions.

Evidence of Segmentation across Different Dimensions

As mentioned above, segmentation is hard to prove empirically. The most immediate implication of segmented labor markets is that two apparently identical individuals (with respect to education, age, experience, location, gender, and family structure) earn different wages depending on the sector in which they are working. However, this is not sufficient to establish segmentation. Individuals may be in a given sector by choice. In other words, despite the earnings differential, being in a lower-paying sector might give them other benefits (that is, they have different preferences). Establishing segmentation would require establishing that workers in the low-paying sectors would rather not be there. Thus this section tries to address both issues.

This section explores whether markets are segmented between the formal and informal status of the worker (as measured by affiliation to social security), by sector of economic activity (primary, secondary, and tertiary), and by employment category (that is, self-employed versus wage employed, family enterprise, or employer). To do so, the analysis will explore whether there are significant differences in returns to individual characteristics (such as education, gender, or age) depending on the segment of the labor market.

The traditional way of establishing whether there are significant differences in returns to individual characteristics is to estimate the determinants of earnings for each sector of economic activity as a function of individual characteristics. The earnings differential is then decomposed between the different segments, into a part due to differences in average characteristics and a part due to differences in returns to individual characteristics using Oaxaca-Blinder decompositions. The following equation illustrates the methodology.

$$\ln \varpi_i - \ln \varpi_j = \beta_j (X_i - X_j) + (\beta_i - \beta_j) X_j + ((X_i - X_j) (\beta_i - \beta_j)) \quad (5.1)$$

Where ϖ_i denotes average earnings in sector i , β_i corresponds to the vector of coefficients from the earnings equation estimated for sector i , and X_i is

the vector of average individual characteristics (education, age, experience, and so forth). The first term on the right-hand side of equation 5.1 reflects the part of the earnings differential that is due to differences in (average) observed characteristics, the second term reflects that part that is due to differences in returns to individual characteristics, and the final term is an interaction term. Important wage differences due to differences in returns to individual characteristics may be an indication of segmentation.

Given that people may select themselves (or be selected by employers) into different segments of the labor markets according to observable characteristics, it is important in a first step to correct for possible selection bias by estimating a sectoral choice model. That is, the probability of being employed in a particular sector as a function of individual characteristics is determined. It gives information as to which individual characteristics may be potentially acting as barriers to mobility. In a second step, wages are estimated correcting for possible selection bias. From this step it highlights the effect of education on earnings. Finally, to determine the share of wage differentials that can be attributed to differences in the rewards to individual characteristics, Oaxaca-Blinder decomposition is performed as in equation 5.1, but with the term reflecting the earnings gap net of selection effects.³ This step will allow the identification of the possible segments of the labor markets. The results presented correspond to the 2001 household survey.

Before a discussion of the results, it is worth describing some stylized facts on earnings and the composition of the labor force by segments. Figure 5.1 shows the pattern of median hourly earnings from the main activity for six employment categories by level of education. The classification of workers explained in the introduction has been used, but it differentiates the classifications into agricultural and nonagricultural employment. Agricultural employment categories are illustrated by a solid line, while nonagricultural categories appear as a dashed line. The graph shows a very clear divide between agricultural earnings and nonagricultural earnings, with the latter being larger for every employment category. In addition, within both sectors, being an employer offers the highest return regardless of educational level. Within agriculture, for those with less than secondary education, there appears to be no major differences between being a wage worker, a self-employed worker, or a family enterprise worker. For higher levels of education, however, being a family enterprise worker offers the lowest returns. For employment categories outside of agriculture, among those with less than secondary edu-

cation, again family enterprise offers the lowest returns, followed by wage work and self-employment. For workers with completed secondary education, the picture changes, with wage work having the highest returns, followed by self-employment.⁴

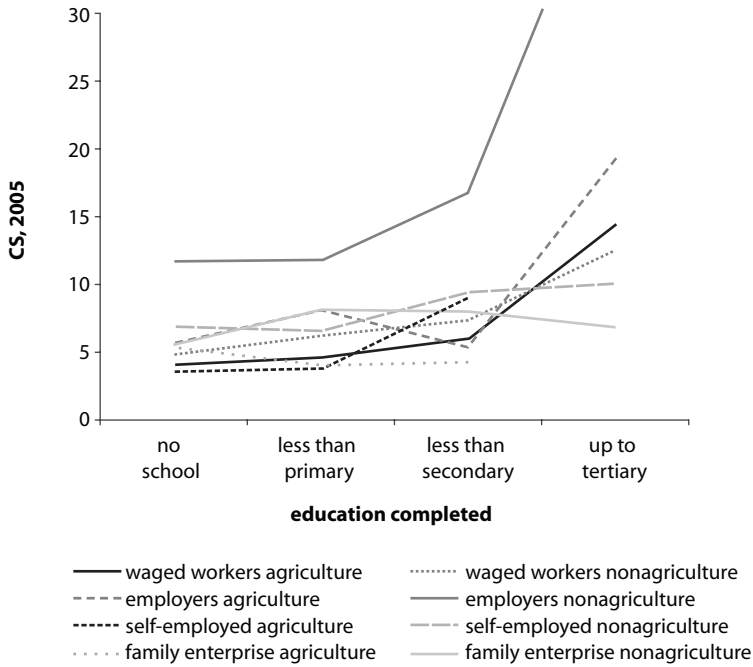
These results suggest four conclusions: (i) there is a clear divide between agricultural and nonagricultural employment; (ii) being an employer (that is, hiring paid labor) makes a positive difference in terms of earnings, regardless of sector or level of education; (iii) the behavior of earnings among employment categories differs for those with less than secondary education and for those with complete secondary or above (in the former, there seems to be no important premium to being a wage worker, while in the latter case there is); and (iv) there appears overall to be positive returns to education.

Figure 5.2 illustrates the evolution of median hourly earnings by sector of economic activity and education. As expected, workers in agriculture earn less than others, except for those with a higher level of education, who earn more than workers in the informal secondary sector and in the tertiary sectors. Within primary and secondary sectors, informal workers earn less than their formal counterparts, and the wage gap widens with the level of education. An exception is represented by formal workers with no schooling in the tertiary sector, who earn almost the same as informal workers in the secondary and tertiary sectors.

These results confirm the agricultural-nonagricultural divide, also support positive returns to education, and show a premium for working in the formal sector for workers with some level of education, with the premium increasing with the level of education.

Summarizing from a simple inspection of wages across different segments of the labor market, it can be concluded that there are significant wage premiums attached to being an employer and to being outside of agriculture. Being in the formal sector carries a smaller premium that increases with education. The results indicate that there is scope for the informal sector (the sector of those employed in family enterprises and those in agriculture) to constitute the bad jobs sector. These gaps need not necessarily imply segmentation.

For a more formal analysis of whether there is segmentation, it will be analyzed whether differences in average returns across segments of the labor market can be attributed to differences in returns to individual characteristics or differences in the average characteristics of those employed in the different segments. The first step is to estimate an earnings equation

Figure 5.1 Hourly Earnings by Employment Category, 2001

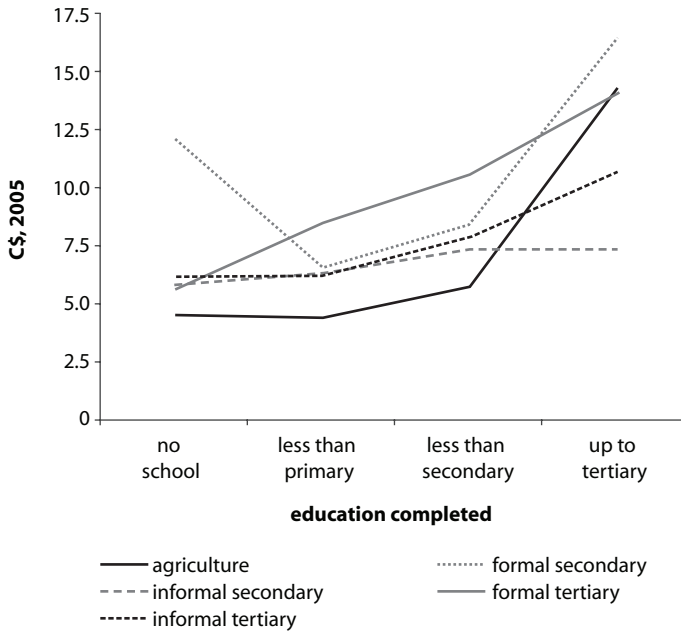
Source: Authors' calculations based on National Household Living Standards Survey (EMNV).

Note: "Up to tertiary" includes complete secondary, plus incomplete or complete tertiary education level.

for the different segments, correcting for possible selection bias (because people might be selected or might select themselves into different segments according to individual characteristics).

The first step in the estimation procedure is to understand, on the basis of observable characteristics, whether there is selection into different segments. Because most people in low-income countries participate in the labor market, the probability of being employed in a particular sector while abstracting from participation decisions can be analyzed.

The probability of being employed in a particular sector should be interpreted loosely. It might reflect both demand-side and supply-side choices. For example, in the case of wage workers, demand-side constraints

Figure 5.2 Hourly Earnings by Broad Sector and Informality, 2001

Source: Authors' calculations based on EMNV.

Note: "Up to tertiary" includes complete secondary, plus incomplete or complete tertiary education level.

might select the people who end up working in that sector. In the case of maquila factories, only workers who have completed a secondary education and are less than 30 years of age can be employed. In the case of the self-employed, employers, and family enterprises, the selection bias is mainly due to the supply side, as they are all independent workers and they have decided to be employed in that specific sector; however, demand-side forces may still play a role if they are induced to set up and run their own businesses because they do not find jobs as wage workers. In an analysis of the probability of being employed in a particular sector (formal versus informal; primary, secondary, or tertiary), rather than in a particular employment category, the explanatory variables used might be interpreted as reflecting both demand-side and supply-side constraints in the selection process.

To estimate how individual and household characteristics affect the probability of getting a certain job, a multinomial logit model on 2001 household survey data is estimated. In the first case, the employment categories are wage workers, employers, and self-employed or family enterprises, divided into two subcategories: agriculture and nonagriculture. There are six possible alternatives. The category of unemployed and inactive people is left out, since the alternative of not working is not feasible for most of them except for the youth and for women. In the second case, there are five categories: the primary sector, plus the secondary and tertiary sectors divided into formal and informal subsectors. For determinates of earnings, estimates use age, gender, educational attainment, nonlabor income, regional dummies, and dummies for the presence of the elderly, adults, and children in the household.

The annex contains descriptive statistics of the variables used in the selection and wage equations: on average, employers, the self-employed, and household heads of family enterprises are older than wage workers and have more experience. The majority of agricultural workers are males, as are the majority of employers (both in and outside of agriculture). More than one-third of those working in agriculture are illiterate, and that share increases up to almost 50 percent for the agricultural self-employed and those working in family enterprises. There is a very low rate of illiteracy among nonagricultural workers (less than 1 percent), and 40 percent have at least some primary education. Outside of agriculture, among wage workers and employers, 50 percent have a completed secondary education or above, while only 30 percent of the self-employed or those working in family enterprises have a completed secondary education or higher. Agricultural workers are concentrated in the Central and Pacific regions, while others work mainly in the Managua region.

Workers in the primary sector are, on average, older and consequently have more experience.⁵ Males are mostly employed in the primary sector, in the secondary informal sector, and in the tertiary formal sector. Illiterate workers are employed mainly in the primary sector and in the informal subsector of both the secondary and the tertiary sector. The tertiary formal sector comprises mostly workers with a completed secondary education or above, while the secondary formal sector is evenly divided between workers with incomplete secondary and complete secondary education or above. The good jobs, and the upper tier of the secondary and tertiary sectors, are concentrated in the Managua region, and people working there have high nonlabor incomes.

Table 5.1 illustrates the outcomes of the occupational selection obtained by estimating a multinomial logit model.⁶ The reference category is wage workers in agriculture.⁷ The table presents the relative risk ratio (RRR), which indicates the likelihood of a worker ending up employed in the given category (more likely if the coefficient is larger than 1, less likely if the coefficient is smaller than 1), compared with being a wage worker in agriculture, if there is a one-unit increase in the explanatory variable.⁸

Overall, age, education, region, and nonlabor income significantly affect the likelihood of ending up in any given category as compared to being a wage worker in agriculture. Higher nonlabor income increases by 9 percent the likelihood of ending up as an employer, either outside of agriculture or in agriculture. It also increases by 9 percent the probability of ending up working outside of agriculture as a family enterprise or self-employed. Within agriculture it has no effect on the likelihood of being self-employed or as a family enterprise. Thus, nonlabor income or assets may be acting as a barrier to moving outside of agriculture. Region determines strongly whether a person ends up in an agricultural employment category or not; being outside of Managua reduces the chances of ending up in agriculture. Again, this may suggest barriers to mobility from rural to urban areas.

Education is an important determinant of being outside of agriculture for all categories. Within agriculture, more education renders a worker 10 percent less likely to work as a family enterprise worker, the lowest earning category. Outside of agriculture, more education increases the likelihood of being an employer (by 34 percent), being a wage worker (by 34 percent), and being self-employed (by 17 percent). Again, this suggests that education might be acting as a barrier to moving to better earning opportunities. Demographic characteristics are in general not significant, except in the case of self-employed or family enterprise workers outside of agriculture, in which case having more children age six or younger makes a worker less likely to be in this category.⁹

Table 5.2 shows the results of selection across the five categories defined by sector of economic activity and informality (primary sector, secondary formal, secondary informal, tertiary formal, and tertiary informal). The reference category is the primary sector. The results indicate that being male decreases the likelihood of working outside of the primary sector. Age increases the likelihood of working in the tertiary sector, but not in the secondary. Education is always significant and increases the likelihood of being employed outside of agriculture. The effect of education is slightly higher for the formal sector, with one more year of education

Table 5.1 Selection among Employment Categories, 2001

Variables	Wage workers			Employers			Self-employed			Family enterprises				
	Nonagriculture		Agriculture	Nonagriculture		Agriculture	Nonagriculture		Agriculture	Nonagriculture				
	RRR	t	RRR	t	RRR	t	RRR	t	RRR	t				
Age	1.018	2.600	1.079	6.880	1.098	8.370	1.040	3.730	1.063	7.950	1.095	8.290	1.106	10.680
Years of education	1.345	10.570	1.066	1.580	1.341	8.130	0.976	-0.710	1.171	5.570	0.907	-2.790	1.126	3.880
Gender	0.114	-8.780	1.952	1.550	0.368	-3.240	0.753	-0.870	0.063	-10.770	1.484	1.080	0.233	-5.240
Dummy child age 6	0.867	-1.750	0.846	-1.310	0.889	-0.870	1.074	0.660	0.934	-0.770	0.986	-0.150	0.927	-0.740
Dummy child 7-15	1.038	0.420	1.038	0.360	0.957	-0.440	0.879	-1.390	0.993	-0.080	1.385	3.970	1.115	1.140
Dummy adult	1.037	0.630	1.019	0.240	0.924	-1.060	0.836	-1.930	0.884	-2.070	0.996	-0.060	0.916	-1.340
Dummy elderly	1.222	1.040	1.078	0.260	1.221	0.690	1.379	1.160	0.856	-0.690	0.827	-0.420	0.793	-0.780
Nonlabor income	1.084	1.980	1.096	2.240	1.093	2.180	1.040	0.890	1.088	2.060	1.081	1.920	1.090	2.120
Pacific	0.296	-2.430	1.24E+08	22.990	0.545	-1.080	1.128	0.220	0.315	-2.190	7.627	1.890	0.499	-1.360
Central	0.146	-5.270	2.20E+08	26.900	0.323	-2.590	2.027	1.880	0.144	-4.660	13.833	2.600	0.329	-2.790
Atlantic	0.207	-4.110	2.24E+08	24.290	0.404	-1.800	3.464	2.980	0.150	-4.300	24.493	3.050	0.501	-1.730

Source: Authors' calculations based on EMNV.

Note: RRR = relative risk ratios, t = t statistics.

Table 5.2 Selection among Sectors, 2001

<i>Variables</i>	<i>Secondary</i>			
	<i>Formal</i>		<i>Informal</i>	
	<i>RRR</i>	<i>t</i>	<i>RRR</i>	<i>t</i>
Age	0.989	-1.06	0.996	-0.60
Years of education	1.364	8.55	1.220	8.50
Gender	0.128	-7.93	0.212	-8.69
Dummy child age 6	0.871	-1.68	0.903	-1.28
Dummy child 7-15	0.850	-2.04	0.984	-0.25
Dummy adult	0.998	-0.03	1.043	0.84
Dummy elderly	0.766	-1.02	1.144	0.79
Nonlabor Income	1.032	2.18	1.019	1.32
Pacific	0.118	-4.70	0.316	-2.60
Central	0.039	-7.64	0.113	-5.47
Atlantic	0.020	-5.29	0.106	-4.85

<i>Variables</i>	<i>Tertiary</i>			
	<i>Formal</i>		<i>Informal</i>	
	<i>RRR</i>	<i>t</i>	<i>RRR</i>	<i>t</i>
Age	1.021	3.00	1.016	2.96
Years of education	1.588	17.13	1.264	11.02
Gender	0.093	-14.56	0.073	-18.30
Dummy child age 6	0.905	-1.27	0.886	-2.13
Dummy child 7-15	1.026	0.36	0.973	-0.50
Dummy adult	1.006	0.11	0.987	-0.33
Dummy elderly	1.125	0.65	1.005	0.03
Nonlabor Income	1.031	2.23	1.034	2.48
Pacific	0.152	-4.55	0.200	-4.10
Central	0.053	-7.32	0.076	-7.27
Atlantic	0.069	-6.57	0.072	-7.22

Source: Authors' calculations based on EMNV.

Note: RRR = relative risk ratios, t = t statistics.

increasing the likelihood of being employed in the secondary formal sector by 36 percent and in the tertiary formal sector by almost 60 percent. Nonlabor income also increases the likelihood of being outside of agriculture in the formal sector and tertiary informal sector.¹⁰

Overall, individual characteristics are associated with the employment category and the sector of employment. Whether this reflects supply or

demand conditions, or both, is not possible to infer from the analysis presented here. Education, nonlabor income, and region seem to play a key role in this selection process, increasing the chances of ending up in better-earning jobs. As such, if one is going to further explore barriers to mobility, these present themselves as good candidates for analysis.

After controlling for selection bias, the analysis of the determinants of earnings differentials across segments of the labor markets comes into the picture. The annex presents the results of estimated earnings equations.¹¹ Age increases earnings for wage workers and for household enterprise workers in agriculture, and being outside of Managua reduces these earnings. Education increases returns outside of agriculture for wage workers, employers, and self-employed but has no effect on household enterprise workers. Within agriculture, education increases the income of wage workers and self-employed workers. It is important to note that income for family enterprises is calculated as the profits from the enterprise divided by the number of workers in the household; as such, it captures the returns to all factors of production, rather than to individual factors of production. So caution is needed when interpreting the results of earnings equations for this group. In particular, the lack of effect of education on household enterprise workers might just reflect this fact, rather than no effect at all.¹² The premium for education is higher outside of agriculture and in the formal sector of the economy.¹³ The above results are important for educational policy for two reasons: one, education may be acting as a barrier to mobility, and two, education may increase earnings in some low-earning sectors and categories.

In order to determine whether there are wage differentials across labor market segments, the Oaxaca-Blinder decomposition is performed. (It is explained in equation 5.1, where the term $\ln\varpi_j - \ln\varpi_s$ corresponds to earnings gap net of selectivity effects.) The results allow identification of (i) whether the observed net wage differentials are statistically significant, and (ii) which part of the wage differentials between labor market segments can be attributed to differences in average individual characteristics and which can be attributed to returns to observed characteristics (represented as total, endowments, and β coefficients, respectively, in table 5.3 and table 5.4).

The results indicate that there are significant wage differentials between the primary and the secondary/tertiary sectors, with most of the difference explained by differences in returns to individual characteristics (table 5.3). In all cases, differences in returns to individual characteristics

Table 5.3 Oaxaca-Blinder Decomposition by Employment Category

	<i>Coefficient</i>	<i>P-value</i>
Wage worker nonagriculture vs. wage worker agriculture		
Net difference	0.342	0.445
Endowments	0.517	0.093
β coefficients	-0.336	0.480
Interaction	0.160	0.617
Wage worker nonagriculture vs. enterprise agriculture		
Net difference	4.083	0.259
Endowments	-0.364	0.006
β coefficients	5.715	0.348
Interaction	-1.268	0.717
Wage worker nonagriculture vs. employers nonagriculture		
Net difference	4.409	0.001
Endowments	0.248	0.000
β coefficients	4.813	0.002
Interaction	-0.652	0.004
Wage worker nonagriculture vs. self-employed agriculture		
Net difference	0.914	0.289
Endowments	0.713	0.297
β coefficients	0.312	0.724
Interaction	-0.111	0.873
Wage worker nonagriculture vs. self-employed nonagriculture		
Net difference	1.122	0.001
Endowments	-0.255	0.000
β coefficients	1.425	0.000
Interaction	-0.048	0.580
Wage worker nonagriculture vs. family enterprise worker in agriculture		
Net difference	0.703	0.130
Endowments	-0.494	0.002
β coefficients	1.718	0.116
Interaction	-0.521	0.461
Wage worker nonagriculture vs. family enterprise worker nonagriculture		
Net difference	0.127	0.909
Endowments	0.045	0.853
β coefficients	-0.102	0.928
Interaction	0.184	0.497

Source: Authors' calculations based on EMNV.

Table 5.4 Oaxaca-Blinder Decomposition by Employment Sector

	<i>Coefficient</i>	<i>P-value</i>
Secondary informal vs. primary		
Net difference	1.326	0.083
Endowments	-0.648	0.150
β coefficients	1.205	0.110
Interaction	0.769	0.090
Tertiary informal vs. primary		
Net difference	1.234	0.018
Endowments	-0.922	0.170
β coefficients	1.065	0.058
Interaction	1.092	0.108
Secondary formal vs. secondary informal		
Net difference	1.598	0.171
Endowments	-0.341	0.002
β coefficients	1.773	0.135
Interaction	0.167	0.174
Tertiary formal vs. tertiary informal		
Net difference	0.110	0.856
Endowments	-0.778	0.002
β coefficients	0.398	0.512
Interaction	0.490	0.049

Source: Authors' calculations based on EMNV.

explain most of the differential.¹⁴ In looking at which characteristics are responsible for these differences in returns, it is age, education, and region that account for an important part of the difference, meaning that there is a higher premium for education and experience outside of agriculture, with the premium lower in the Central and Atlantic regions. Wage differentials, however, are not significant between formal and informal sectors. Formal and informal sectors have significantly different compositions of the labor force, but returns to individual characteristics are not significantly different.

Table 5.4 shows the results among employment categories. The reference category is wage employment outside of agriculture. Earnings differentials—net of selection effects—are only significant between wage workers and self-employed outside of agriculture and between wage workers

and employers outside of agriculture. In both cases, net earnings differentials are positive, while observed earnings differentials are negative. This means that selection is playing an important role in observed difference in average earnings among these categories. In both cases the net earnings premium is positive for wage workers owing to higher returns to individual endowments, with age and education having the most important effect (see annex). Net earnings differentials are not significant between other employment categories and wage workers outside of agriculture, which means that differences in *observed* earnings arise solely because of selection effects.

Thus, there appears to be segmentation between the primary and secondary/tertiary sectors, or in other words, between employment in agriculture and nonagriculture. Potential segmentation between the formal and the informal is not supported by the results. Potential segmentation between wage workers and self-employed workers and between wage workers and employers outside of agriculture is also supported by the results. Differences in earnings between other employment categories arise mostly as a result of selection, whereby more educated and older workers select themselves or are selected into higher-earning employment options.

Evidence from section A suggests that selection into employment outside of agriculture plays an important role in explaining observed earnings, with education playing the most prominent role in this selection process. Even after a netting out of the effects of selection from the non-agricultural earnings premium, there is an important premium to working outside of agriculture, with most of the difference being explained by differences in returns to endowments, mainly age, education, and location. Therefore, some potential segmentation between agricultural and non-agricultural employment is supported by the data. Potential segmentation between formal and informal work is not supported by the data. Instead, selection effects appear to explain the observed earnings differentials. Selection into formal employment is determined mostly by education and gender, with more education and being a male increasing the chances of selecting or being selected into formal employment.

In terms of employment categories, the results suggest that most of the observed earnings differentials can be attributed to selection effects. Once these effects are controlled for, there are no significant differences among most of the employment categories, except for earnings premium in wage work and self-employment outside of agriculture. Selection into better-

earning employment categories is determined by education, age, and non-labor income. Nonlabor income appears to be an important determinant for being an employer, which may be an indication of credit constraints, as those with other sources of income may also be able to offer more as collateral.

Thus, in terms of policy it is important to understand the barriers to selection into formal employment and wage work and to moving people outside of agriculture. In addition, credit constraints to becoming an employer merit further research.

As has been mentioned, however, differences in returns to individual characteristics among segments of the labor market are only a first step in identifying segmentation. These differences may be capturing other non-pecuniary characteristics of jobs (such as flexibility or regional price differences), which are not explored here. In addition, the differences are inconclusive about whether workers end up in a given segment because of choice or through lack of an alternative. These issues are explored further in section B.

Segmentation and Barriers to Mobility: A Qualitative Approach

The previous section showed that when controlling for observable characteristics, markets may be segmented between agriculture and nonagriculture, among formal and informal secondary sectors, and among employers and nonemployers.

However, this is not sufficient for an understanding of whether there is segmentation among good and bad job sectors. For segmentation to be present, it is necessary that workers not be in the low-paying alternatives through choice. Unfortunately, this is a question that is rarely addressed in household surveys. However, the Nicaragua household survey contains a question that addresses this issue for the nonagricultural self-employed. In particular, the 2001 survey includes a question that may help to identify whether the nonagricultural self-employed are self-employed because they cannot find a wage job. Those who respond as being self-employed in the nonagricultural sector are asked detailed questions about the type of business they have. Among these questions they are asked the reason for opening a business. One possible answer is “because [they] could not find wage employment.” In other words, they would rather be wage workers.

Table 5.5 summarizes evidence from the survey question reported above, disaggregating the results by level of education, and table 5.6 sum-

Table 5.5 Reason for Starting a Business, by Level of Education, 2001
(percentage who state as main reason)

	No Schooling	Incomplete Primary	Complete Primary	Incomplete Secondary	Complete Secondary	Tertiary	All
Implied flexibility ^a	23	32	39	36	35	35	33
Get higher income than as wage employment	4	5	6	11	10	12	7
Complement other income	35	37	25	26	32	21	31
Could not find wage employment	23	17	20	17	18	12	18
Wanted to use skills	2	1	1	4	1	10	2
Other	13	9	9	5	5	11	9
Total	100	100	100	100	100	100	100

Source: Authors' calculations based on EMNV.

a. "Implied flexibility" aggregates the following answers: "wanted to be independent," "flexible time," and "combine work and households activities."

marizes the same evidence by poverty level. For the population as a whole, the main reason for starting a business is because it gives workers more flexibility, and this is followed by wanting to complement other sources of income.

However, when the answer is disaggregated by level of education, it is found that for those with no schooling or with incomplete primary education, the most important reason for starting a business is to complement other sources of income, followed by the inability to find wage employment. It should also be noted that a very low proportion of low-skilled workers answer that they started a business because they could have a higher income than as a wage worker. Thus, self-employment does seem to be a last-resort option for 23 percent of those with low skills.

When the results are disaggregated by poverty level a similar picture emerges. Twenty-six percent of the poor started a business because they were unable to find wage employment. However, 28 percent did so because of the flexibility it allowed them. Only 3 percent started a business because they believed that they could have higher earnings than as wage workers.

This suggests that some sort of segmentation may be occurring for those with very low skills, which is consistent with the evidence in section A.

Table 5.6 Reason for Starting a Business, by Poverty Level, 2001
(percentage who state each reason)

	Poor	Not Poor	Total
Implied flexibility	28	34	33
Get higher income than as wage employment	3	9	7
Complement other income	33	30	31
Could not find wage employment	26	15	18
Wanted to use skills	1	3	2
Other	9	9	9
Total	100	100	100

Source: Authors' calculations based on EMNV.

The result may be intuitive: if minimum wages are binding, those with productivity below the minimum wage would be the ones rationed out of wage employment (most likely workers with very low skills).¹⁵

The agricultural business module does not have a comparable question (regarding their reason for opening the business), so it is unclear to what extent agricultural self-employment may be serving as a last-resort employment option. But the Nicaragua poverty assessment conducted a qualitative study from which some insight may be gained as to possible segmentation and barriers to mobility (Del Carpio 2006). The study focused on urban and rural communities that, on average, hovered around the poverty line, but both poor and better-off households were interviewed. The study found some evidence that there are barriers and queuing in accessing formal jobs and that agricultural employment is not a preferred employment option, particularly among the youth.

Access to formal employment seems to be limited by geography, skills and social connections. From the communities evaluated in the qualitative analysis there seems to be a pattern emerging in terms of formal employment; people in the urban area tend to have wider access to formal low skilled jobs located in nearby communities or urban centers. People in an urban community in a municipality in Managua were able to count and report the status on 10 people in the community who are formally employed in a local cement factory. Those people have social security benefits and have a fixed income whereas the rest of the people in the community work informally as drivers, carpenters, builders, welders (all men) and making tortillas, bread, washing, cleaning and domestic duties (for women) People who gained

employment in the cement factory or maquilas usually have someone already working who helped them gain employment; the majority of the people however cannot access these jobs because they either lack the skills necessary, a connection or both. In RAAS [the Autonomous Region of the Atlantic South], the ability to speak English is a necessary skill to work as an *embarcado* (in cruise ship); people with low levels of education, ability to speak English and an initial fee for paperwork (passport, medical exams, etc.) can access these jobs. In Managua, a high school degree is required to work in the maquila factories; age (under 30) is also a factor that some of the youth mention is a requirement. People in some rural communities exhibited frustration toward the lack of employment outside of agriculture; many are hopeful about the prospect of finding a job, particularly the youth who often aspire to work in an activity different than that of their father (agriculture). There is wide heterogeneity in economic functions and opportunities related to agriculture; disparities within communities and between them as well as gender divisions. Livestock and commerce of livestock products (milk, *cuajada*, meat) are generally reserved for the more affluent members of the community.³¹ (Del Carpio 2006, 5).

In addition, the sector of employment was perceived by the interviewed communities, together with the available services and educational attainment, as important factors in determining the socioeconomic change. The youth in particular expressed their concern for the lack of adequate employment opportunities and for the little access they have to vocational training; they see agricultural work as the only available occupation. They want to have a better life than their parents and would like to have a profession but see no alternatives, no one has come to help them or worry about them” (Del Carpio 2006, 22).

Throughout the qualitative analysis, a rural-urban divide was present. Rural communities have more limited access to nonfarm employment and to education. Both factors reinforce each other and act as barriers for the poor in moving out of poverty through better employment opportunities. Although communities perceive education to be important for accessing better earning opportunities, the qualitative evidence is that the supply of educational services is vastly reduced in rural areas, and particularly in remote ones. The transport costs for accessing secondary education are high, and in the winter months the lack of infrastructure makes it impossible for children and teachers to reach schools. In one of the rural communities interviewed, parents do not send their daughters to school

because they perceive their daughters to be at risk, given the long distances that they must travel.

All of the above factors suggest that rural farm employment may be a nonpreferred sector of employment, and that skill and geographic barriers reduce outward mobility for this sector. Formal wage employment, on the other hand, seems to be an option mostly for urban workers. Although many opt for self-employment as a choice rather than as a last-resort option, an important fraction, particularly those with low skills, prefer self-employment to wage employment. Queuing is evidenced by the need for connections in accessing formal wage employment. Finally, lack of skills seems to be a major obstacle to good employment opportunities. The next section explores the skill mismatch in more detail.

Skill Mismatch

As mentioned at the beginning of this chapter, in noncompetitive settings, supply and demand may not equate to “clear the market.” Instead, market imperfections and friction may imply that a share of those needing employment end up unemployed or, if unemployment is not an option, in the bad jobs sector. This means that markets would be segmented in the sense defined in section B; that is, two agents with similar characteristics would end up with different earnings depending on their segment of the labor market (in the good jobs sector versus unemployed or in the bad jobs sector).

However, although segmentation implies that there may be two identical individuals with different earnings because they are in different segments, it is also well known that the compositions of labor market segments differ, with the good jobs sector having a lower share of unskilled workers than the unemployed sector and the bad jobs sector. A possible explanation is that the rigidities that generate the segmentation are more binding for the unskilled. For example, minimum wages or union-set wages affect the unskilled more than the skilled. If workers in the bad jobs sector could become skilled, they would have a higher probability of being hired in the good jobs sector. In terms of demand and supply, this means that excess supply is higher for the unskilled population. This is what is referred to as mismatch of skills.

Skill mismatch matters not only in a static sense but also and probably most importantly, in a dynamic sense. In the presence of skill-biased technical change, skill mismatch is likely to increase. The larger the share of

agents that lack or cannot acquire the skills demanded by firms, the larger is the share that will end up in the bad jobs sector. Rising informality or increasing shares of employment in agriculture may be consequences of rising skill mismatch.

There are several ways of exploring the degree and evolution of skill mismatch. This section reviews two of these methods. The first is an adaptation based on the work of Katz and Murphy (1991). The general idea is that if the relative demand of two educational categories is stable, then an increase in the relative supply of a group must lead to a reduction in the relative wage of that group. For example, if the amount of skilled labor is increasing with respect to unskilled labor, and if there is no change in the demand for either, then the wages of the skill must fall in response to the greater relative supply. Thus, a very simple test of this hypothesis is to check whether the product of the change in the skill premium and the change in the relative supply is negative. Rising wage gaps due to relative demand shifts may be interpreted as increasing skill mismatch (that is, the demand for skills is rising more rapidly than the supply of skills).

Aside from supply and demand, average wages may be affected by the average level of education. If the quality of education is changing unevenly (for example, if it is improving for the unskilled), then the wage premium may go down for the youngest cohorts, and this will be reflected in an overall decrease in the skill premium. However, this shrinking of the skill premium would not be caused by the relative supply but by the changing quality of education. To control for this effect, it is useful to perform the analysis by cohorts, as the quality of education is likely to stay constant within cohorts.

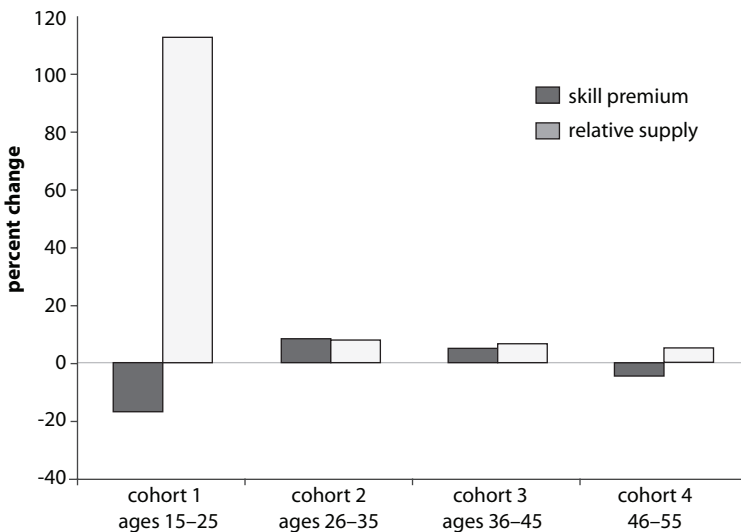
Figure 5.3 and figure 5.4 show the changes in the relative supply of skills and the skill premium by cohort of workers for the total population and for the population in urban areas. The skilled are defined as those having a complete secondary education and above. Cohort 1 corresponds to the population ages 15 to 25 in 2001; cohort 2 corresponds to the population ages 26 to 35; cohort 3 corresponds to the population ages 36 to 45; and cohort 4 corresponds to those between 46 and 55. The fifth and last cohort, those between 56 and 65, is not included in the analysis, given that an important fraction was above working age (65 years) in 2005.

The results of the skill mismatch investigation show that, for the total labor force (urban and rural), the skill premium between 2001 and 2005 shrank for the youngest cohort while it remained relatively constant for the other cohorts. For cohorts 2 and 3, the skill premium increased, and

for the oldest workers it decreased. When the results are analyzed for the urban labor force only, the results are similar.

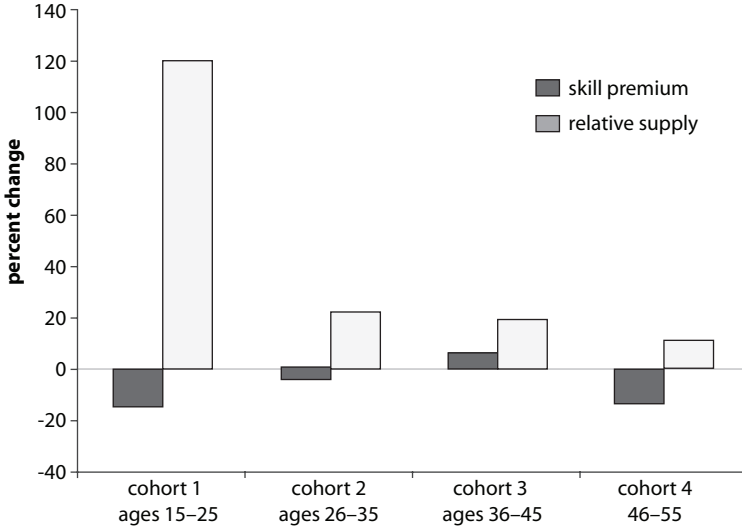
General features are worth highlighting. First, the educational expansion is significant. This is manifested in the fact that, in the case of urban areas (for example, for 2005), 79 percent of the urban population ages 19 to 29 (cohort 1) had complete secondary education or above, whereas only 27 percent among those ages 50 to 59 (cohort 4) had a secondary education or above. A similar trend is observed for the total population. The second feature of these results is that, proportionally, in most cases where there was a drop in the skill premium, the reduction of the skill premium was substantially smaller than the increase in the relative supply of skills. In other words, the elasticity of the wage with respect to the supply of skills was substantially smaller than 1, or relative wages responded less than proportionally to relative labor supply, or the demand

Figure 5.3 Changes in the Skill Premium and the Relative Supply of Skills, of Total Wage Workers, 2001–05



Source: Authors' calculations based on EMNV.

Figure 5.4 Changes in the Skill Premium and the Relative Supply of Skills, of Urban Wage Workers, 2001–05



Source: Authors' calculations based on EMNV.

for skills was increasing for the period analyzed. Third, it is worth highlighting that the skill premium is lower in the younger cohorts, where the relative supply of skills is highest, which reinforces the idea that the higher supply of skills is reducing its relative return.

The above analysis suggests that the demand for skills in the wage sector is increasing. In the case of cohorts 2 and 3, the evidence suggests that the supply of skills, although increasing slightly, is increasing at a slower pace than the relative demand. For the oldest cohort (4) the result is the opposite. In the younger cohorts, however, the increase in the supply of labor was large enough to have had a downward impact on the relative wage. This may imply that, as the educational expansion continues, the wage differential could possibly be further reduced. The implications for poverty reduction will depend on whether this contraction of the skill

premium is obtained through higher wages for the unskilled or lower wages for the skilled, and on whether the educational expansion is reaching the poor. If the educational expansion is leaving the poor behind, and the skill premium is shrinking because of lower wages among the skilled, then poverty is not likely to be reduced. If, however, part of this educational expansion is reaching the poor, and the skill premium shrinks because of higher unskilled wages, then poverty should be reduced. For the period analyzed, wages for the unskilled increased in constant terms, thus potentially having a poverty-reducing effect.

Despite some small increases in the skill premium of those ages 36 to 46, it is unclear whether the economy has a substantial skill mismatch, as the observed increases in the skill premium are small, and among the younger cohorts the skill premium has shrunk. On the other hand, the supply of skills seems to be growing, particularly among the youngest cohorts.

In addition to exploring the evolution of the skill premium and the supply of skills, a more direct approach to discovering whether the supply of skills meets the demand is by asking employers whether they find it difficult to fill vacancies because of lack of skills. Although there is no such information for Nicaragua, the 2003 Investment Climate Assessment asks a related question, namely, whether the skills and the education of available workers present a problem for the operation and growth of business. The survey asks the respondents to judge the severity of the problem on a five-point scale, with ratings of no obstacle, minor obstacle, moderate obstacle, major obstacle, and very severe obstacle.

Table 5.7 presents the results of the question, to what extent skills and education of available workers are a problem for the operation and growth of business, disaggregating firms by firm size, export type, and ownership. For the aggregate, only 5.5 percent of firms judged it to be a very severe problem, and 11.5 percent judged it to be a major problem. The majority of firms (66 percent) considered it not a problem or only a minor problem. When the results are disaggregated by firm type, they indicate that large firms, exporters, and government firms tend to find it slightly more of a problem, although the majority consider it a minor or a moderate problem. The results seem to confirm what the analysis of skill premiums and supplies indicated.

Table 5.7 Skills and Education of Available Workers as an Obstacle to Firms' Operation and Growth, 2003

<i>Firm size by number of workers</i>				
<i>Response</i>	<i>Small (1–19)</i>	<i>Medium (20–99)</i>	<i>Large (100+)</i>	<i>Total</i>
Not a problem	57.5	38.7	40.0	50.2
Minor problem	15.6	18.2	17.5	16.6
Moderate problem	13.8	19.0	22.5	16.1
Major problem	9.1	14.6	17.5	11.5
Very severe problem	4.0	9.5	2.5	5.5

<i>By export type</i>			
	<i>Exporters</i>	<i>Nonexporters</i>	<i>Total</i>
Not a problem	38.0	52.5	50.2
Minor problem	23.9	15.2	16.6
Moderate problem	21.1	15.2	16.2
Major problem	12.7	11.3	11.5
Very severe problem	4.2	5.8	5.5

<i>By ownership</i>					
	<i>Domestic private</i>	<i>Foreign</i>	<i>Government</i>	<i>50–50</i>	<i>Total</i>
Not a problem	51.1	47.2	42.9	28.6	50.2
Minor problem	17.0	13.9	14.3	14.3	16.6
Moderate problem	15.7	16.7	14.3	28.6	16.2
Major problem	11.0	16.7	14.3	14.3	11.5
Very severe problem	5.2	5.6	14.3	14.3	5.5
Total	100	100	100	100	100

Source: Authors' calculations based on World Bank Enterprise Survey.

Note: 50–50 is foreign domestic ownership.

Notes

1. Labor market segmentation is now part of the standard labor economic textbooks; see, for example, Borjas (1996), Bosworth, Dawkins, and Stromback (1996), and Layard, Nickell, and Jackson (1991). The main reason is that it offers a better explanation for some empirical observations than the competitive model. An often-quoted example is the persistent existence of intraindustry wage differentials for observationally equivalent workers (Katz and Summers 1988). For other contributions, see Dickens and Lang (1985) and Esfahani and Salehi-Isfahani (1989).
2. The bad jobs sector is usually associated with the agricultural sector or the informal sector, and the good jobs sector is generally associated with the industrial or modern sector or the formal sector. This distinction may oversimplify; the division of the labor market between good and bad jobs goes beyond the formal versus informal or agricultural versus industrial divides and depends on the specificities of each country.
3. See Newman and Oaxaca (2004) for a discussion of earning gap decomposition in the presence of selection.
4. The graph does not show earnings for family enterprises and self-employed in agriculture for workers with complete secondary or more because there were very few observations in each cell.
5. Experience is constructed as age minus years of education minus six.
6. It is a generalization of the two-step selection-bias correction method introduced by Heckman (1979) that allows for any parameterized error distribution. It only requires the estimation of one parameter in the correction term that is achieved at the cost of some restrictive assumptions, namely, linearity in the outcome variable and joint normality in the error terms (see Bourguignon, Fournier, and Gurgand 2007).
7. The analysis has left out the no-education dummy and the Managua dummy to avoid perfect collinearity.
8. Relative risk ratios (RRRs) are presented as an exponential; thus a coefficient lower than 1 indicates a negative effect and a coefficient larger than 1 indicates a positive effect. For example, the first column in the table indicates that an increase of one year in age makes a worker 1.02 times more likely to end up employed as a wage worker outside of agriculture than to end up employed as a wage worker in agriculture.
9. Some of the results suggest that a sequential decision might be taking place. However, this possibility was examined by testing IIA assumptions. In all but one case IIA assumptions held, so further nested models were explored.

10. Caution should be exercised in inferring causality; it might be that because a worker is outside of agriculture the worker's nonlabor income is higher, rather than the other way around.
11. Earnings functions are separately estimated for the two classifications described above. The dependent variable is the logarithm of hourly earnings; the impact of estimated coefficients is measured in terms of percentage change in hourly earnings for a unit increase in the explanatory variable. Since an analysis controls for selection bias by using a number of variables that can be interpreted as demand- and supply-side constraints, only standard controls other than the selection term λ are included in the wage equations.
12. There are other approaches to calculating returns to labor for household enterprise workers. One approach is to estimate a profit function, with different types of labor forces—female adult, female young, male adult, male young—in efficiency units (that is, adjusted by years of education of each), and then impute returns to labor to each type of worker. Alternatively, instead of using as regressors the head of the enterprise's individual characteristics, one might use the average characteristics of the household.
13. Again the lack of returns to education in agriculture overall may reflect the fact that household enterprise workers are almost 50 percent of all workers in this sector.
14. For a more detailed analysis, the tables in the annex report Oaxaca-Blinder decompositions for each variable.
15. The analysis assumes that more-skilled workers are more productive, and that in the medium and long run, diminishing marginal returns to labor due to fixed capital need not set in. If in fact capital is fixed, then the marginal product of labor will also depend on the employment decisions of the firm (that is, how many workers to hire).

CHAPTER 6

Policy Implications and Further Research

Despite modest economic growth and important employment growth, Nicaragua saw no major decrease in poverty. Two main factors explain this outcome. One, an important fraction (39 percent) of new jobs was generated in agriculture, which offers the lowest returns among economic activities. Two, jobs with good earnings, generated outside of agriculture, either were accessible only to the most educated workers, as in the case of the maquila sector, or experienced a decrease in wages, as was the case for the industrial food and beverage sector.

The depth of poverty, as measured by the poverty gap, saw significant reductions. These reductions in poverty were due to the following: increases in the relative prices of products produced by the agricultural poor, and an increase in the amount of remittances. However, the increase in income was not sufficient to bring the poorest out of poverty.

The analysis presented here has implications for action on five policy fronts: (i) skills, (ii) productivity, (iii) employment generation, (iv) geographic mobility, and (v) regulation of minimum wage.

Skill levels in Nicaragua are substantially lower than in neighboring countries. Despite the important progress on this front, substantial efforts

are still needed. Increasing skills in Nicaragua would involve both benefits and risks, and any education policy must try to magnify the former while minimizing the latter. Currently, the supply of skills seems to be growing at a higher rate than the demand, and, as a consequence, wages for the skilled population might drop. Such a drop in the returns to schooling could serve as a disincentive to acquiring education and might reduce employment growth in the waged sectors of the economy, mainly manufacturing and services. It is thus imperative that policies to increase growth in these sectors (and with this, to increase the demand for labor) be undertaken.

Currently, constraints to growth appear to lie outside of the labor market and involve macroeconomic uncertainty and lack of affordable credit. An increase in the demand for wage work and, in particular, for higher skills is unlikely to be seen unless these constraints are addressed. However, higher skills are important determinants of earnings among the urban self-employed and family enterprises, as well as among urban informal wage workers. Higher skills are also important in increasing earnings in wage agricultural work and among agricultural employers. Targeting the expansion of education to the rural sector appears to have important potential as a poverty-reducing strategy. Education is a key determinant in accessing better earning opportunities and in moving out of agriculture.

Productivity in Nicaragua declined during the period studied, with important decreases within agriculture. Nicaragua has the lowest levels of agricultural productivity among its neighbors and trading partners. This factor, together with some indirect evidence of low mobility between urban and rural areas, suggests that raising productivity in agriculture should also be in the forefront of policy initiatives. Without targeted investments in agricultural productivity and agricultural exports, decreasing rural poverty in the short and medium runs seems implausible.

Employment generation should be targeted toward the formal secondary and tertiary unskilled labor-intensive sectors. Exploring targeted interventions to foster growth in such sectors as tourism, with training programs for the unskilled specifically designed for the industry, seems a policy worth exploring. Nicaragua recently conducted a tourism investment climate survey that may provide initial input for the design of this policy. Regulation does not seem to pose a constraint for job creation and growth. The most urgent policies in this area would seem to be to address macroeconomic uncertainty and credit constraints.

The study pointed toward possible geographical barriers to mobility between the urban and the rural sectors. It is as yet unclear how important these barriers to mobility are, and what the main determinants of the barriers are. Further study on this issue may yield promising policy implications. Becoming an employer is also linked with availability of nonlabor income, which leads to the natural question of whether alleviating credit constraints might help more family enterprise workers or self-employed to become employers.

It is unclear to what extent the current minimum wage structure in Nicaragua provides any benefits or manages to take into account the skills of the labor force. More productive sectors have higher minimum wages and thus may be constraining the poorest from accessing jobs in precisely the sectors that offer the highest earnings potential. Workers with productivity below the minimum wage will be rationed out of formal employment. The higher the minimum wage is, the less access the unskilled have to these sectors. Results of this study suggest that minimum wages may be binding for the maquila manufacturing sector and probably for commerce. Further study in this area may clarify the extent to which the current sectoral structure of minimum wages is beneficial to the poor or is actually constraining them from accessing jobs in the most productive sectors of the economy.

References

- Arias, Omar, Andreas Blom, Mariano Bosch, Wendy Cunningham, Ariel Fiszbein, Gladys López Acevedo, William Maloney, Jaime Saavedra, Carolina Sánchez-Páramo, Mauricio Santamaría, and Lucas Siga. 2005. "Pending Issues in Protection, Productivity Growth, and Poverty Reduction." Policy Research Working Paper No. 3799, World Bank, Washington, DC.
- Besley, Timothy, and Robin Burgess. 2004. "Can Labor Regulation Hinder Economic Performance? Evidence from India." *Quarterly Journal of Economics* 119 (1): 91–132.
- Bibi, Sami. 2005. "When Is Economic Growth Pro-Poor? Evidence from Tunisia." Paper presented at the Economic Research Forum, 12th Annual Conference, Cairo, Egypt, December 19–21, 2005.
- Borjas, G. J. 1996. *Labor Economics*. New York: McGraw-Hill.
- Bosworth, D., P. Dawkins, and T. Stromback. 1996. *The Economics of the Labor Market*. Essex, England: Addison Wesley Longman, Ltd.
- Bourguignon, François. 2002. "The Growth Elasticity of Poverty Reduction: Explaining Heterogeneity across Countries and Time Periods." DELTA Working Papers No. 2002–03. Département et Laboratoire d'Economie Théorique et Appliquée of the École Normale Supérieure, Paris, France.

- Bourguignon, François, and Gary S. Fields. 1997. "Discontinuous Losses from Poverty, Generalized P Measures, and Optimal Transfers to the Poor." *Journal of Public Economics* 63 (2): 155–75.
- Bourguignon, F., M. Fournier, and M. Gurgand. 2007. "Selection Bias Corrections Based on the Multinomial Logit Model: Monte Carlo Simulations." *Journal of Economic Surveys* 21 (1): 174–205.
- Calderón, César, and Alberto Chong. 2005. "Are Labor Market Regulations an Obstacle for Long Run Growth?" In *Labor Markets and Institutions*, ed. J. E. Restrepo and A. Tokman. Santiago, Chile: Banco Central de Chile.
- Chen, Shaohua, and Martin Ravallion. 2004. "How Have the World's Poor Fared since the Early 1980's." *World Bank Research Observer* 19: 141–69.
- Contreras, Dante. 2001. "Economic Growth and Poverty Reduction by Region: Chile 1990–1996." *Development Poverty Review* 19 (3): 291–302.
- Cukierman, Alex, Martin Rama, and Jan van Ours. 2001. "Long-Run Growth, the Minimum Wage and Other Labor Market Institutions. Preliminary notes." Mimeo. World Bank, Washington, DC. <http://www.tau.ac.il/~alexcuk/pdf/GrowthB.pdf>.
- Datt, Gaurav, and Martin Ravallion. 1993. "Growth and Redistribution Components of Changes in Poverty Measures: A Decomposition with Applications to Brazil and India in the 1980s." *Journal of Development Economics* 38: 275–95.
- . 1998. "Farm Productivity and Rural Poverty in India." *Journal of Development Studies* 24 (4): 62–85.
- Del Carpio, Ximena. 2006. "Voices of Nicaragua. A Qualitative and Quantitative Approach to Viewing Poverty in Nicaragua." Mimeo, World Bank, Washington, DC.
- Dickens, W. T., and K. Lang. 1985. "Testing Dual Labor Market Theory: Reconsideration of the Evidence." NBER Working Paper Series No. 1670, 1–27. National Bureau of Economic Research, Cambridge, MA.
- Dollar, David, and Aart Kraay. 2002. "Growth Is Good for the Poor." *Journal of Economic Growth* 7 (3): 195–225.
- Esfahani, H. S., and D. Salehi-Isfahani. 1989. "Effort Observability and Worker Productivity: Towards an Explanation of Economic Dualism." *The Economic Journal* 99: 818–36.
- Essama-Nssah, B. 2005. "A Unified Framework for Pro-Poor Growth Analysis." *Economics Letters* 89: 216–21.

- Fields, G. 2006. "Employment in Low-Income Countries beyond Labor Market Segmentation?" Document prepared for the World Bank conference "Rethinking the Role of Jobs for Shared Growth," Washington, DC, June 19.
- Fortreza, Alvaro, and Martin Rama. 2001. "Labor Market 'Rigidity' and the Success of Economic Reforms across More Than 100 Countries." Policy Research Working Paper No. 2521, World Bank, Washington, DC.
- Freeman, Richard, and Remco H. Oostendorp. 2000. Occupational Wages around the World (OWW) Database. <http://www.nber.org/oww>.
- Goodman, Leo A. 1960. "On the Exact Variance of Products." *Journal of the American Statistical Association* 55 (292): 708–13.
- Huassman, Ricardo, Dani Rodrik, and Andrés Velasco. 2005. "Growth Diagnostics." Unpublished, John F. Kennedy School of Government, Harvard University, Cambridge, MA. <http://ksghome.harvard.edu/~drodrik/barcelonafinalmarch2005.pdf>.
- ILO (International Labour Organization). 2003. "Review of the Core Elements of the Global Employment Agenda." Committee on Employment and Social Policy, Geneva, March.
- Islam, Rizwanul. 2004. "The Nexus of Economic Growth, Employment and Poverty Reduction: An Empirical Analysis." Issues in Employment and Poverty Discussion Paper No. 14, ILO, Geneva.
- Kakwani, Nanak, Shahid Khandker, and Hyun H. Son. 2006. "Pro-Poor Growth: Concepts and Measurement with Country Case Studies." Working Paper No. 1, UNDP International Poverty Centre, Brasilia, Brazil.
- Kakwani, Nanak, Marcelo Neri, and Hyun H. Son. 2006. "Linkages between Pro-Poor Growth, Social Programmes and Labour Market: The Recent Brazilian Experience." Working Paper No. 26, UNDP International Poverty Centre, Brasilia, Brazil.
- Kakwani, Nanak, and Ernesto M. Pernia. 2000. "What Is Pro-Poor Growth?" *Asian Development Review* 18 (1): 1–16.
- Kapsos, Steven. 2004. "Estimating the Requirements for Reducing Working Poverty: Can the World Halve the Working Poverty by 2015?" Employment Strategy Papers No. 14, Employment Strategy Department, ILO, Geneva.
- Katz, L. F., and K. M. Murphy. 1991. "Changes in Relative Wages, 1963–1987: Supply and Demand Factors." NBER Working Paper Series No. 3927: [1]–38, National Bureau of Economic Research, Cambridge, MA.
- Katz, L. F., and L. H. Summers. 1988. "Can Inter-Industry Wage Differentials Justify Strategic Trade Policy?" NBER Working Paper Series No. 2739, National Bureau of Economic Research, Cambridge, MA.

- Kraay, Aart. 2006. "When Is Growth Pro-Poor? Evidence from a Panel of Countries." *Journal of Development Economics* 80 (1): 198–227.
- Landman, Oliver. 2004. "Employment, Productivity and Output Growth." Employment Strategy Papers No. 2004/17, Employment Trends Department, ILO, Geneva.
- Layard, P. R. G., S. J. Nickell, and R. Jackson. 1991. *Unemployment: Macroeconomic Performance and the Labour Market*. Oxford, U.K.; New York: Oxford University Press.
- Loayza, Norman, and Claudio Raddatz. 2006. "The Composition of Growth Matters for Poverty Alleviation." World Bank Policy Research Working Paper No. 4077, World Bank, Washington, DC.
- López, J. Humberto. 2004a. "Pro-Poor Growth: A Review of What We Know (and What We Don't)." Mimeo prepared for the Operationalizing Pro-Poor Growth Program Series by Agence Française pour le Développement, Bundesministerium für Wirtschaftliche Zusammenarbeit, U.K. Department for International Development, and the World Bank, Washington, DC.
- . 2004b. "Pro-Growth Poor-Poor: Is There a Trade-off?" World Bank Policy Research Paper No. 3378, World Bank, Washington, DC.
- López, J. Humberto, and Luis Servén. 2006. "A Normal Relationship? Poverty, Growth and Inequality." Policy Research Working Paper No. 3814, World Bank, Washington, DC.
- Lucas, Sarah, and Peter Timmer. 2005. "Connecting the Poor to Economic Growth: Eight Key Questions." Center for Global Development Brief, Washington, DC.
- Lustig, Nora C., and Darryl McLeod. 1997. "Minimum Wages and Poverty in Developing Countries: Some Empirical Evidence." In *Labor Markets in Latin America*, ed. Sebastian Edwards and Nora Lustig. Washington, DC: Brookings Institution Press.
- Maloney, William F. 2004. "Informality Revisited." *World Development* 32 (7): 1159–78.
- Menezes-Filho, Naercio, and Ligia Vasconcellos. 2004. "Operationalizing Pro-Poor Growth: A Country Study for Brazil." Background paper in the Operationalizing Pro-Poor Growth Program Series by Agence Française pour le Développement, Bundesministerium für Wirtschaftliche Zusammenarbeit, U.K. Department for International Development, and the World Bank, Washington, DC.
- National Institute for Statistics and Census, Nicaragua. Encuesta Nacional de Hogares sobre Medicion de Niveles de Vida (EMNV). National Household Living Standards Survey.

- Neuman, S., and R. Oaxaca. 2004. "Wage Decompositions with Selectivity-Corrected Wage Equations: A Methodological Note." *Journal of Economic Inequality* 2(1): 3–10.
- Osmani, S. R. 2005. "The Employment Nexus between Growth and Poverty: An Asian Perspective." Sida Studies No. 15, Swedish International Development Cooperation Agency, Stockholm, Sweden.
- Prasada Rao, D. S., Timothy J. Colleli, and Mohammad Alauddin. 2004. "Agricultural Productivity Growth and Poverty in Developing Countries, 1970–2000." Employment Strategy Papers No. 2004/9, Employment Trends Department, ILO, Geneva.
- Rama, Martin, and Raquel Artecona. 2002. "A Database for Labor Market Indicators Across Countries." Mimeo. World Bank, Washington, DC.
- Ravallion, Martin. 2004. "Pro-Poor Growth: A Premier." Policy Research Working Paper No. 3242, World Bank, Washington, DC.
- . 2005. "Inequality Is Bad for the Poor." Policy Research Working Paper No. 3677, World Bank, Washington, DC.
- Ravallion, Martin, and Shaohua Chen. 2003. "Measuring Pro-Poor Growth" *Economics Letters* 78: 93–99.
- Ravallion, Martin, and Gaurav Datt. 2002. "Why Has Economic Growth Been More Pro-Poor in Some States of India Than Others?" *Journal of Development Economics* 68: 381–400.
- Satchi, Mathan, and Jonathan Temple. 2006. "Growth and Labor Markets in Developing Countries." Discussion Paper No. 06/581, Department of Economics, University of Bristol, U.K.
- Shorrocks, Anthony F. 1999. "Decomposition Procedures for Distributional Analysis: A Unified Framework Based on the Shapley Value." Mimeo, University of Essex, Colchester, U.K.
- Sundaram, K., and Suresh K. Tendulkar. 2002. *The Working Poor in India: Employment-Poverty Linkages and Employment Poverty Options*. Issues in Employment and Poverty Discussion Paper 4, ILO, Geneva.
- Temple, Jonathan, and Ludger Woessmann. 2006. "Dualism and Cross-Country Regressions." *Journal of Economic Growth* 11 (3): 187–228.
- Timmer, Peter C. 2005. "Agriculture and Pro-Poor Growth: An Asian Perspective." Working Paper No. 63, Center for Global Development, Washington, DC.
- World Bank. 2005. "Pro-Poor Growth in the 1990's: Lessons and Insights from 14 Countries." Agence Française pour le Développement, Bundesministerium für Wirtschaftliche Zusammenarbeit, U.K. Department for International Development, and World Bank, Washington, DC.

Index

A

agriculture sector, 59
 area harvested, 74
 earnings, 23, 91, 92, 99
 education and, 91, 92, 95, 99, *114n.13*
 employment, 12, 13, 69–76, 107
 growth, 41, 73
 income, 65, 68
 new jobs, 115
 output, 73
 poor vs nonpoor, 65
 productivity, 11–12, 40, 69, 74
 self-employment, 74, *77n.2*, 105, 107
 value added, 39–40
 workers, 18, 95, 96, 97, 100

B

bad jobs sector, 88, 89, *113n.2*
beans, dry, 69
 productivity, 70, 72
benefits, 60, 63
business, reason to start, *114n.15*
 education and, 104–105

C

capital-labor ratio, 58
cereals, prices, 76
child labor, 4, 12
coffee, 69
 prices, 74
 productivity, 70, 72
commerce sector, 31, 117
community services sector, minimum wage,
 23–24
costs, nonwage labor, 20
country context, 7–26

D

definitions, 4–5
demographics
 characteristics, 96, *113n.9*
 shifts, 56
 transition, 8–9
dependency rates, 66, 69, *26n.1*

E

earnings, 5, 92
 analysis, *114n.10, 11*
 determinants, 99
 economy, 7
 education and, 92
 employers, 5
 employment category, 13–15, 83
 employment selection and, 102
 functions, analysis, *114n.11*
 hourly, 91, 93
 household enterprise, 5
 informality, 94
 labor market segmentation and, 90
 sector, 84, 94
 self-employed, 5, 13
 education, 12, 29–30, 36–37, 116
 access to, 106–107
 agricultural earnings, 91, 95, *114n.13*
 earnings and, 99
 employment sector and, 18, 96
 employment categories, 91
 level of, and reason to start a business,
 104–105
 maquila sector, 94
 obstacle to firms' operation and growth,
 112
 population ages, 30
 self-employment, 92
 skills and, 89–90
 mismatch, 108, 109
 premium, 111
 emerging markets, productivity analysis,
26n.5
 employed, 4
 employment, 1
 generation, 49–50, 115, 116–117
 intensive growth 2
 rate
 agriculture, 66
 changes, 56
 shifts in, 58
 structure, 10–11
 subsector, 43
 trends, 30–31
 employment categories
 earnings
 differentials, 102–103
 equations, 83
 hourly, 93

education, 91
 labor market segmentation, 90
 mean and standard deviation, 81
 Oaxaca-Blinder decomposition, 86, 100
 poverty level, 62
 quintile, 62
 selection among, 96, 97
 employment sector, 32, 34
 earnings equations, 84
 employment generation, 49–50
 Oaxaca-Blinder decomposition, 101
 productivity and, 40
 enterprise survey, 20
 error distribution, *113n.6*
 experience, *113n.5*
 export processing zone (EPZ) , 45–46
 exports, 9, 73–74
 products, 69
 producer prices vs consumer prices, 75

F

family enterprise workers, 100
 manufacturing, 43, 45
 financial intermediation, 10
 formal sector, 4, 98
 access to, 105, 106, 107
 benefits, 60, 63, 105
 education, 106
 labor market segmentation, 90
 mean and standard deviation, 82
 Oaxaca-Blinder decomposition, 85, 101
 wages, 22–23

G

GDP, 8, 10
 growth, 9, 27
 aggregate, decomposing, 48–49
 manufacturing, 45
 sectoral, 28, 41
 growth rates, past, 8

H

HIPC Initiative, 8
 household enterprise worker, 4
 earnings, 14, 15
 returns to labor, *114n.12*
 household income
 change per capita, by quintile, 66, 68, 69
 growth, 59

household survey, 47n.2
 hurricane, emergency assistance and
 reconstruction, 8, 28

I

inactive, 4
 inactivity, 60
 income
 agriculture, 65, 68
 average, 1
 employment profile and, 60–63
 growth, 1, 6n.1
 decomposition of, 32–42
 levels, 2
 self-employed, 3, 6
 structure
 by poverty level, 64
 by quintile, 64
 individual characteristics, 98–99
 industrialization, 11, 12, 18–19
 informal sector, 12, 60, 98
 labor market segmentation, 90
 mean and standard deviation, 82
 Oaxaca-Blinder decomposition, 85, 101
 wages, 23
 International Monetary Fund policies, 8
 investments, 8, 9, 75
 agriculture, 12
 climate, issues, 22
 constraints to, 20–21
 investments

J

jobs, two or more, 13

L

labor force, 4
 growth, 30
 profile, by quintile, 66, 67
 regulations, 20–25
 labor income, 5
 decomposition, 63–69, 77n.2
 profile, 59
 labor income growth
 decomposition, 65, 78–80
 per capita, 63, 65, 70
 Shapley decomposition, by quintile, 70

labor market, 2, 4, 107
 context, 10–19
 indicators, 13
 premises, 88
 labor market segmentation, 87–107,
 113n.1
 analysis, 92–95
 barriers to mobility and, 103–107
 causes, 88–89
 distinguishing, 88
 evidence of, 90–103
 primary vs secondary sectors, 102
 wage workers vs employers, 102
 wage workers vs self-employed
 workers, 102
 life expectancy, 7
 low earner, 5

M

macroeconomic context, 7–10
 indicators, 11
 Macroeconomic Policies for Growth and
 Employment, 6n.3
 manufacturing sector, 31, 42–47, 117
 employment generation, 44
 growth, 41, 45
 productivity, 40
 subsector, 43
 value added, 39–40
 wages, 44
 maquila sector, 4, 9, 43–44, 117
 education, 94
 employment and output, 46
 evolution and importance, 45–46
 growth, 10
 marginal cost, 25
 meat, prices, 75
 migration, 12
 milk, 69
 productivity, 70, 72
 minimum wage, 21–25, 117
 analysis, 22–23
 mobility, barriers to, 103–107, 117
 modern sector, 11–12
 multinomial logit model, 96, 97, 113n.6

N

new jobs, 115

O

- Oaxaca-Blinder decomposition, 90–91, 99–103
 - employment categories, 86
 - sector, 85
- occupational selection, 96, 97
- output per worker, 56
 - changes, 57
 - aggregate and by sector, 52–54
 - within, 57
 - decomposition
 - per sector, 50–52
 - per worker, 36–37
 - trends, 27–28

P

- participation rates, 66, 69, 77*n.3*
- policy, 2
 - implications, 115–117
 - selection barriers and, 103
- poor employed, 27
- population, 7
 - ages 60–64, 47*n.1*
 - growth, 9–10
 - hierarchical description, 16–17
 - inflow, 28
 - labor profile, 59
 - rural, 18–19
 - structure, 14, 15, 29
 - trends, 28–30
 - urban vs rural, 19
- poverty
 - gap, 115
 - impact of growth, 6*n.2*
 - labor profile, 65
 - rate
 - unemployment and, 12
 - working-age population, 32, 33
 - trends, 31–32
- Poverty Reduction and Growth Facility (PRGF), 7
- prices
 - agricultural products, 73
 - cereals, 76
 - exports, producer vs consumer, 75
 - income and, 75
 - meat, 75
 - sensitive products, 76
 - price shocks, 75

- primary sector, 18, 95, 96
 - labor market segmentation, 102
- Oaxaca-Blinder decomposition, 101
- productivity, 116
 - agriculture, 69, 70–71, 72
 - employment and, 38–39
 - sectors, 40
 - shares, 40
 - poor, 69
 - self-employed, 69
 - total factor (TFP) , 36–37, 58
 - U.S. , 75
- public transfers, 63

R

- regulations, 2
- relative risk ratios (RRRs), 96, 113*n.8*
- remittances, 63
- report
 - objective, 2–3
 - structure, 3, 5
- research, further, 115–117
- returns to labor, 1
- rice, 69
 - productivity, 70, 72
- rigidities, 107
 - indexes, 20, 21
- rural-urban divide, 106

S

- secondary sector, 10, 18, 95, 96, 98
 - labor market segmentation, 102
 - Oaxaca-Blinder decomposition, 85, 101
- sector of economic activity
 - labor market segmentation, 90
 - mean and standard deviation, 82
- sectors
 - decomposition, 38–41
 - employment increases, 56
 - growth, 39
 - intersectoral shifts, 54–55, 57
 - decomposition of, 38, 39
 - movement across, 38
 - selection among, 98
- self-employed, 4, 10, 11, 26*n.4*, 60, 63, 100
 - agricultural, 68, 74, 77*n.2*
 - earnings, 13, 14, 15
 - education and, 92

- income, 66
- manufacturing, 43
- number, 18
- sensitive goods, 69–70
 - area harvested, 73
 - farms by number and size, 71
 - prices, 76
 - productivity, 71, 74
- services sector, growth, 41
- Shapley decomposition, per capita labor
 - income, by quintile, 70
- skills
 - levels, 115–116
 - mismatch, 89, 107–112
 - analysis, 108–111
 - obstacle to firms' operation and growth, 112
 - premium, 109–111
 - supply of skills and, 109, 110–111
 - urban workers, 110
- social security, 12, 20
- supply and demand, skill mismatch, 108, 109–110
- survey, household, *47n.2*

T

- tertiary sector, 10, 18, 95, 96, 98
 - Oaxaca-Blinder decomposition, 85, 101
- TFP, 36–37, 58
- trade and integration agreements, 8
- transformation services, *26n.2*

U

- unemployed, 4, *26n.3*, 60
 - rates, 10, 12
 - rural vs urban, 32
 - urbanization and, 11

- urban workers, skill premium vs skills
 - supply, 110
- urbanization, unemployment and, 11

V

- value added, 27
 - growth, 38–40, 41
 - decomposition of, 48–58
 - per capita, 33, 48–58
 - decomposition of, 34–35

W

- wage employment, 12, 60
 - access to, 107
 - skill demand, 110–111
- wages, 5, 11
 - behavior of, 42
 - differentials, analysis, 99–103
 - disparity, 90
 - hourly, 22, 24
 - manufacturing sector, 44
 - minimum, 21–25, 117
 - sector, 42
 - skill mismatch, 108
 - structure, 117
- wage workers, 5, 60, 100
 - benefits, 20
 - earnings, 14, 15
 - manufacturing, 43, 45
- working-age population, 5, 9–10, 12, 31, *77n.2*
 - employment status, 60, 61
 - poverty rates of, 32, 33

ECO-AUDIT

Environmental Benefits Statement

The World Bank is committed to preserving endangered forests and natural resources. The Office of the Publisher has chosen to print *Making Work Pay in Nicaragua: Employment, Growth, and Poverty Reduction* on 50% recycled paper including 30% post-consumer recycled fiber in accordance with the recommended standards for paper usage set by the Green Press Initiative, a nonprofit program supporting publishers in using fiber that is not sourced from endangered forests. For more information, visit www.greenpressinitiative.org.

Wood Saved: 1 ton

Total Energy: 3 million

Greenhouse Gases: 323 lbs

Wastewater: 1,338 gallons

Solid Waste: 172 pounds



Poor people derive most of their income from work. However, there is insufficient understanding of the role of employment and earnings as a link between growth and poverty reduction, especially in low-income countries. *The Making Work Pay* series analyzes the important roles of labor markets, employment, productivity, and labor income in facilitating shared growth and promoting poverty reduction.

Making Work Pay in Nicaragua provides a description of the trends in growth, poverty and labor market outcomes in Nicaragua. It assesses the linkages among changes in output, employment, and labor productivity and links changes in the quality and quantity of employment to poverty reduction. The book also addresses other key issues such as rural versus urban conditions, women and children in the labor market, self-employment and household enterprises, and it identifies priorities for further analysis and policy intervention.

Making Work Pay in Nicaragua will be of interest to development practitioners in international organizations, governments, research institutions, and universities with an interest in inclusive growth and the creation of productive employment.



THE WORLD BANK

ISBN 978-0-8213-7534-1



SKU 17534