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DIAGNOSTIC PARAGUAY

The Dynamic Transformation of Employment in Paraguay

LET'S WORK
A global partnership to create more & better private sector jobs

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Forthcoming analysis to be carried under the Let's Work Paraguay program will include labor demand analysis and a qualitative youth survey, inter alia.

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Note that the analysis in this report has been updated to reflect the revised population weights introduced by DGEEC in 2017 relating to the Encuestas Permanente de Hogares.

CONTENTS

ABBREVIATIONS

CPI..... Consumer Price Index
DGEEC..... General Directorate for Economic Surveys and Censuses
(Dirección General de Estadísticas, Encuestas y Censos)
GDP..... gross domestic product
HDI..... Human Development Index
ILO..... International Labour Organization
PPP ..... purchasing power parity
RUC..... registration number (Registro Único de Contribuyente)
SEDLAC ..... Socio-Economic Database for Latin America and the Caribbean
WDI..... World Development Indicators

EXECUTIVE SUMMARY

Paraguay in the last decade and a half not only experienced robust economic growth and improved labor outcomes across sectors, it also saw marked improvements in job quality and the creation of many new jobs that are good for development. Good jobs for development, the focus of this analysis, are those that boost living standards, have higher levels of productivity, and enhance social cohesion through positive social externalities. The analysis in this report describes the ways in which employment outcomes have improved for a majority of Paraguayans, the degree to which certain types of workers have not benefited from ongoing dynamic transformations, and the challenges for sustaining and enhancing labor market gains in the future.

The observed transformation of employment reflects multiple concurrent underlying dynamic factors:

- Decades of sustained economic growth
- Structural shifts in economic production away from agriculture toward services
- Demographic forces that have expanded the working-age population
- Increased urbanization
- A growing public sector providing expanded public services
- Increased domestic demand for goods and services in both the informal and formal sectors

DEMOGRAPHICS AND THE CHANGING PATTERN OF ECONOMIC PRODUCTION

Paraguay's rapid demographic growth has put considerable pressure on the labor market. The current youth bulge has the potential to create an important demographic dividend, but at the same time increases pressure for faster job creation. The labor force expanded by 2.6 percent annually over the past decade, but job creation more than kept pace, at 2.8 percent per year.

Economic growth was therefore robust enough to increase employment during this period. The employment-to-GDP elasticity of 0.58—in line with global norms—translated into over 63,000 net new jobs annually. Looking to the future, Paraguay's labor force is projected to add 970,000 workers between 2015 and 2030, requiring nearly 65,000 new jobs every year; this target is achievable if the economy sustains annual average growth rates over 3 percent.

Paraguay's economy is in the midst of a structural transformation from an agricultural to a services-based economy. The majority of recent job growth was concentrated in retail (accounting for 45 percent of net new jobs) and government services (over 20 percent), followed by manufacturing (13 percent), construction (11 percent), finance and real estate (10 percent) and other services (9 percent).

Job creation was accompanied by very strong within-sector labor productivity growth, averaging 2.1 percent per year in real terms, much higher than the observed between-sector productivity gains that occur when workers shift from less productive to more productive sectors. Agricultural productivity growth was the main driver of aggregate gains in the first part of the last decade, but other sectors subsequently gained steam, leading to more widely shared productivity gains between 2008 and 2015. For example, transport, communications, financial, and other services had the strongest productivity growth (1.1 percent per year since 2008), followed by public administration (0.6 percent), construction (0.5 percent), and agriculture (0.4 percent). Productivity in manufacturing and utilities stagnated, and the retail sector actually lost productivity.

VERY POSITIVE LABOR MARKET OUTCOMES

The large increase in the number of formal sector jobs further contributed to higher labor productivity. Formal job creation was in fact double informal job creation, despite the dominance of informal jobs in Paraguay. Between 2008 and 2015, 300,000 formal jobs were added, compared with 144,000 informal jobs (in net terms), and the informality rate fell from 78 to 71 percent in less than seven years. The private sector added nearly 155,000 formal jobs, while the public sector added 84,000 formal jobs (equivalent to a 48 percent increase). Large formal firms were responsible for adding the majority of private sector jobs since 2008.

These patterns of job creation translated into improved job quality, both because many formal jobs were created, but also because real wages grew across the board—that is, in all sectors and for most types of work status. Self-employed smallholder farmers experienced very large income gains in the early part of the period, averaging 8 percent per year in real terms between 2001 and 2008, but earnings fell between 2008 and 2015. Since 2008, formal wages rose by 3 percent per year in real terms, self-employed (non-farmer) earnings experienced 6 percent annual growth, and earnings of informal wage workers rose over 2 percent per year.

The combination of robust job growth and higher incomes led to significant reductions in poverty and inequality. Extreme poverty fell from 13 percent in 2003 to 5 percent in 2015, and moderate poverty fell from 51 percent to 27 percent in the same period. Rural poverty rates remain much higher than urban poverty, but both saw rapid improvements in the last decade.

UNEQUAL ACCESS TO BETTER JOBS

Not all workers have been able to benefit from the increased demand for labor and rising incomes, however. This is especially true when considering the welfare of informal and formal workers, and reflects unequal access to good jobs. In comparing labor outcomes across different worker characteristics such as gender, age, and education, the data show that young workers, women, and those with less education are more likely to work informally. Women have lower rates of labor force participation, and those in the labor force earn significantly less than men, even when controlling for individual characteristics such as education and sector of work. Regression analysis indicates an earnings gap between men and women that ranges from 25 to 43 percent.

Household characteristics also affect access to good jobs. Workers in the bottom 40 percent of households are nearly one-third more likely to be in informal work, and rural workers are about one-fourth more likely to be in informal work. Part of this unequal access to formal employment stems from education differences, although educational attainment for both rural and urban youth has increased sharply in recent years. Workers from Guaraní-speaking households also have a higher probability of being in informal work.

The observed imbalances in access to formal jobs also reflect geographic inequalities in terms of the rural–urban composition of jobs. Job growth has been skewed to urban formal jobs: whereas rural employment grew steadily after 2001, urban jobs grew much faster, adding three times the number of new rural jobs. And of the urban jobs added since 2008, about four-fifths were formal.

Despite strong formal job growth, informal workers have difficulty transitioning into formal employment, according to panel data that track worker transitions into and out of the labor force and between jobs. The data reveal a dynamic labor market on the informal side, but a degree of rigidity on the formal side. Workers move easily into and out of activity, into and out of unemployment, and between informal jobs, the latter reflected by high rates of rotation among self-employed, informal wage employee, and employer status. Labor turnover in the formal sector is very low, by contrast, reflecting more stable employment contracts, particularly in the public sector. Firm size plays a role in labor transitions, as large firms are more likely to create formal jobs, and informal workers in large firms are more likely to land a formal job.

Individual characteristics—including education level—have only modest effects on the likelihood of transitioning from informal to formal jobs, even though formal employees have more education on average. **This education paradox suggests that other factors play a larger role in impeding worker mobility into formal work,** factors such as regulatory impediments on formal firms which encourage underreporting and informal contracting, weak governance, structural factors, and sectoral composition effects. For

instance, workers in a rural area will have difficulty finding formal jobs without moving to the city, even if they have high levels of education. The government may prefer to hire new graduates rather than those with only informal work experience, and/or tertiary graduates may prefer to enter directly into formal employment; both would be consistent with low transition rates from informal to formal work for the highly educated.

Despite this paradox, education is nevertheless an important driver of job outcomes. Having a tertiary degree significantly increases a worker's probability of being in formal work—especially in the public sector—and even a secondary degree increases the likelihood markedly. Earnings analysis shows that higher levels of education bring higher wages, and the returns are large; for example, tertiary graduates earn nearly double the wages of a worker lacking a primary degree and nearly a third more than those with an incomplete tertiary degree, even controlling for other characteristics such as formality.

THE CONNECTION BETWEEN ECONOMIC GROWTH AND JOBS

The trends in employment, productivity, and job quality show that Paraguay's productivity growth was diversified across most services sectors (except retail) and construction. In addition, rising aggregate demand and rising incomes stimulated further demand for goods and services in sectors across the economy. The mutually reinforcing feedback effects fostered job creation in both formal and informal activities. The higher share of formal and urban employment—boosted by public sector hiring—contributed to higher average wages and better job quality. Informal workers benefited from these quality improvements as well, through strong wage growth for self-employed and informal wage workers.

Informal low-productivity employment still dominates. Most new jobs—whether formal or informal—were added in the retail sector, followed by government services, manufacturing, construction, finance and real estate, and other services. Despite this diverse sectoral distribution of *added* jobs, most jobs in Paraguay are still found in agriculture, retail, and other services—three sectors with the lowest productivity, the lowest wages, and a high degree of informality. Although agriculture is no longer the dominant employer, it nevertheless plays a central role in the economy, providing a fifth of GDP, the majority of exports—especially in capital-intensive soy and beef —and a fifth of jobs, mostly smallholder farmers.

QUESTIONS OF SUSTAINABILITY

The continued dominance of informal, low-productivity, low-skilled jobs despite significantly improved labor outcomes raises concerns about the sustainability of Paraguay's future growth path. Demand for Paraguayan goods and services is constrained by the small domestic market, and existing links to export markets are highly concentrated in capital-intensive agricultural products that provide little scope for spurring export-oriented employment. Rural workers are moving to more productive jobs in urban areas, but many of these are in retail, construction, or other services, suggesting only modest gains in labor productivity. Although educational attainment is rising, education quality is weak, limiting the prospects for improved labor productivity. Moreover, the preference for government jobs could dampen future productivity growth, if the country's most skilled workers are not becoming innovators and creating or entering businesses with high growth potential.

The shift out of agriculture has been accompanied by rapid urbanization, but this in turn hinders balanced job creation and widespread access to good jobs. Because jobs in urban centers tend to be better than rural jobs, urbanization pressures will persist in the coming years, especially as youth become increasingly mobile. But as more and more youth migrate to the capital, and the growing urban population has children at the present high rate, there may not be enough productive jobs in the urban private sector to absorb the number of entering workers.

A more effective transformation would be more evenly distributed across urban centers, secondary towns, and rural regions, to foster better links between the rural and urban economies and between domestic and external markets in a way that reduces rather than exacerbates the gaps vis-à-vis lagging regions and economically marginalized population groups. A key objective is to harness the ongoing structural shift out of agriculture into more productive work in a way that transforms the nature of jobs toward higher-value activities

that are better connected to larger, more competitive domestic and external markets, and at the same time generates positive social spillovers that support inclusive development.

FUTURE CHALLENGES

Ensuring a development path that supports more, better, and inclusive jobs in Paraguay requires meeting four fundamental challenges: (i) continued rapid job creation that keeps pace with labor force growth; (ii) more diversified economic activities that enable job creation in a wide range of sectors and geographic locations, and across the skills spectrum to accommodate the diverse labor supply, especially higher-skilled workers; (iii) improved job quality, especially within existing informal jobs in agriculture and services, through higher productivity and earnings; and (iv) better access to jobs for workers with fewer opportunities or weaker attachment to the labor market, including women, youth, rural, and poor workers.

1. INTRODUCTION

JOBS FOR DEVELOPMENT

Jobs are central to economic development. Economies grow when more people work, when jobs become more productive, and when workers move to better jobs—e.g., from low-productivity farm work into jobs in the modern manufacturing or services sectors, or from remote rural areas to urban centers with greater specialization and more job opportunities. Similarly, living standards improve and poverty declines when individuals move from inactivity or unemployment into jobs, or when workers' labor income rises. Transformation that occurs at the level of the individual takes place through employment earnings that raise household living standards and welfare, contributing to social development. A jobs-centered development path that effectively connects vulnerable groups to jobs can have positive reinforcing effects on social cohesion, leading to a virtuous cycle of rising incomes, productivity, and inclusion (see the World Development Report on Jobs, World Bank 2012).

For Paraguay, achieving development objectives with respect to economic growth, diversification, competitiveness, and poverty reduction requires meeting specific goals for job creation, job quality—especially informal jobs[1]—and access to jobs. The country's recent strong economic performance and significant reductions in poverty are, in fact, explained by improvements in labor market outcomes. The aim of this report is to describe the types of employment transformations that enabled this to happen and the remaining challenges going forward. Characterizing labor outcomes requires characterizing jobs, but job attributes vary, playing different roles for different segments of the population and different sectors of the economy. A nuanced interpretation of job quality is therefore required.

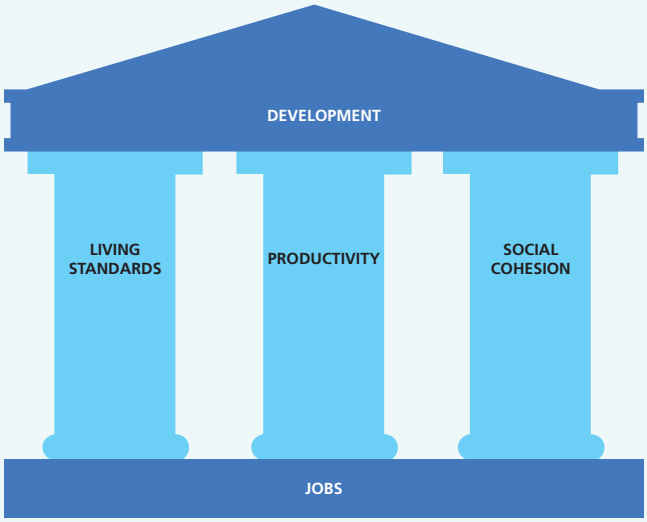
Good jobs for development are those that boost living standards, have higher levels of productivity, and enhance social cohesion through positive social externalities (box 1). Good jobs for development are also context-specific, and thus depend on country circumstances. In Paraguay, the types of jobs that can help achieve development objectives might include modern manufacturing jobs that employ semiskilled workers producing for large export markets or skilled service sector jobs that facilitate integration into global markets through better logistics, business services, and ICT, among other things. Skilled agriculture jobs that enhance Paraguay's competitiveness in the soy and cattle markets, where it is already a global player, would boost productivity and incomes, and help sustain export revenues and aggregate economic growth.

But Paraguay also needs better jobs for workers who lack the education and skills to access jobs at the high end of the productivity spectrum. For example, small-scale farmers and rural non-farm workers need enhanced income-earning opportunities such as through better-quality crops, through larger harvests or larger and healthier herds per unit of input, or through easier access to markets with more demand for their products or services. The large number of workers in the unskilled services sectors—many of whom are self-employed or work in microenterprises—earn low and unstable incomes from low-productivity work and have limited prospects for upgrading job quality.

Demographic pressures are feeding rising urbanization in Paraguay, yet cities are ill-equipped to absorb new arrivals into sustainable productive work. A key challenge for developing countries including

[1] Informal jobs are defined in this report to include (i) farmers, herders, and fishers (self-employed or employers of firms with no Registro Único de Contribuyente, or RUC); (ii) unpaid family workers; (iii) non-farmer self-employed, employee, or employer of firm with no RUC; and (iv) wage employees not contributing to Social Security. Formal jobs include (i) wage employees contributing to Social Security, (ii) employers of a registered firm (with a RUC), and (iii) self-employed workers with a registered firm (with a RUC).

BOX 1: JOBS ARE TRANSFORMATIONAL



Source: World Bank 2012

Paraguay is to harness the shift out of agriculture into more productive work—within cities, secondary towns, and rural regions—in a way that transforms the economy and the nature of jobs toward higher-value activities connected to larger, more competitive markets. Three types of transformation are needed to achieve lower poverty together with increased economic diversification and growth: creating more jobs, improving the quality of existing jobs, particularly informal jobs, and increasing access to jobs for vulnerable groups. Dynamic economies experience churning in the labor market, and in developing economies, this churning can take the form of job destruction in less productive activities, replaced by new, more productive jobs in other activities or sectors. But the process can be risky if the volume and types of jobs created are inadequate to absorb job seekers, especially in countries that are experiencing a youth bulge. The result can be a vicious cycle of high youth unemployment or underemployment, low productivity growth, low earnings, labor force exit or out-migration, and dissatisfaction, which undermines social cohesion and leads to low-level equilibria in output and labor markets.

This Jobs Diagnostic examines employment outcomes over the past 15 years so as to understand the degree to which economic growth translated into more jobs, better job quality, and more equal access to employment. The analysis utilizes household and labor force survey data to derive the characteristics of workers and the types of jobs they hold.[2] The report also estimates productivity trends, using macroeconomic data combined with the labor data to explore the links between jobs and growth across all economic sectors.

The analysis illustrates that structural transformation is underway, as rural workers shift into largely urban services sector employment. Productivity growth since 2008 has been robust and widely shared across service sectors (except retail) and construction, but these sectors still have relatively low productivity. In contrast, the more productive utilities and manufacturing sectors actually lost productivity. Since 2008, the private sector has added many formal jobs, double the number of informal jobs created. As a result, average wages and average job quality have improved markedly. In fact, both formal and informal workers benefited from strong wage growth, which improved welfare and reduced poverty. These trends suggest first, that growth was diversified

[2] The analysis in this report primarily relies on microdata from the annual household income survey, Encuesta Permanente de Hogares, for 2001 through 2015, carried out by the Dirección General de Estadísticas, Encuestas y Censos (DGEEC) under the Ministry of Planning. Reliable information on formality status is available only beginning in 2008, however; so for any analysis referring to work status, the period of study is 2008 to 2015. The second main data source, which is used to analyze between-period labor transitions, is the panel component of the labor force survey, Encuesta Continua de Empleo, for 2010 to 2014.

across economic sectors, particularly multiple services sectors, and second, that rising aggregate demand and rising incomes led to further demand for goods and services in sectors across the economy and to the creation of formal and informal jobs. The expanded working-age population resulting from rapid population growth provided an additional stimulus, as did the growing government sector.

Despite improved labor outcomes for many, employment remains dominated by informal jobs that are low-productivity, poorly paid, and relatively low skilled. On the one hand, the informal sector has generated jobs for most unskilled workers in the labor force and boosted aggregate demand and GDP growth. On the other hand, the continued dominance of informal employment raises questions about Paraguay's future growth path and the extent to which broad-based productivity gains can be sustained. Rising educational attainment is a positive indicator for skilled workers finding high productivity jobs, but the generally weak educational quality will ultimately undermine future returns to education. Moreover, a large share of tertiary graduates prefers to enter public service, reducing the stock of highly skilled workers available to spur productivity growth in the private sector. The youth bulge has heretofore helped economic performance; however, sustaining welfare gains and inclusive GDP growth going forward will require, among other things, increased diversification of production, including in more productive and/or export-oriented activities, and improved access to high-quality employment for a wider swath of the population.

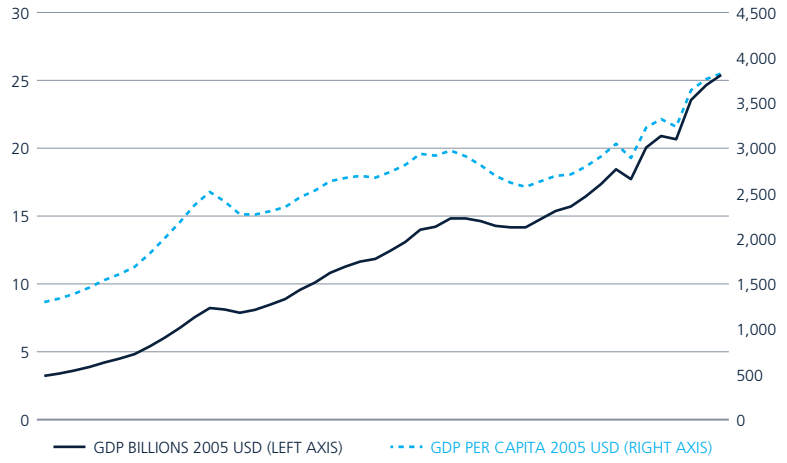
This Jobs Diagnostic is the first stage of a multipronged analytical program to address Paraguay's jobs challenges under the Let's Work partnership, a program financed by multiple donors led by the World Bank's Jobs Cross-Cutting Solutions Area. The program supports jobs diagnostics, sectoral analyses, and policy design using a multi-sectoral approach that brings together government, civil society, the private sector, and donors within a consultative framework. Subsequent work to be carried out under the program includes firm-level analysis to diagnose the challenges affecting labor demand by private employers, and a qualitative youth survey to deepen knowledge of the factors affecting education and labor supply decisions by young population cohorts. The findings of this Jobs Diagnostic will be combined with the findings of these subsequent assessments to inform policy design and priorities for a multi-sectoral jobs strategy to help Paraguayans reach their development potential through more, better, and inclusive jobs.

PARAGUAY'S DEVELOPMENT CONTEXT

Jobs challenges are closely tied to the realities of Paraguay's economic and sociodemographic structure and resources. This development context shapes the characteristics and potential role of jobs for realizing the country's economic and social development potential. Paraguay is a small, open, but landlocked economy. Its population of 7 million is dwarfed by those of neighboring Brazil and Argentina, and the country has abundant and rich land resources and a river system that provides hydroelectric power. Over the past 45 years, Paraguay's GDP grew almost eightfold; this development trajectory enabled GDP per capita to nearly triple in real terms since 1970, reaching US$3,825 in 2015 (upper-middle-income country status; figure 1). This strong economic growth was accompanied by significant improvements in living standards, although Paraguay's rate of improvement lagged that of some of its neighbors in the region (figure 2). During the last decade, Paraguay's continued strong economic performance resulted in annual average growth of nearly 5 percent, albeit with sizeable year-to-year fluctuations.

The structure of economic production is undergoing a profound transformation away from agriculture toward services and, to a lesser degree, industrial activities (figure 3). Nevertheless, agriculture continues to play a central role. It accounts for 20 percent of both employment and GDP, and is a significant source of export earnings. Paraguay is the fourth largest soybean exporter in the world and the ninth largest beef exporter. More than three quarters of all exports are food and agricultural products, and another 22 percent is energy from hydroelectric generation (figure 4). Commercial, capital-intensive agricultural production has boomed over the past 15 years, with total cultivated area more than doubling since the 1990s and pasture land increasing nearly 50 percent. In addition to expanded production, Paraguay's sustained export-driven growth partly reflects entry into new markets.

Figure 1
GDP and GDP per capita
(2005 USD)

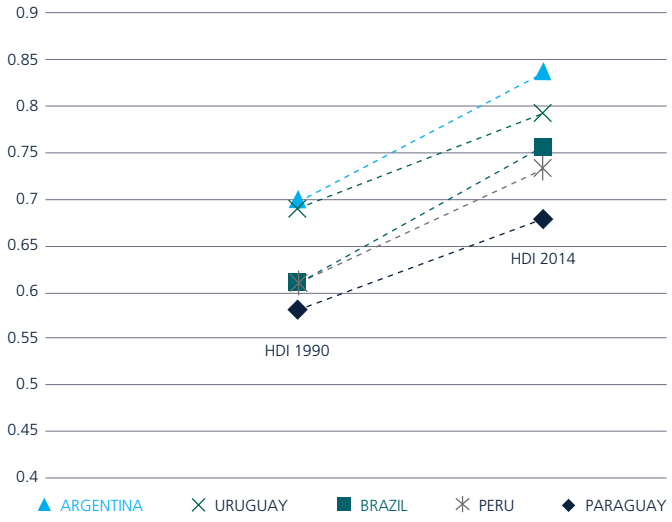


Source: World Bank, World Development Indicators (WDI).

Paraguay's trade is highly concentrated in relatively few products and markets. Paraguay trades primarily with its South American neighbors (MERCOSUR—Southern Cone Common Market—partners, and especially Brazil), but since 2008 it has increasingly exported to European markets and imported from East Asia (see annex A, figures A1 and A2). Paraguay's highly concentrated export basket and fairly narrow non-agriculture activities are consistent with a high level of imports (the country is a net importer). Even foodstuffs are imported, although the share has declined in recent years (from 15 to 7 percent). Concurrent with expanded exports, imports have also risen sharply, nearly tripling between 1995 and 2014. Machinery and electrical products account for the highest share of imports, much of which are capital inputs into agricultural production.

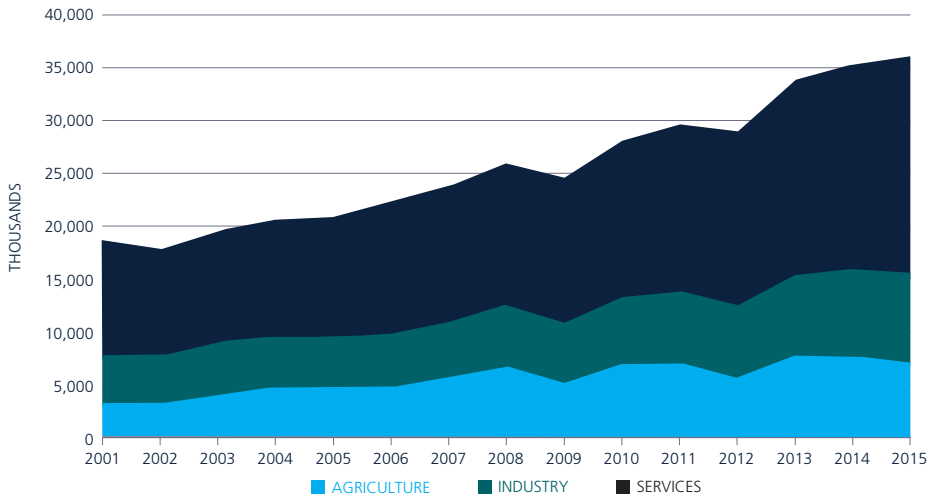
Paraguay's agriculture sector has a dual nature, and each segment plays a distinct role. The modern agriculture sector relies on technology-intensive production methods, is oriented toward commodity export markets, and employs a relatively small number of highly skilled workers. Traditional agriculture, by contrast,

Figure 2
Human Development Index, Paraguay and LAC comparators



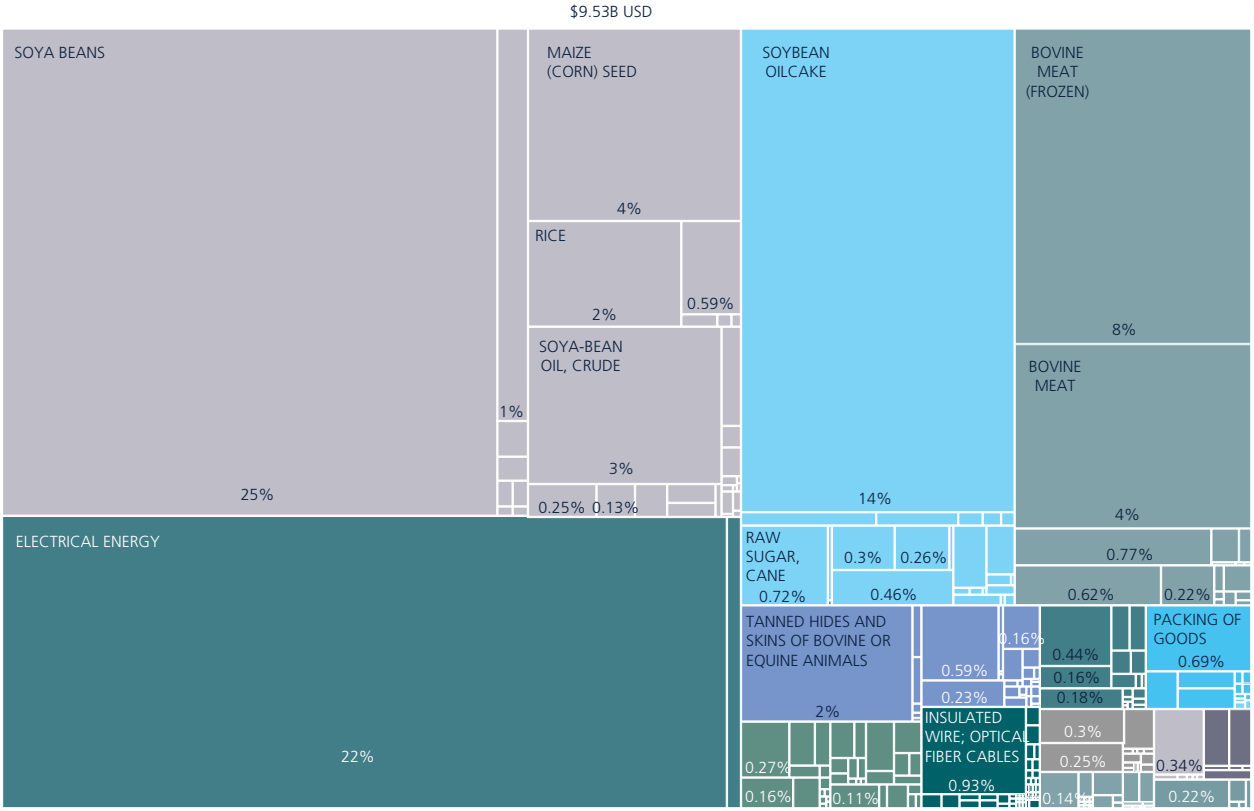
Source: UNDP, Human Development Index (HDI).

Figure 3
Sectoral value added shifts to services
(Thousands 2005 USD)



Source: World Bank, WDI.

Figure 4
Export basket, 2014

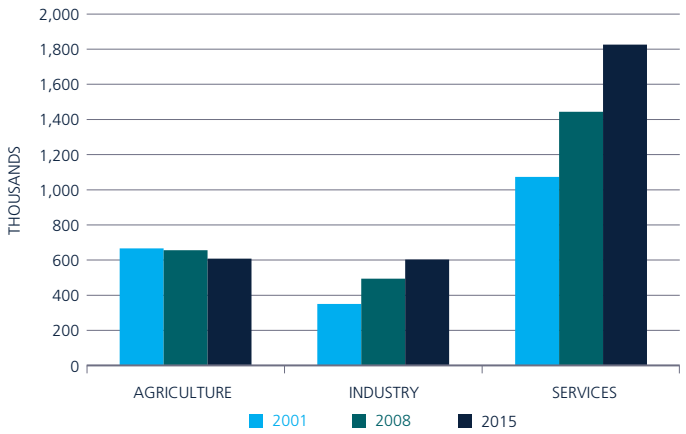


Source: Harvard University, *Atlas of Economic Complexity* (http://atlas.cid.harvard.edu).

accounts for nearly a fifth of total employment—mostly self-employed farmers or unpaid family workers—and is highly labor intensive. This segment tends to produce traditional products for auto-consumption or for local markets, and has very low productivity. The links between the modern and traditional agriculture sectors are minimal, as their relative contributions to growth and employment diverge. Neither engages in significant local transformation or value addition.

A nearly half-century of robust *economic* growth has translated into significant—albeit slower—*job* growth. With an employment-to-GDP elasticity of 0.58, close to the global norm, employment growth has averaged 2.8 percent per year over the past decade, faster than the very high rate of growth of the labor force. The sectoral distribution of job growth reveals a structural transformation away from agriculture employment toward mostly services sector jobs (figure 5), in accord with the shift in economic production. Employment in industry and services each expanded by over 70 percent between 2001 and 2015, absorbing most of the rapidly growing labor force.

Figure 5
Employment by sector, 2001, 2008, and 2015



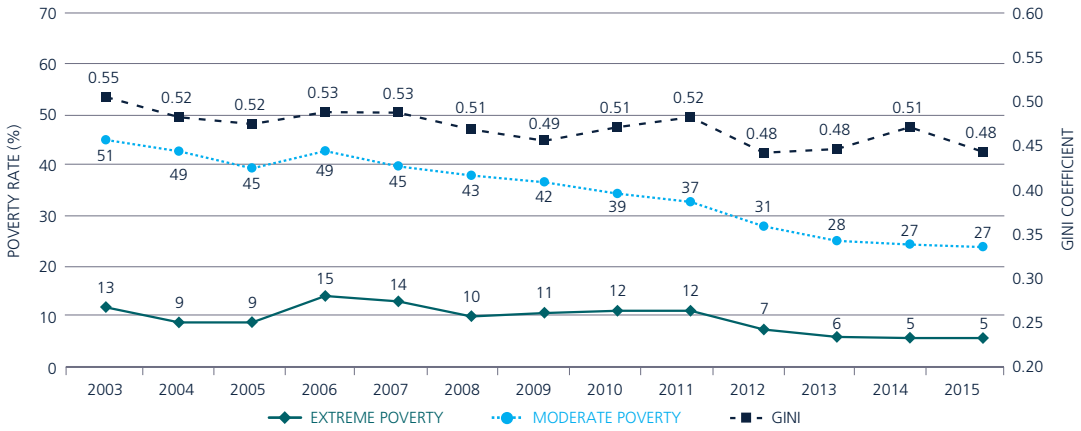
Source: Encuesta Permanente de Hogares data.

This strong job growth brought higher incomes, both in the aggregate and across sectors and population groups, which contributed to significant reductions in poverty and inequality. Extreme poverty fell from 13 percent in 2003 to 5 percent in 2015, and moderate poverty fell from 51 percent to 27 percent in the same period (figure 6). Real incomes of the bottom 40 percent increased steadily, and the Gini coefficient declined from 0.55 in 2003 to 0.48 in 2015, consistent with large reductions in inequality in the rest of Latin America (World Bank 2016a). Poverty reduction was primarily driven by increases in labor income, but non-labor income—for example, from pensions and from private and public transfers—has played an increasingly relevant role.

The prospects for continued strong, export-driven growth buoyed by the commodity price boom have faded, creating uncertainty for the future. Even the diversification of Paraguay's trading partners away from now-struggling Brazil and Argentina toward European markets and China will expose trade balances to increased pressure due to diminished demand for exports and a slowdown in FDI from these quarters (World Bank 2015).[3] The resulting decline in a key impetus of Paraguay's income growth—including through aggregate demand effects—raises questions about future labor market developments. Other commodity- or resource-based economies face similar challenges in generating enough good jobs to foster broad-based and

[3] Thirty percent of Paraguayan exports go to Brazil and 11 percent to Russia. The economic outlook for the European and Chinese economies is also subject to significant uncertainty.

Figure 6
Poverty and inequality trends



Note: Based on updated official poverty lines introduced by DGEEC in 2017.
Source: Encuesta Permanente de Hogares, DGEEC.

inclusive growth.[4] The structural challenges facing Paraguay highlight the need for careful analysis of recent employment and productivity outcomes across sectors and income groups, in order to understand the challenges and opportunities for sustainable growth and inclusive job creation going forward.

The remainder of this report is organized as follows. Chapter II examines demographic trends, labor productivity, and job creation in the aggregate and across sectors, and assesses their impact on job quality. Chapter III documents gaps in access to better jobs and analyzes the micro-determinants of employment outcomes and wages. It uses panel data to examine worker transitions between jobs and the factors linked to transitions into formality. The final chapter summarizes the main findings, identifies key remaining knowledge gaps, and describes next steps under the Let's Work Paraguay program to fill these gaps.

[4] In Indonesia, the commodity boom actually reversed the country's industrialization trend, and the concurrent depreciation of the exchange rate made exports less competitive. This coincided with a shift in employment from manufacturing to relatively low-productivity, largely informal service, retail and construction jobs (World Bank 2016b). In Côte d'Ivoire, informality rates and especially self-employment in household enterprises are very high, as workers unable to access formal work set up their own income-generating activities. But these typically have very low productivity and low earnings, and ultimately constrain aggregate productivity growth through low investment due to low potential returns (World Bank 2016c).

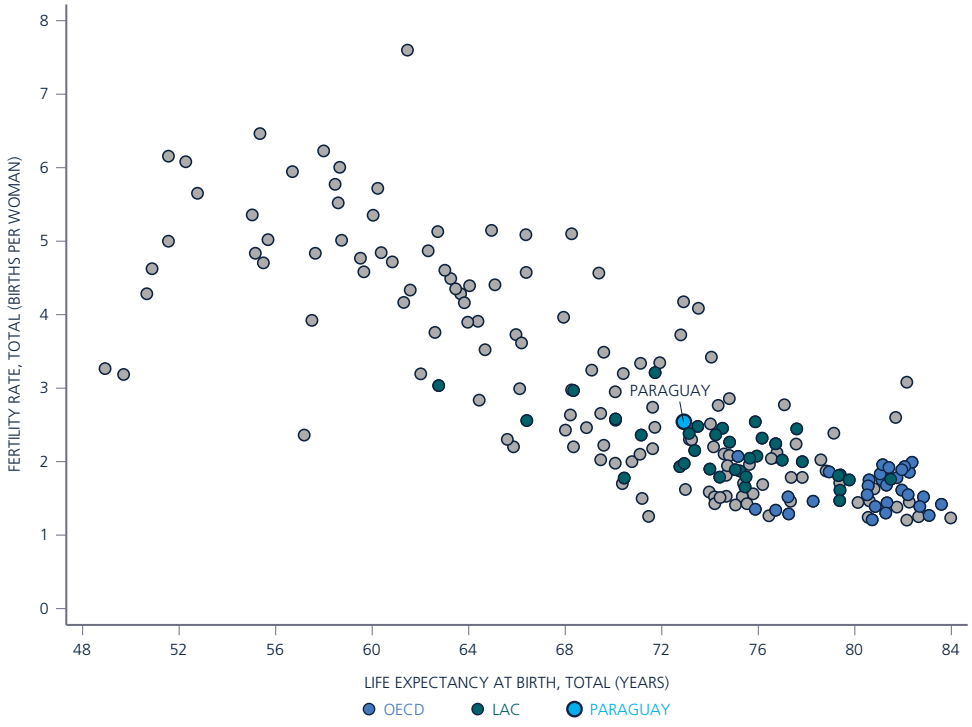
2. DEMOGRAPHICS, JOB CREATION, AND LABOR PRODUCTIVITY

This chapter begins by describing the demographic transition in Paraguay and how it will influence the evolution of the working-age population and the labor force. The analysis then looks at aggregate job creation and discusses how it affected per capita output and labor productivity growth, and the distribution of these productivity gains across sectors. This is followed by an analysis of sectoral and regional employment trends, and their resulting impact on job quality.

DEMOGRAPHIC PRESSURES ON THE LABOR MARKET

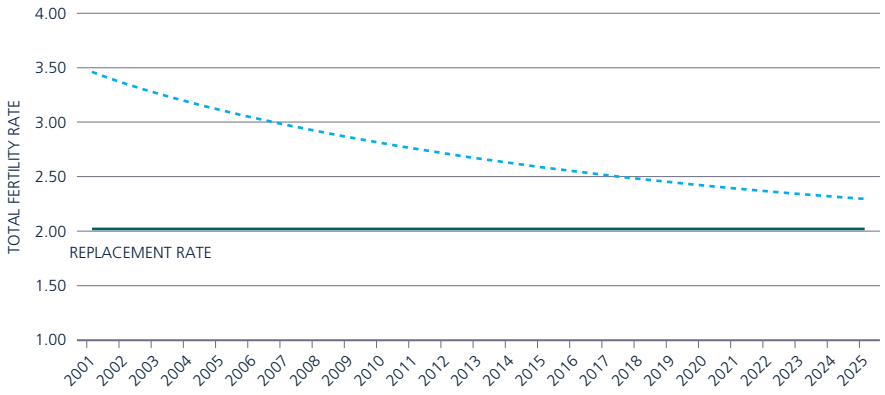
Paraguay's population age structure is changing, driven by two offsetting demographic factors: declining fertility rates and rising life expectancy. During the last century, countries around the world experienced significant improvements in both, which increased the shares of prime-age and elderly populations. This demographic phenomenon is more advanced in OECD countries and in the rest of Latin America, but Paraguay is in the midst of both transitions (figures 7 and 8).

Figure 7
Fertility rates and life expectancy, international comparison, 2014



Source: World Bank, WDI.

Figure 8
Paraguay's Declining fertility, 2001–25



Source: DGEEC.

As a result of this demographic shift, the dependency ratio also fell, creating the potential for a demographic dividend (annex A, figure A3). In Paraguay, the share of the working-age population increased from 63 percent in 2002 to 69 percent in 2015, and is projected to reach 73 percent by 2025; it is, however, expected to slow after 2030 (figure 9). In order to reap the full benefit of this surge in the share of the working-age population, however, labor demand must increase sufficiently to absorb the new labor force entrants into productive jobs.

A disproportionate share of the recent population growth was in urban areas, particularly in greater Asunción, and this trend is projected to continue over the next 15 years (figures 10 and 11). The share of the urban population in total population rose from 55 percent in 2002 to 60 percent in 2014, and is expected to surpass 64 percent by 2025.

Labor force participation rates for men in Paraguay are already high by international standards and might not provide much additional scope for future labor force growth. In 2015, 69 percent of the working-age population were economically active, as compared with the Latin America average of 65 percent. Eighty-three percent of men aged 15 and older participated in the labor market, compared with only 56 percent of women (figure 12).[5]

As a result of these demographic forces and assuming constant participation rates, the Paraguayan labor force is projected to add 970,000 workers between 2015 and 2030, equivalent to an annual growth rate of 1.8 percent. This will require the creation of 65,000 new jobs every year to absorb the added workers and avoid higher unemployment.

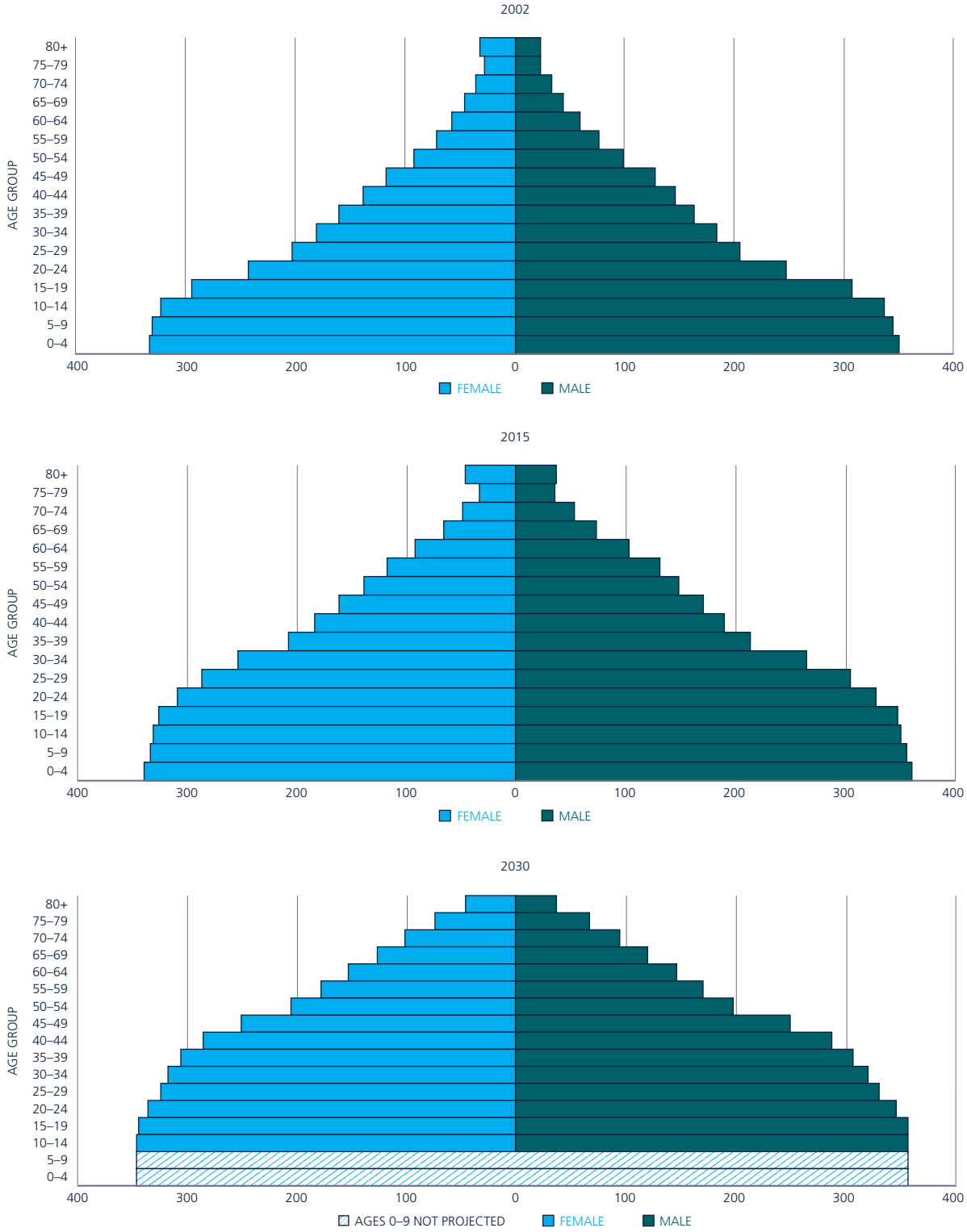
JOB CREATION AND LABOR PRODUCTIVITY DURING THE PAST 15 YEARS

As more people (with fewer dependents) work, incomes typically rise, and as workers become more productive, average incomes increase and countries grow faster. Workers can become more productive by getting better at what they do, producing higher-quality products or services due to better inputs or production technologies, and/or moving from lower- to higher-productivity jobs. The analysis that follows looks at the degree to which the Paraguayan economy has been able to create enough jobs to keep pace with labor force growth and the role that productivity increases and demographic factors played in this economic performance.[6]

[5] According to the WDI, in 2014 the global average labor force participation rate for men was 74 percent and for women was 53 percent.

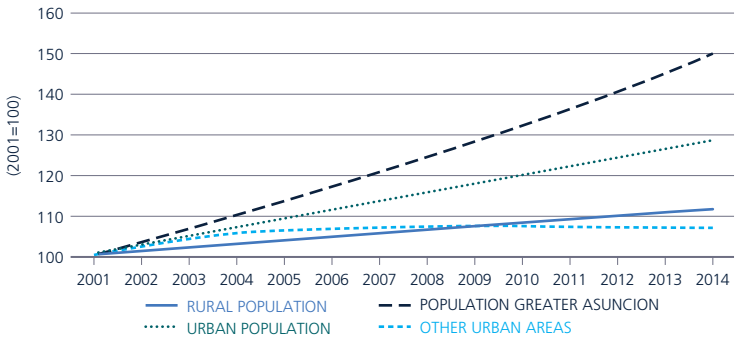
[6] The analysis in this section uses the Jobs Structure tool for the period 2001–15. This tool, developed by the World Bank Group's Jobs Cross-Cutting Solutions Area, decomposes income per capita growth into (i) changes in the size of the working-age population, (ii) changes in participation rates, (iii) changes in employment rates, (iv) changes in average labor productivity resulting from within-sector changes in labor productivity, and (v) changes in average labor productivity resulting from the movement of workers between more and less productive economic sectors. Three main sources of data are used in the analysis: national accounts data on value added by sector, demographic data, and household-level data on employment by sector (see annex B, table B1).

Figure 9
Population pyramids for Paraguay: 2002, 2015, 2030



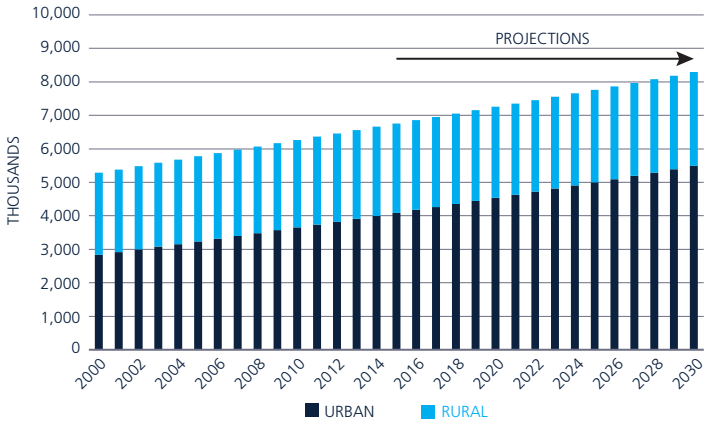
Sources: DGEEC; projection for 2030 based on 2025 DGEEC projections and staff estimates.

Figure 10
Population growth by region, 2001–14 (indexed to 2001)



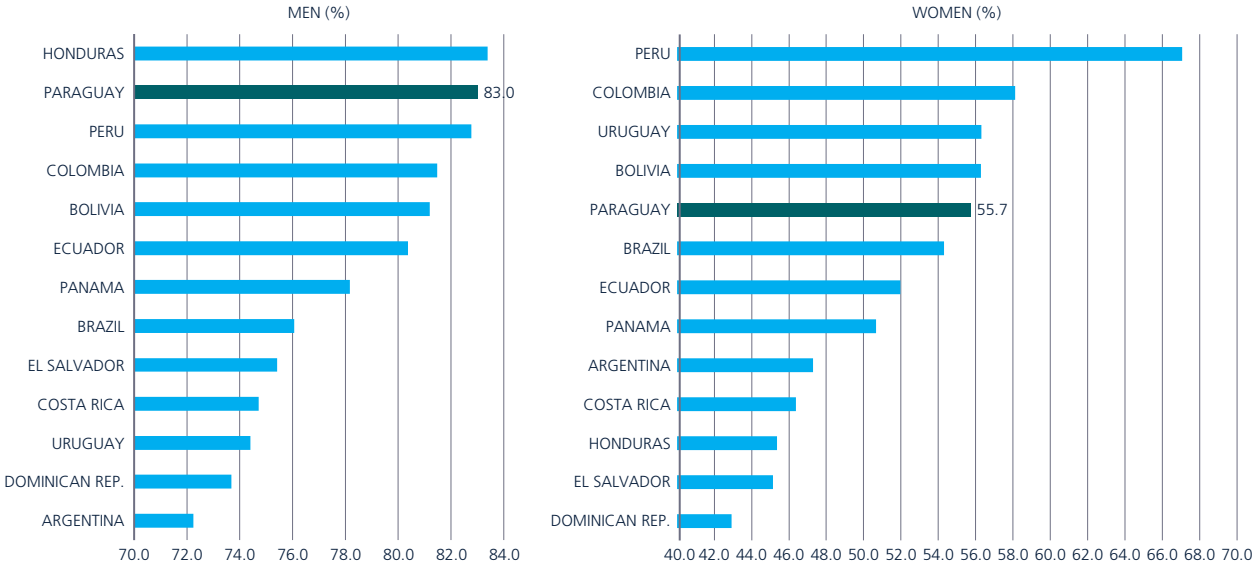
Source: DGEEC.

Figure 11
Urban versus rural population, 2000–30



Source: DGEEC.

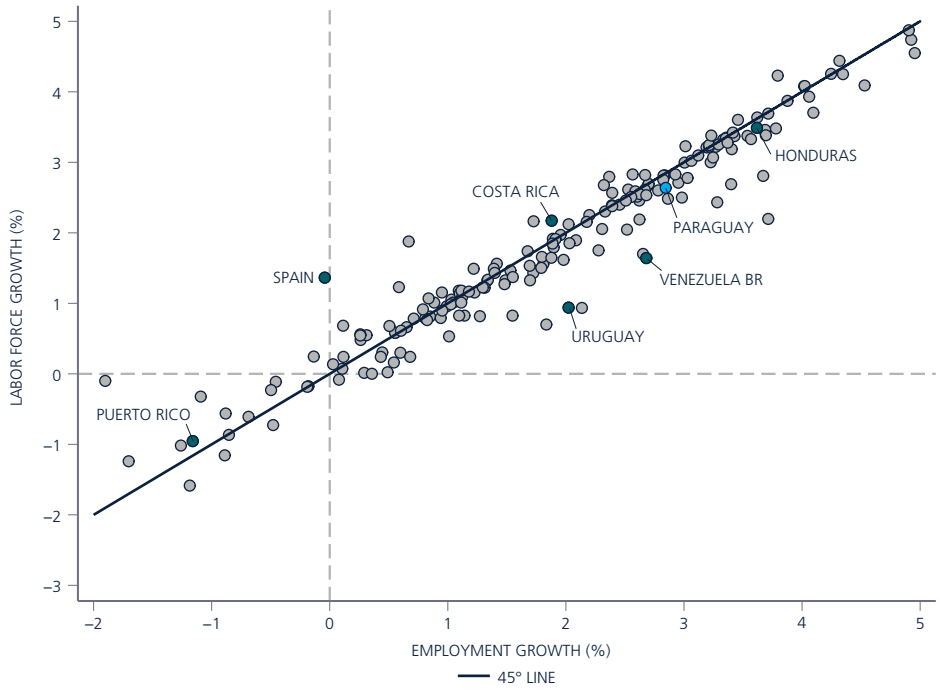
Figure 12
Labor force participation rates, LAC Region, 2015



Sources: SEDLAC, Encuesta Permanente de Hogares.

Employment has been growing at just above the rate of labor force growth over the last decade, despite the rapid labor force expansion. Annual labor force and employment growth averaged 2.6 and 2.8 percent respectively during 2004–2014, much higher than the projected future labor force growth. Paraguay's historical pace compares with job creation rates of 2.6 percent in Argentina, 1.7 percent in Brazil, 2.3 percent in Colombia, 3.6 percent in Honduras, and 2 percent in Uruguay during the same period (figure 13).

Figure 13
Employment and labor force growth across countries, 2004–14



Source: Based on ILO estimates.

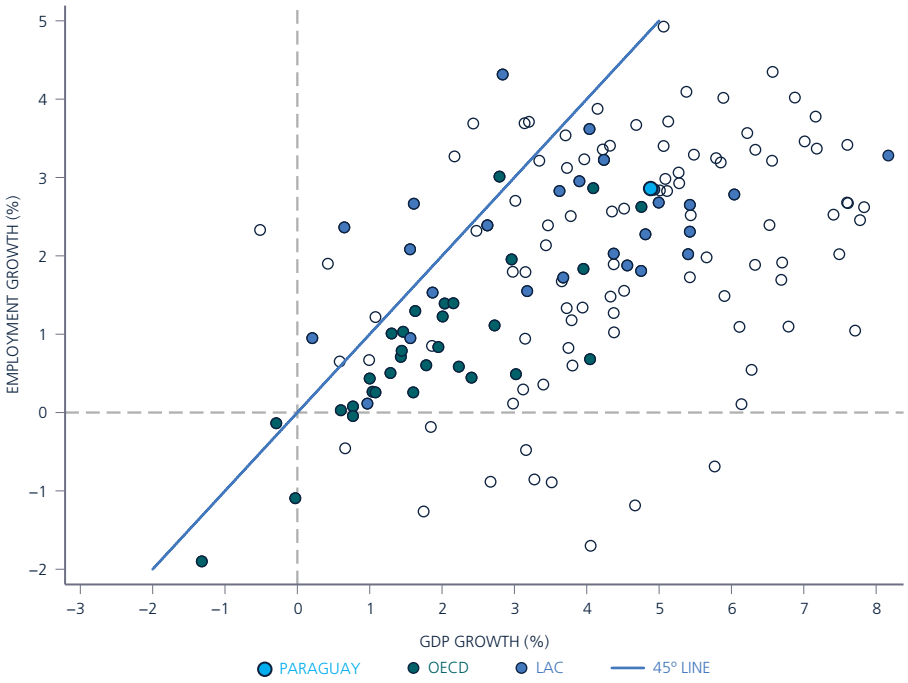
Paraguay's economy has created fewer jobs for a given level of economic growth than other countries in the region, however. The last decade saw average economic growth of 5 percent per year, nearly double the rate of employment growth. In effect, each percentage point increase in GDP was associated with a 0.58 percent increase in employment—an "employment-growth elasticity" that is below the average of Latin America (1.04) but in line with global norms (figure 14). This lower elasticity implies fewer jobs for a given level of economic growth, though it also means higher labor productivity growth.

Paraguay experienced very strong growth in per capita output over the past decade and a half, averaging 3.1 percent annually.[7] This was driven primarily by strong growth in labor productivity[8]—which contributed 2.1 percentage points—but was significantly helped by the boost in the working-age population—responsible for another 0.9 percentage points (figure 15). The increase in the employment rate also made a modest positive contribution to output growth, while changes in the labor force participation rate had little net impact on output.

[7] For detailed results from the Jobs Structure Tool, see annex B, table B1.

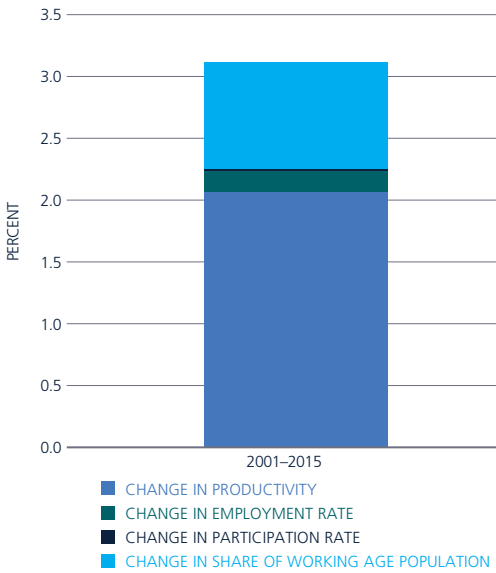
[8] Labor productivity is measured by value added per worker. Using this broad measure as a proxy for productivity, it is not possible to differentiate between price effects and output effects. For example, agricultural productivity may be high when market prices of agriculture products are high. Similarly, productivity in the government sector may be high as a result of high government wages, independent of the level of output produced by government employees.

Figure 14
Employment growth and GDP growth across countries, 2004–14



Sources: Based on WDI and ILO estimates.

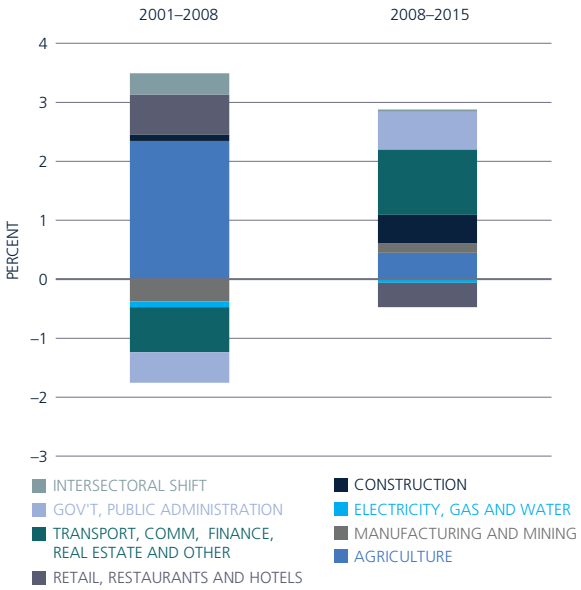
Figure 15
Decomposition of growth in per capita output, 2001–15



Source: Staff calculations.

Decomposing by sector, agriculture[9] led in productivity growth in the first part of the past decade, but other sectors subsequently gained steam, leading to more widely shared productivity gains (figure 16). During the 2001-2008 subperiod, agricultural output posted strong growth—driven by the modern agriculture subsector—at the same time that agricultural employment stagnated—primarily in the traditional agriculture subsector—together resulting in annual productivity growth of 2.4 percent. The other main performing sector during this earlier subperiod was retail, restaurants, and hotels[10] (0.7 percent annual productivity growth). Between 2008 and 2015, productivity growth was more evenly distributed across sectors: transport, communications, finance, real estate, and other services had the strongest productivity growth at 1.1 percent per year, followed by government services (0.6 percent annual productivity growth[11]), construction (0.5 percent), and agriculture (0.4 percent). Very small productivity increases stemmed from structural employment shifts associated with workers moving into higher-productivity sectors; this effect explains less than 0.1 percentage points of annual productivity growth.

Figure 16
Labor productivity growth, within sectors and between-sector shifts, 2001–08 and 2008–15



Source: Staff calculations.

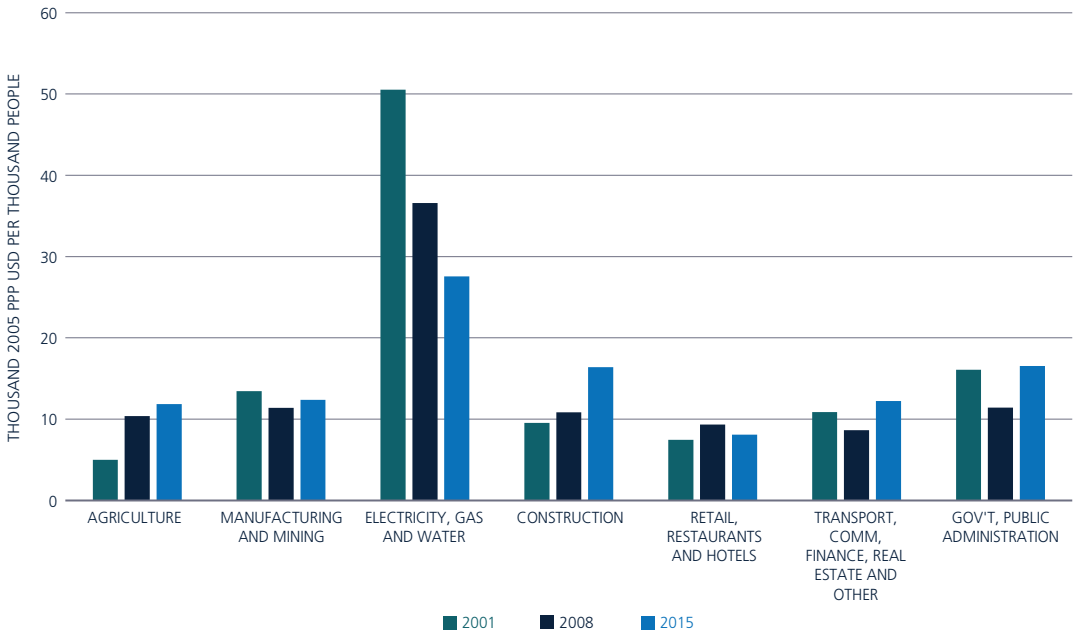
The average level of labor productivity in agriculture is very low, despite recent gains that nearly caught up to the levels in manufacturing and in transport, communications, finance, real estate and other services, and surpassed the level in retail (figure 17). In fact, value added per worker in agriculture doubled between 2001 and 2008, and continued to grow modestly thereafter. Construction also experienced robust productivity gains, overtaking the transport, communications, finance, real estate and other services sector by 2008, and passing most remaining sectors by 2015, with the exception of utilities and the government sector. These productivity gains are surprising, given the concurrent increase in employment in service sector jobs (recall figure 5).

[9] Note that the dual nature of agriculture means that measures of sector productivity represent an average of the traditional and the modern subsectors. Data limitations preclude disaggregating production by subsector.

[10] Referred to as the "retail sector" henceforth.

[11] This is largely explained by recent wage increases in the government sector.

Figure 17
Value added per worker by sector, 2001, 2008, 2015



Source: Encuesta Permanente de Hogares data.

Within sectors, labor productivity growth emerged from different quarters, some driven by dynamism in the informal sector, some by gains in the formal sector. And some productivity gains resulted from the reallocation of workers toward more productive jobs, either from less to more productive sectors, or from informal work into formal work. Comparing the productivity implications of job churning in the informal and formal sectors during 2008–2015, the period for which data on formality status are available,[12] shows that many more formal jobs were created (in net terms) than informal jobs—by a ratio of 2:1. At the same time, the formal sector saw large productivity gains, particularly within the government sector and in transport, communications, finance, real estate and other services (figure 18, left panel). There was also a positive productivity effect from workers reallocating to formal jobs in retail; transport, communications, finance, real estate and other services; manufacturing; and agriculture (the hyphenated line in figure 18). In the informal sector, the largest productivity increases were observed within construction and transport, communications, finance, real estate and other services, and to a lesser extent in manufacturing. These were offset by significant productivity losses in informal retail, the largest non-farming employer of unskilled workers.

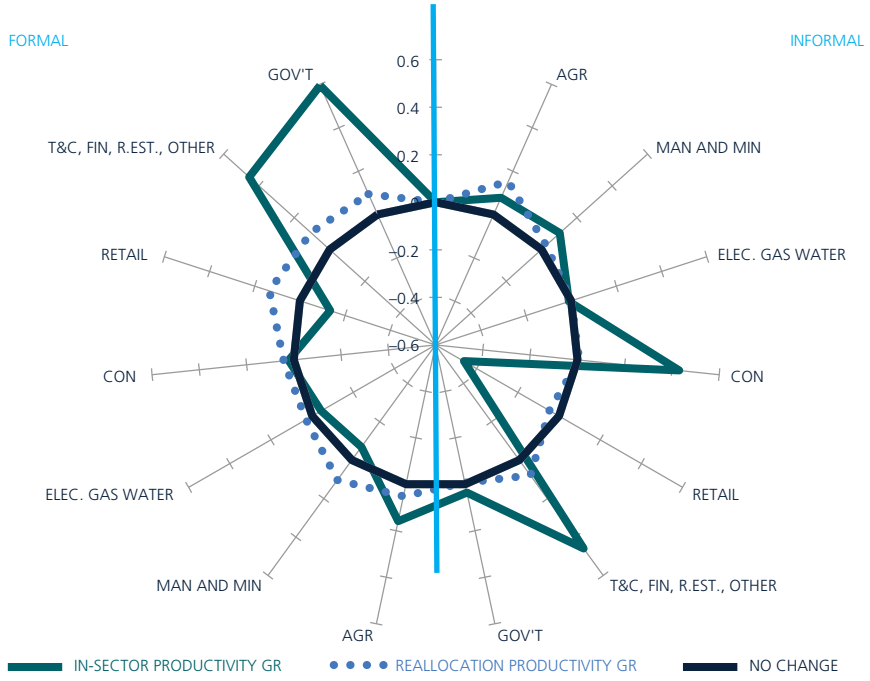
SECTORAL AND REGIONAL EMPLOYMENT TRENDS

New job creation resulted in a significant rise in the share of formal employment, from 22 percent of total employment to 29 percent, in under seven years. Between 2008 and 2015, over 300,000 new formal jobs were created (in net terms), as compared with nearly 144,000 new informal jobs (figure 19a).[13] The private sector added nearly 155,000 formal jobs, a 63 percent increase, and the public sector added 84,000 formal jobs, a 48 percent increase (figure 19b).

[12] The questionnaire for the Encuesta Permanente de Hogares was amended in 2007 to collect data on pension contributions and firm registration (RUC), among other things, but the 2007 data suggest spotty coverage for these new questions. Therefore, the formality-related variables are used here beginning in 2008.

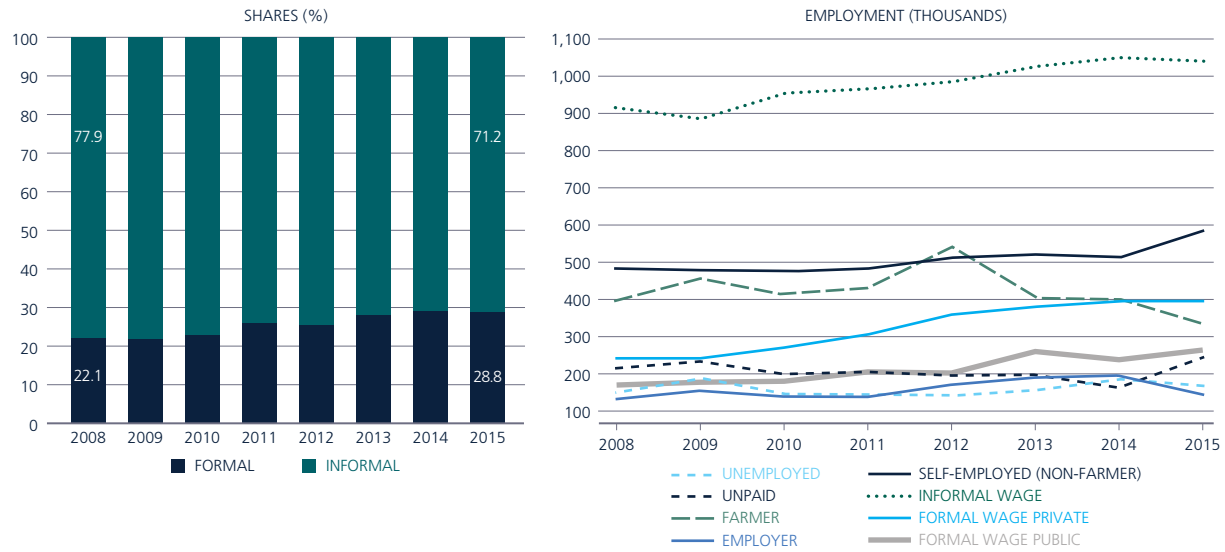
[13] Note that alternative definitions of informality would generate different magnitudes. For example, using the productivity-based definition employed by SEDLAC in which all employers, workers in firms with more than five employees, public sector workers, and self-employed workers with a tertiary degree are deemed to be formal, Paraguay's informality rate is a more modest 58 percent.

Figure 18
Productivity change decomposed by formality and sector, 2008–15 (percent)



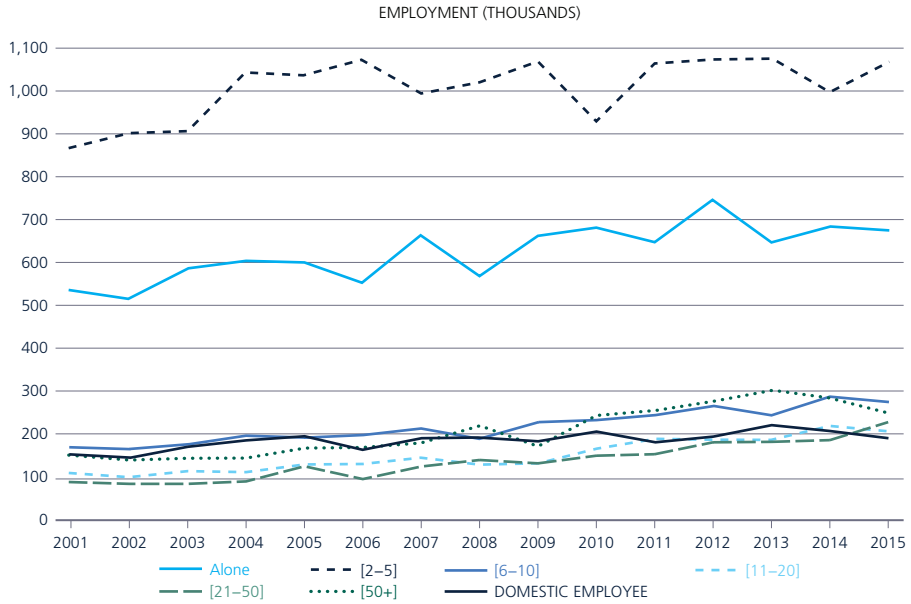
Note: Retail indicates wholesale and retail trade, and restaurants and hotels.
Source: Staff calculations.

Figure 19
Growth in formality of employment, 2008–15



Source: Based on Encuesta Permanente de Hogares data.

Figure 20
Employment by size of firm, 2001–15



Source: Encuesta Permanente de Hogares data.

Microenterprises dominate the landscape of economic activity, but large and very large formal firms added the majority of jobs. Microenterprises—those with fewer than six employees, mostly informal—employ over half of all workers (including self-employment) (figure 20). Large and very large formal firms—those with 20–49 and 50+ workers, respectively[14]—account for only a sixth of total employment.

Between 2008 and 2015, the distribution of informal jobs and formal jobs shifted toward the latter. A seven percentage point reduction in the share of informal jobs in the subperiod was accompanied by a significant increase in formal jobs in retail, government, manufacturing, and finance and real estate (net flows) (table 1). Even in the agriculture sector, 3,600 formal jobs were added on net between 2008 and 2015, while 51,000 informal jobs were lost. In retail, a low-productivity sector dominated by informal jobs, nearly half of the added jobs were formal. The manufacturing sector added three times more formal than informal jobs. And although most informal job creation was in the retail sector, 35,000 informal construction jobs were also added, with average productivity two-thirds higher than the average informal agriculture job. Although these recent trends suggest a degree of sectoral diversification, most jobs are still found in agriculture, retail, and other services (figure 21), three sectors with the lowest productivity (figure 22) and the lowest wages (figure 23).

The geographical distribution of job growth has been uneven, skewed to urban formal jobs (figure 24). Rural employment (four-fifths of which is informal) has grown steadily since 2001, but urban employment (three-fifths of it informal) grew much faster, adding 709,000 jobs between 2001 and 2015, three times the number of new rural jobs. And of the 330,000 urban jobs added since 2008, about four-fifths were formal. This shift was accompanied by an increasing urbanization of aggregate employment, overwhelmingly toward Greater Asunción, principally in the Central region (figure 25).

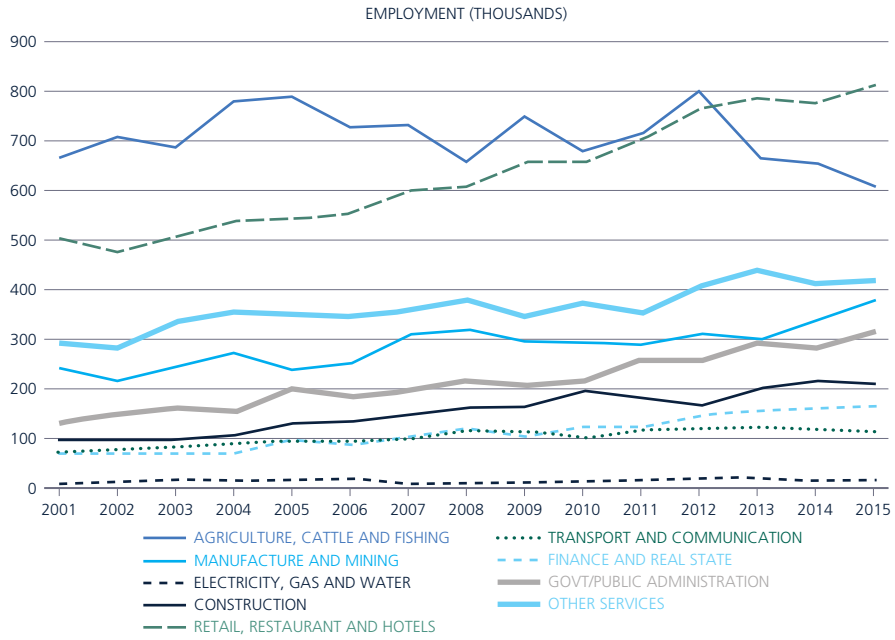
[14] Note that these firm-size classifications differ from the standard thresholds but provide more insight in the Paraguayan context.

Table 1
Change in employment by sector, formal and informal, 2008–15

Sector	Type of job	Number	Share in total change (%)
Agriculture, cattle, and fishing	Formal	3,606	1%
	Informal	–51,231	–12%
Manufacture and mining	Formal	42,414	10%
	Informal	13,065	3%
Electricity, gas, and water	Formal	4,007	1%
	Informal	2,179	0%
Construction	Formal	12,727	3%
	Informal	34,742	8%
Retail, restaurants, and hotels	Formal	94,214	21%
	Informal	104,822	24%
Transport and communications	Formal	9,012	2%
	Informal	–9,909	–2%
Finance and real estate	Formal	30,649	7%
	Informal	12,938	3%
Government and public administration[a]	Formal	84,039	19%
	Informal	15,154	3%
Other services	Formal	19,607	4%
	Informal	21,962	5%
Total net job creation	Formal	300,275	68%
	Informal	143,722	32%

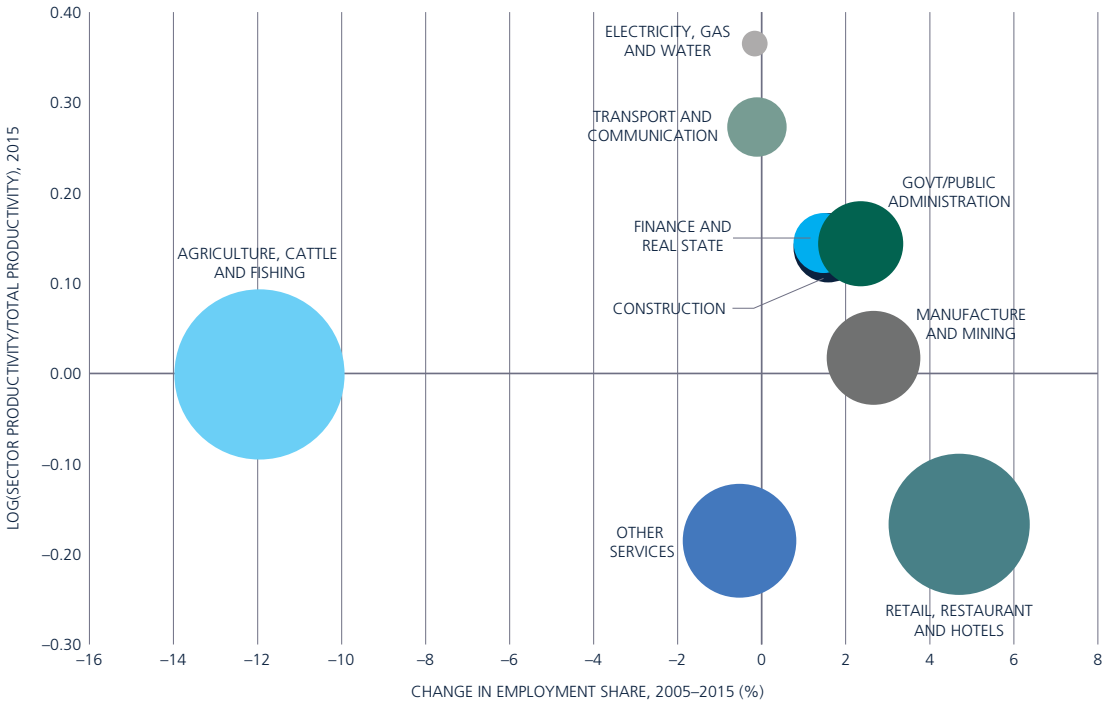
a. The sector is self-reported in the household survey, and data on government employment differ from the public administration records. Informal workers in government are mostly full-time, fixed-term contractors, concentrated in more skilled occupational categories (e.g.. scientists, technicians, clerks) as well as in manual labor.
Source: Based on Encuesta Permanente de Hogares. 2008–2015.

Figure 21
Sectoral breakdown of employment, 2001–15



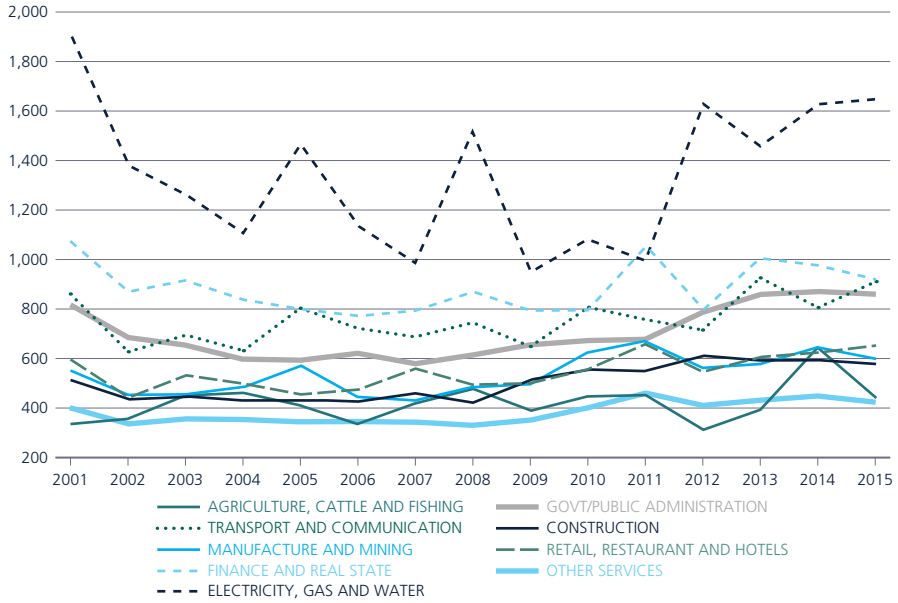
Source: Encuesta Permanente de Hogares data.

Figure 22
Change in employment across more and less productive sectors, 2005–15



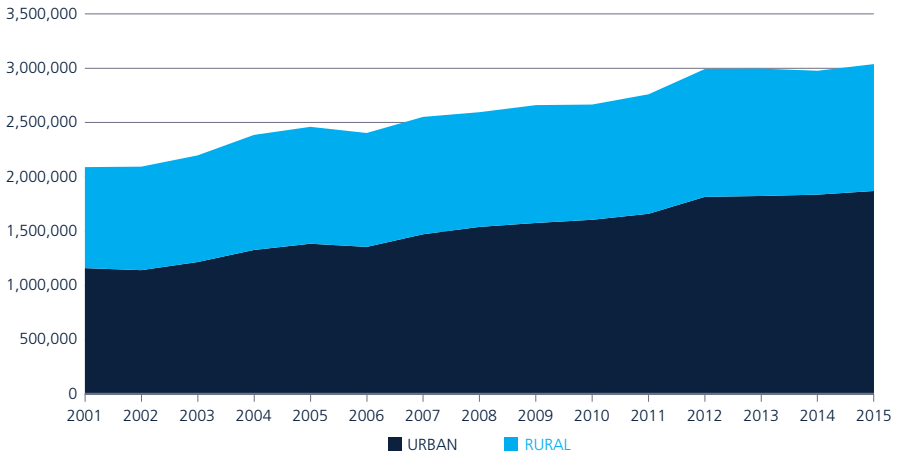
Note: Circle size is proportionate to employment share in 2005.
Sources: Based on data from SEDLAC, Banco Central de Paraguay, and Encuesta Permanente de Hogares.

Figure 23
Wages by sector, 2001–15
(monthly wage from main occupation, 2005 USD PPP)



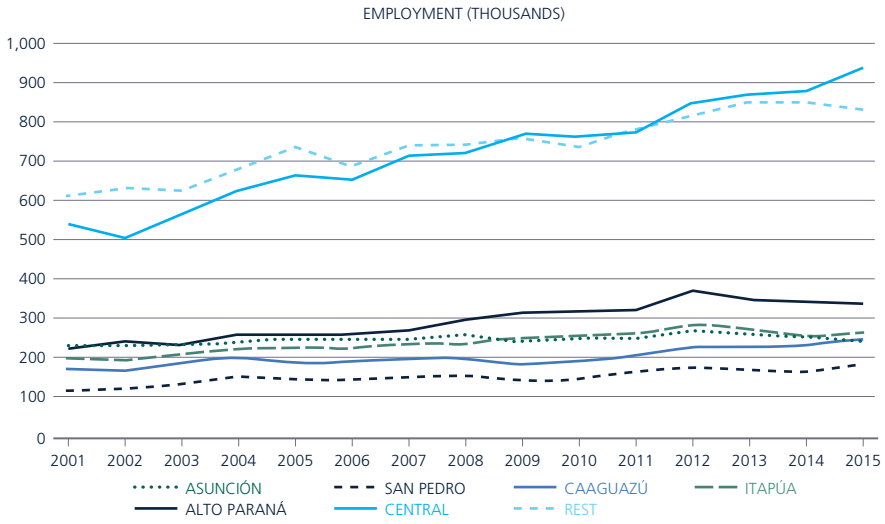
Note: Monthly income in 2005 USD PPP = Income from main occupation * (CPI 2005 / CPI observation year) / PPP Index 2005.
Source: Based on Encuesta Permanente de Hogares data.

Figure 24
Urban and rural employment, 2001–15



Source: Encuesta Permanente de Hogares data.

Figure 25
Employment breakdown by region, 2001–15



Source: Encuesta Permanente de Hogares data.

These sectoral job growth trends and the concurrent contraction in the informal share of employment boosted average labor productivity, as formal jobs are more productive than informal ones (the reallocation effect mentioned above). This productivity growth was diversified across sectors, and reflects different productivity–employment combinations as indicated by the dispersed data points in figure 22, likely the result of different factors in different sectors. In some sectors, productivity growth was jobless, while in other sectors productivity growth was accompanied by strong job growth. Some sectors actually lost productivity.[15]

- In transport and communications, productivity growth was relatively jobless. This suggests either that increases in efficiency, technology, and quality were the result of capital inputs rather than additional labor or that less productive labor was replaced by more productive labor, as seems to be the case (recall from table 1 that informal jobs were eliminated while formal jobs were added).
- Productivity gains in agriculture were also relatively jobless, and most likely stemmed from a combination of price and output effects for large producers,[16] the addition of formal jobs at the more productive end, and a contraction in the number of small farmers.
- In construction and finance and real estate, productivity gains were accompanied by robust job growth, implying that output gains were so large that they more than absorbed the added labor—even the large influx into construction by less productive informal labor.
- Manufacturing productivity gains were mixed, reflecting modest productivity gains within informal manufacturing, but productivity losses in the formal sector concurrent with strong formal job creation.
- In the government sector, the concurrent increases in productivity and employment were driven by especially high wage growth.

[15] Recall that the proxy used for labor productivity—value added per worker—may not fully reflect firm productivity, but without firm-level data on production inputs and outputs, it is not possible to gain insight into the demand-side factors affecting sectoral productivity performance. This type of firm-level analysis is planned under the Let's Work Paraguay program.

[16] The beneficiaries of commodity price-driven productivity gains were primarily the large producers. Note that although real agriculture wages grew by 5 percent annually between 2008 and 2014, they fell in 2015, pulling the period average down to –1.1 percent annual growth for 2008–15 (geometric average). Self-employed farmers' wages grew by 8.4 percent annually during 2001–08, but fell by 5.2 percent per year during 2008–15, pulled down by a nearly 22 percent wage drop in 2015.

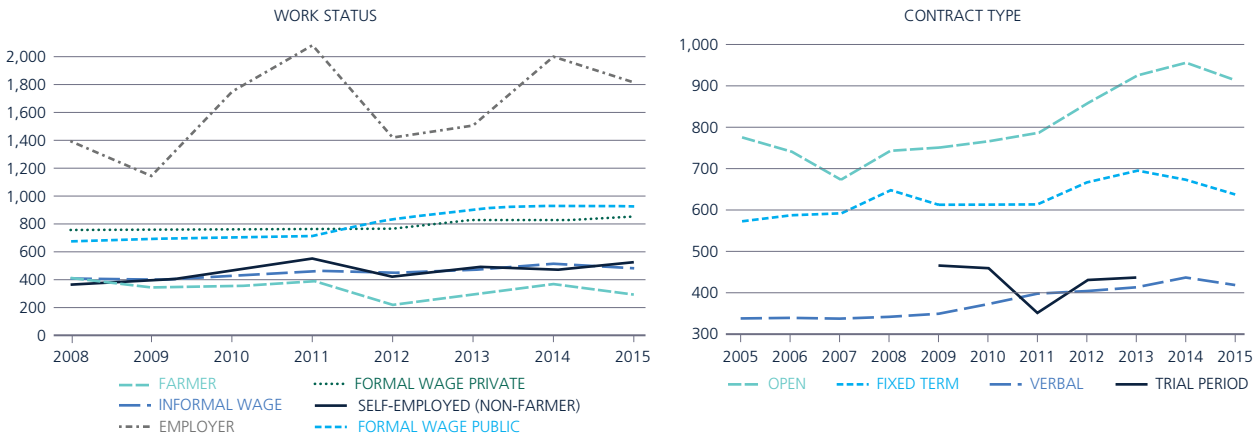
- The retail sector—already one of the least productive sectors and the largest employer (accounting for over a quarter of aggregate employment in 2015)—actually lost productivity while adding 270,000 jobs over the last decade. The fact that half of the jobs added since 2008 were formal did not sufficiently boost productivity to generate a net positive effect across the sector. The role of the retail sector in absorbing unskilled self-employed and informal wage employees is not unique to Paraguay; on the contrary, it is common in countries across the development spectrum.

IMPACT ON JOB QUALITY

How has job quality evolved in recent years, and has that evolution been good for Paraguay's development? Answering this question requires defining criteria for measuring job quality in the development context; these span a range from productivity and skill level (important from the growth and competitiveness perspectives), to wages, benefits, access to social insurance, contract duration, working conditions, and required effort (all important from the worker's welfare perspective), to inclusiveness of vulnerable groups (key to building social cohesion). Some of these desirable criteria are present in formal jobs. By definition, a formal job is in a registered firm and the worker is covered by social insurance (an important non-wage benefit providing income security before and after retirement) as well as labor laws governing (i) workers' rights (such as minimum wage, severance entitlement, voice or representation when negotiating with management), and (ii) working conditions (e.g., occupational safety, limits on working hours, holidays). However, since a majority of Paraguayans cannot access formal employment, it is important to consider quality criteria that are relevant for informal jobs as well. To capture these various aspects, wages are therefore analyzed by work status and sector and their evolution over time.

Formal sector jobs, on average, are more productive and pay significantly higher net wages than those earned by farmers and the self-employed, which tend to be low and irregular (figure 26a). Formal employees also tend to have more education than informal workers and therefore are more likely to engage in skilled work. For example, private sector wage employees in a formal job had an average of 12 years of education in 2015, compared with nearly 9 years for the self-employed and only 5 years for the average farmer. The education effect is even greater in the public sector, where workers on average have 14.7 years of education, equivalent to the tertiary level.[17]

Figure 26
Wages by work status and contract type, 2008–15
(monthly wage from main occupation, 2005 USD PPP)



Source: Based on Encuesta Permanente de Hogares data.

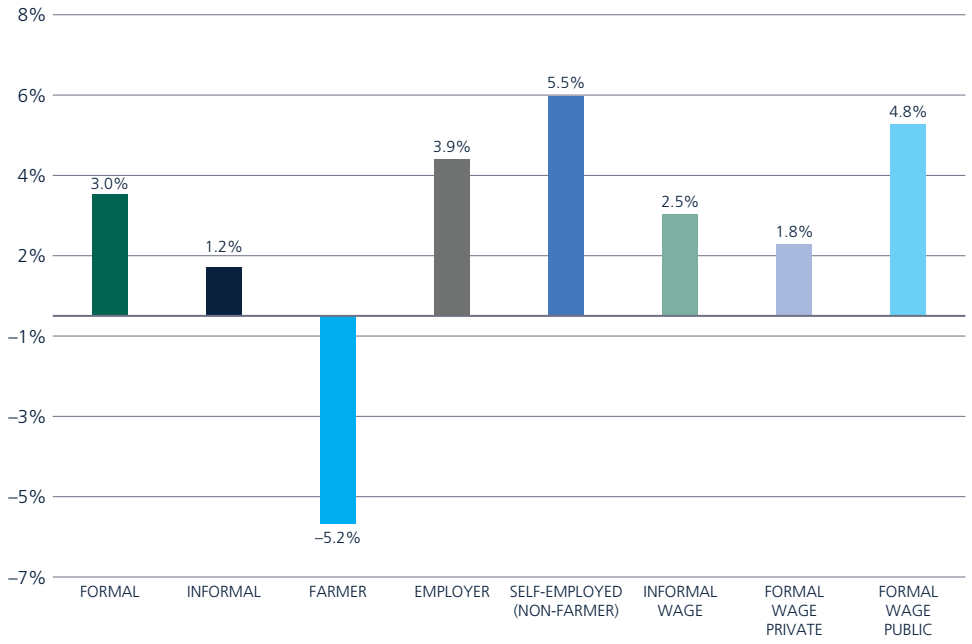
[17] Sixteen years of education typically translates into a complete tertiary degree.

[18] All wages in the analysis are net of social security contributions and taxes, and as such are comparable across formality status.

Most formal workers have open-ended or fixed-term written contracts, which come with significantly higher wages (figure 26b).[18] Informal employees, by contrast, lack access to social security and other work-related benefits, must rely on themselves to ensure workplace safety, and work under either unenforceable verbal contracts or no contract whatsoever.

In addition to the significant increase in the number of formal jobs discussed above, a marked improvement in job quality can be observed in terms of formal wages. They grew by 3 percent per year in real terms between 2008 and 2015, driven by especially strong growth in public sector wages, which averaged 5 percent per year (figure 27). Formal private sector wages grew more modestly at 2 percent per year. Wages for open-ended contract jobs grew by 3 percent per year on average, while those for fixed-term contracts stagnated. Earnings in informal jobs improved, but at a slower pace, averaging 1.2 percent annually. Self-employed farmers' incomes experienced very large gains during 2001–2008 and subsequently fell, particularly in 2012 and in 2015, the latter pulling down the average growth calculation for 2008–2015. By contrast, earnings of the self-employed outside of farming rose significantly, averaging nearly 6 percent annual gains. This mixed performance illustrates the volatility in informal incomes, another indication of lesser job quality among lower income groups.

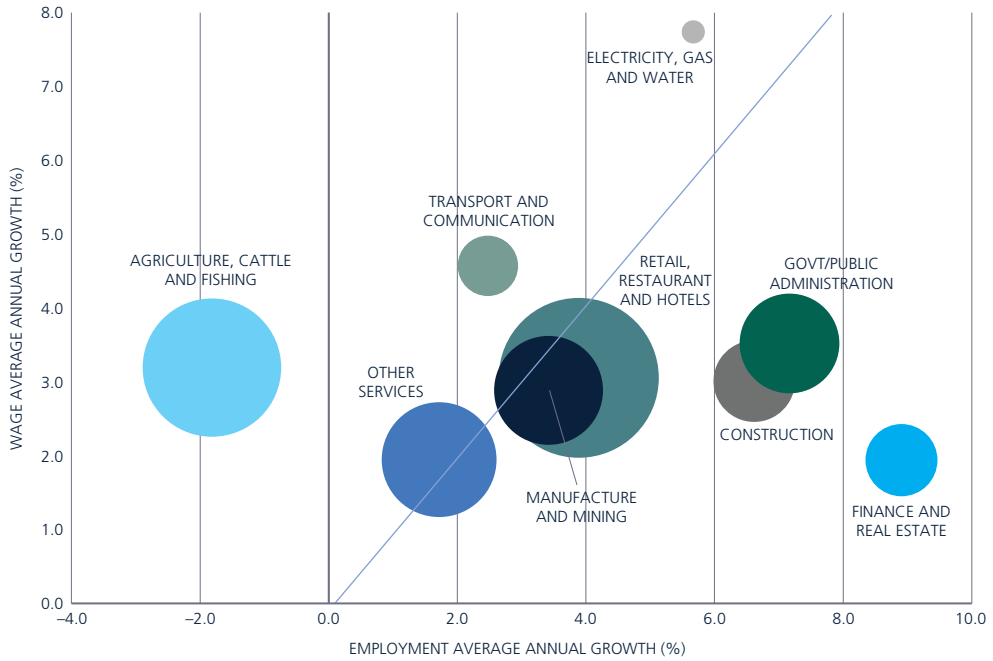
Figure 27
Average annual wage growth, 2008–15
(monthly wages measured in 2005 USD PPP)



Note: Geometric averages. Farmers' income growth is particularly low over this period, due to relatively higher incomes in 2008 than in subsequent years, and due to the decline in 2015 relative to 2014.
Source: Based on Encuesta Permanente de Hogares data.

Wage growth was strong in most sectors over the past decade, even in sectors that added significant jobs (figure 28). In retail, for example, which added the largest number of jobs, real wages increased by 3 percent per year between 2005 and 2015. Not surprisingly, job growth was stronger than wage growth, consistent with increased labor demand putting downward pressure on wages. Stronger formal job growth and formal wage growth together pulled up average wages, implying an overall improvement in average job quality. Even in the relatively less productive and highly informal sectors of retail, construction, and other services, average job quality improved as measured by wages. For the sectors to the right of the 45 degree line in figure 28, employment growth exceeded wage growth. But in several sectors—notably agriculture, transport and communications, and electricity and gas—wage growth outstripped job growth.

Figure 28
Wage and employment growth, 2005–15
(% change in employment level, % change in real 2005 USD PPP monthly wages)



Note: Circle size is proportionate to 2005 employment share. Growth rates are arithmetic averages.
Source: Based on Encuesta Permanente de Hogares data.

In agriculture, employment actually contracted while average real wages increased. The observed strong productivity growth in agriculture belies the binary nature of the sector, where production is dominated by large commercial farms using capital-intensive technology to produce commodities for export, but employment is dominated by self-employed smallholder farmers using unsophisticated techniques to produce staples for local consumption. Although self-employed farmers' earnings have declined since 2005, average agriculture earnings rose over the same period, at least partly explained by commodity price effects (as mentioned above). Moreover, most of the agricultural jobs added since 2008 were formal, to meet the rising demand for skilled labor in the modern agriculture subsector.

The highest job growth was recorded in finance and real estate, followed by government, construction, utilities, retail, and manufacturing, concurrent with robust annual wage growth. In public administration, for example, the expansion of government employment was accompanied by significant wage increases. This implies a potentially distorting role of public employment, given that public wages and hiring are not market-driven but rather represent policy choices. As will be shown in the next chapter, the public sector wage premium is estimated to be large, ranging from 21 percent (for monthly wages) to 38 percent (for hourly wages), controlling for various factors including experience, education, and region of work.

Note that in the preceding analysis, wage comparisons reflect average wages by worker category and do not control for composition effects or for individual characteristics such as education, work status, or sector. These are addressed in detail in the next chapter.

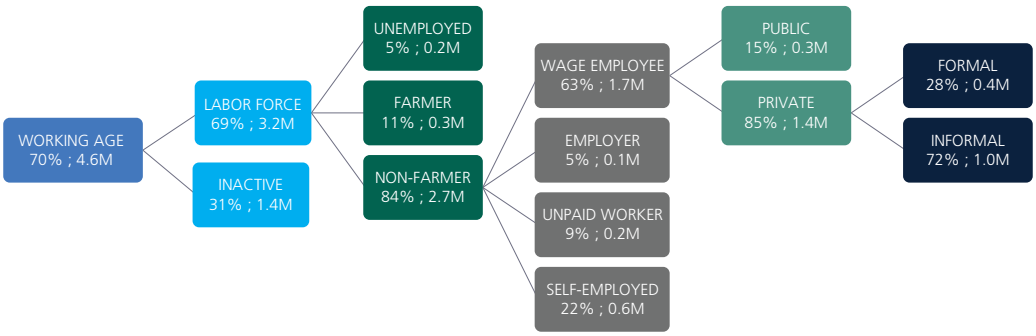
3. LABOR MARKET OUTCOMES AND LABOR TRANSITIONS

This chapter analyzes labor market outcomes—participation rates, employment, types of jobs, and earnings—for different categories of workers. The first part of the analysis provides a snapshot of the labor market in terms of work status, and explores differences in access to jobs by age, gender, household income, and region. The second part looks at the statistical correlates of labor force participation and employment. The analysis subsequently explores the links between wages and skills, and the main determinants of earnings, including education. The last section addresses labor transitions between jobs and the factors likely to contribute to successful transitions into formality.

ACCESS TO JOBS

More than half of workers in Paraguay—1.7 million out of a labor force of 3.2 million—are wage employees, either formal or informal (figure 29). But farmers, unpaid family workers, and other self-employed workers together account for another 1.1 million jobs, reflecting the very high levels of informality. Among non-farmers, nearly two-thirds of employment is wage employment, three-fifths of which is informal. Another 22 percent of non-farmers are self-employed. Employers can be either formal or informal, and informality is significant within this group as well (one-third of employers were informal in 2015).[19] Taken together, over 2.2 million workers were employed informally in 2015, accounting for over 71 percent of all jobs.

Figure 29
Snapshot of the working-age population in Paraguay, 2015

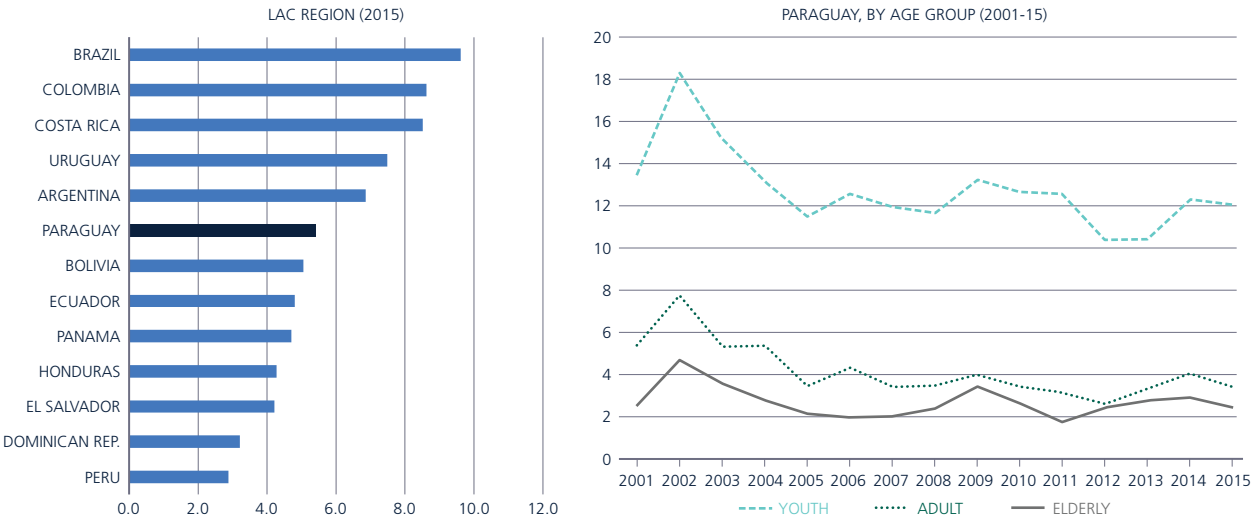


Source: Based on Encuesta Permanente de Hogares data.

Youth find it harder than prime-age workers to land jobs, particularly in the formal sector. Unemployment is modest at 5 percent (2015 data), similar to the regional average (see figure 30). Although unemployment has been mostly declining since 2002, there are important variations in unemployment by age group. Whereas prime-age (ages 25–59) unemployment averaged 3.5 percent over the past decade, the rate was more

[19] The share of informal employers in total employers fell from over 50 percent in 2008–10 to about 40 percent in 2011–14, and subsequently to 35 percent in 2015.

Figure 30
Unemployment in the region and in Paraguay by age group (percent)

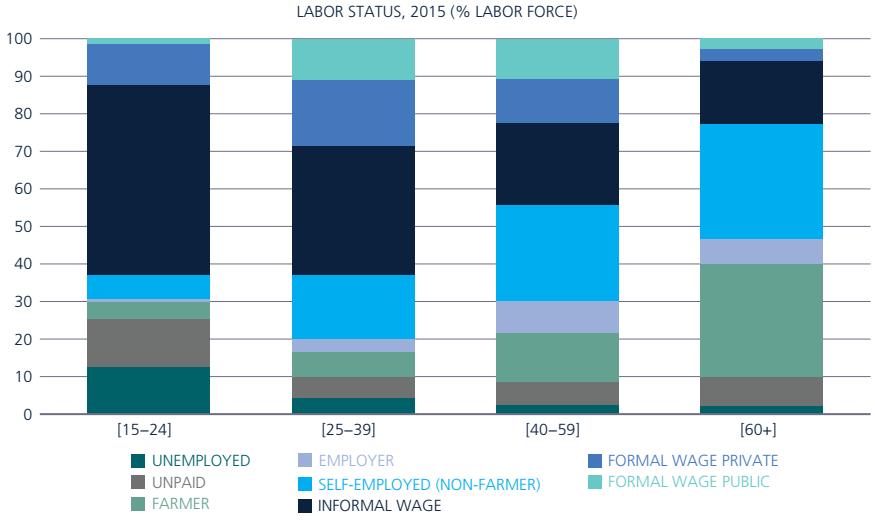


Note: Youth: ages 15–24; adult: 25–59; elderly: 60+. Unemployment in Paraguay was 5.4% in 2015.
Sources: SEDLAC and Encuesta Permanente de Hogares data.

than triple for youth (ages 15–24). The elderly (age 60 and over) are less likely to participate in the labor force, and among those who do, they experience low rates of unemployment.

Among active youth, over half are informal wage workers, and most of the rest are in other types of informal work: 13 percent are unpaid family workers, 6 percent are self-employed, and 5 percent are farmers (figure 31). Only 12 percent of 15- to 24-year-old workers have managed to access a formal job in either the public or the private sector, compared with 28 percent of 25 to 39 year olds. Among those aged 40–59, the shares of farmers and self-employed are significantly higher than for younger age groups, and they are higher still in the 60+ years age category (although the number of Paraguayans still working after age 60 is relatively low).

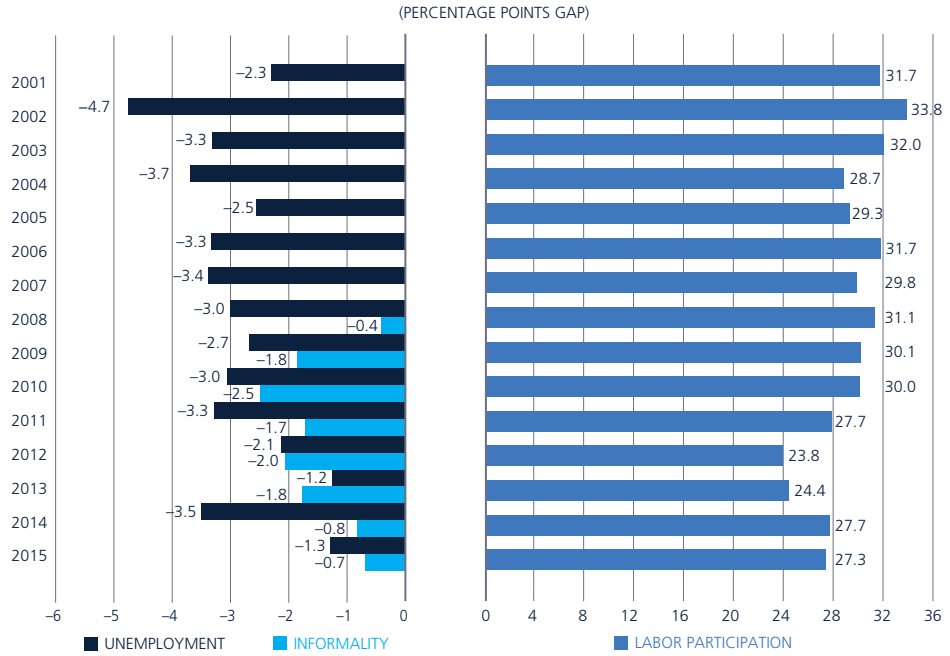
Figure 31
Work status by age group, 2015



Source: Based on Encuesta Permanente de Hogares data.

More and more women are working, but compared with men they struggle to attain good jobs with good wages. Paraguay's labor market is characterized by large disparities along gender lines. Men's labor force participation rates are about 30 percentage points higher than women's, although the disparity has narrowed somewhat over the last six years (figure 32). And men's average wage earnings are about 50 percent higher than women's, not accounting for differences in education, occupation, or hours worked (annex A, figure A4). Women are slightly more likely to be in informal work than men (by about two percentage points), primarily due to the greater preponderance of self-employment among women. Women also experience higher rates of unemployment.

Figure 32
Gender gaps in labor market outcomes, 2001–15
(male minus female, %)



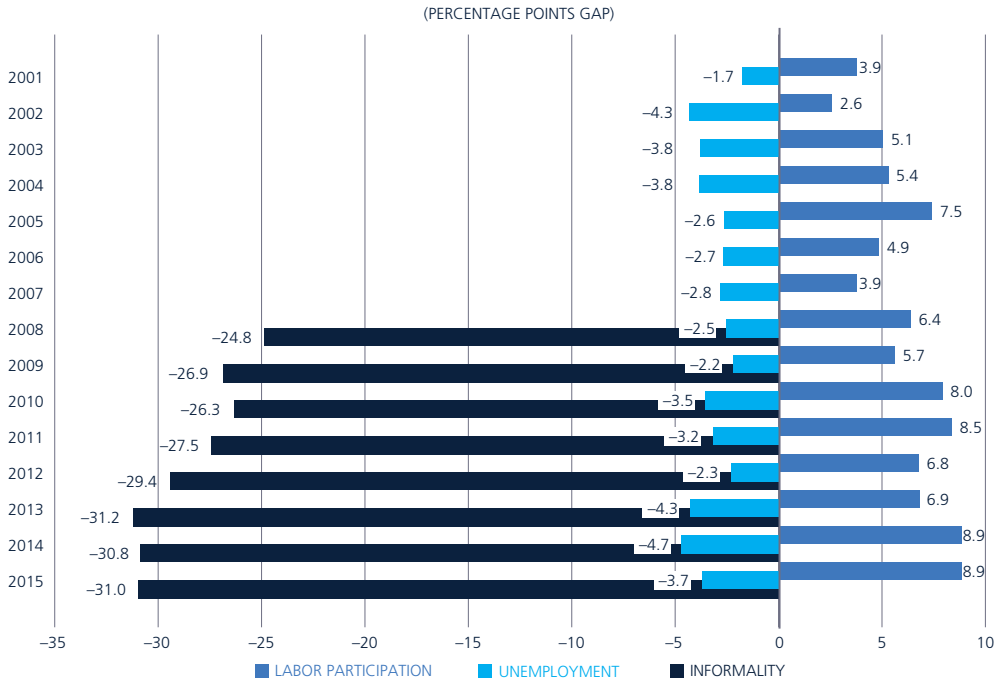
Source: Based on Encuesta Permanente de Hogares data.

Workers from poor households are likely to be excluded from formal jobs. In terms of household income status, there are persistent differences in participation rates, informality shares, and wages between workers living in the poorest 40 percent of households and those in the richest 60 percent of households. Workers living in the bottom 40 percent of households are less likely to participate in the labor market. Since 2005, participation rates for non-poor households averaged 7 percentage points higher than poor households, and the gap has widened in recent years (figure 33). But poor households have much higher rates of informality: over 90 percent, compared with 60 percent for non-poor households in 2015. Households in the bottom 40 percent also experienced higher unemployment rates. The wage differences between poor and non-poor households are particularly large; for example, the average compensation of workers from non-poor households was two and a half times that of workers from poor households, reflecting a high degree of income inequality. Note that these comparisons do not indicate the direction of causality and do not control for compositional effects[20] or individual characteristics such as education or sector of work, which are addressed later using regression analysis.

Outcomes for rural workers are lagging owing to their more limited opportunities. Rural and urban workers exhibit diverging labor outcomes, partly driven by the preponderance of agriculture-based work in rural areas, much of which tends to be less productive and requires lower skills. As shown in figure 34, rural workers have

[20] The wage data are from workers' main occupation only, whereas many poor and/or informal workers are engaged in multiple activities; thus, these data are likely to overstate the gap.

Figure 33
Gaps in labor market outcomes between top 60 percent and bottom 40 percent of households, 2001–15



Note: Gap calculated as top 60 percent minus bottom 40 percent.
Source: Based on Encuesta Permanente de Hogares data.

slightly higher labor force participation rates and significantly lower unemployment rates, reflecting greater household needs owing to the lower rural incomes, as well as their ready access to agricultural activities. Rural workers are also much more likely to be in informal work, although the informality trend is declining among both rural and urban workers. Interestingly, both urban and rural populations increased their educational attainment—respectively adding 2 and 2.6 years of schooling since 2001, a remarkable achievement. But the gap in average education levels between urban and rural workers remained relatively steady at about three and a half years (figure 35).

Strong job creation and wage growth over the last decade had a very positive impact on reducing both rural and urban poverty; nevertheless, rural poverty remains significantly higher than urban poverty (figure 36). In 2015, whereas extreme and moderate poverty in urban regions continued to decline relative to 2013, rural poverty edged upwards. This occurred concurrent with a sharp decline in average earnings in agriculture in 2015, and a more modest decline in farmers' average incomes.

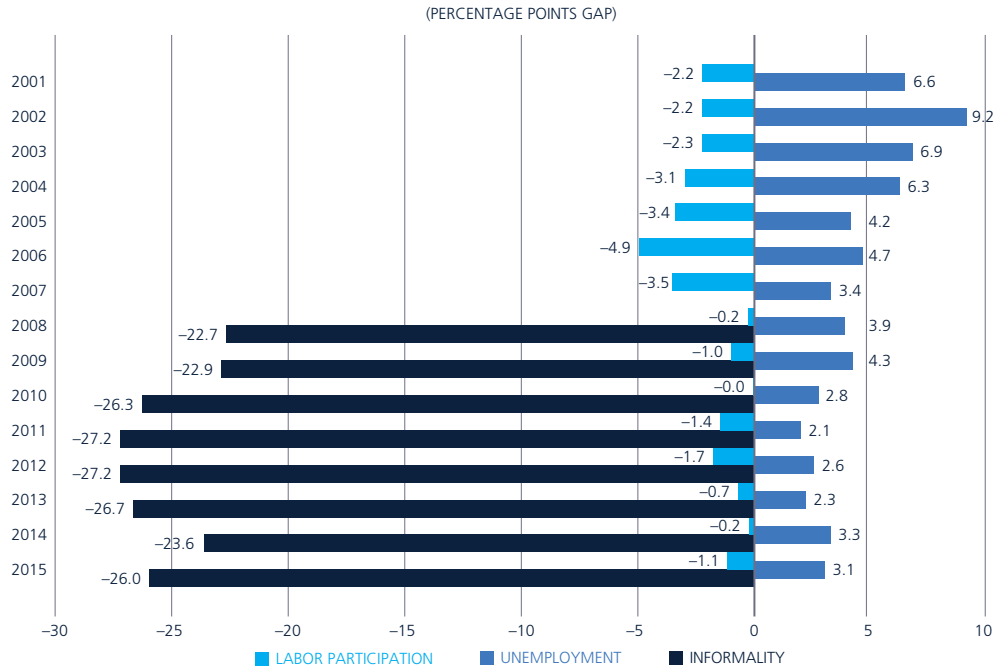
The comparisons of labor market outcomes across population groups suggest large disparities in accessing formal jobs. This in turn leads to an unequal distribution of income, illustrated by the fact that poverty is highly correlated with informal work status (figure 37). These differentiated outcomes partly reflect workers' decisions to seek particular types of work in particular sectors or locations, potentially creating negative dynamic effects that perpetuate the observed inequitable outcomes.

MICRO-DETERMINANTS OF LABOR MARKET PARTICIPATION AND EMPLOYMENT

Gender differences in work status remain large, even controlling for individual characteristics, as shown in logit regressions and multinomial logit regressions used to derive a more precise picture of the main variables that contribute to different labor outcomes.[21] For example, being a woman increases the likelihood of

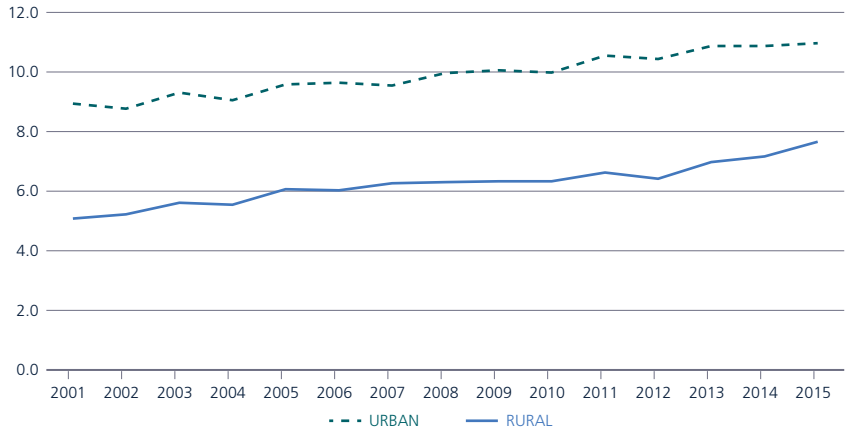
[21] Logit regressions allow for bilateral comparisons between two work states, whereas multinomial regressions compare worker characteristics across the entire set of work states. Neither regression tests for causality, only correlation.

Figure 34
Regional gaps in labor market outcomes, 2001–15
(urban minus rural, %)



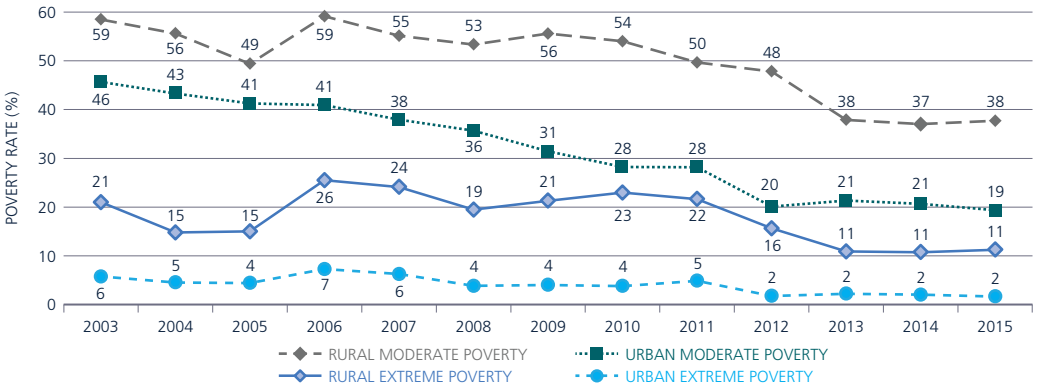
Source: Based on Encuesta Permanente de Hogares data.

Figure 35
Educational attainment by urban and rural workers, 2001–15
(years)



Source: Based on Encuesta Permanente de Hogares data.

Figure 36
Urban and rural poverty trends, 2003–15



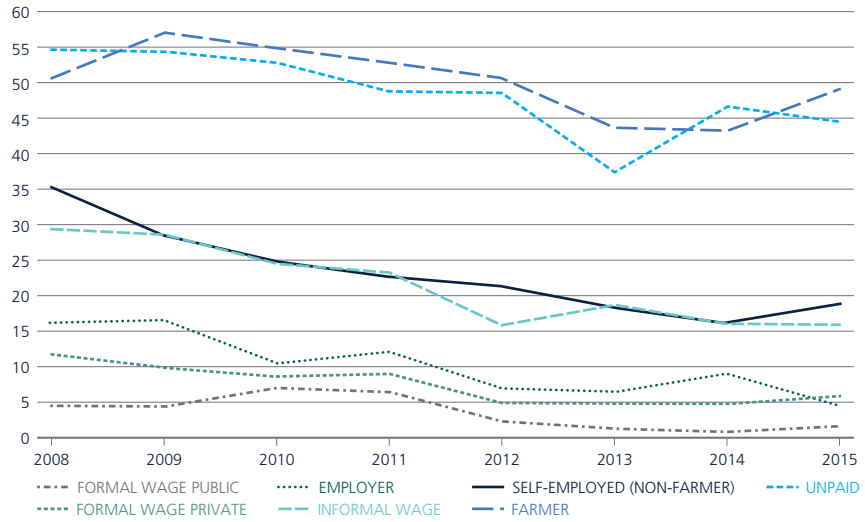
Note: Based on updated official poverty lines introduced by DGEEC in 2017.
Sources: Lugo and Viveros (2016) using DGEEC national poverty lines.

being unpaid, self-employed, an informal wage worker, or a public employee, while being a man increases the likelihood of being a farmer, an employer, or a formal wage worker in the private sector (for regression results, see annex C, table C1). Higher levels of education also increase the likelihood of having a formal job in the public or private sector, or being self-employed or an employer, especially among those who have completed a tertiary degree. Comparing the likelihood of being active versus inactive, we find that men are 28 percent more likely to be in the labor force and that higher levels of education increase the probability of entering the labor force (see annex C, table C2).

For those in the labor force, certain characteristics increase the likelihood of being unemployed, such as being female, being young, or living in urban areas or in Alto Paraná. The effects are small, however, as shown in figure 38. Education has no statistically significant effect on the likelihood of being employed.

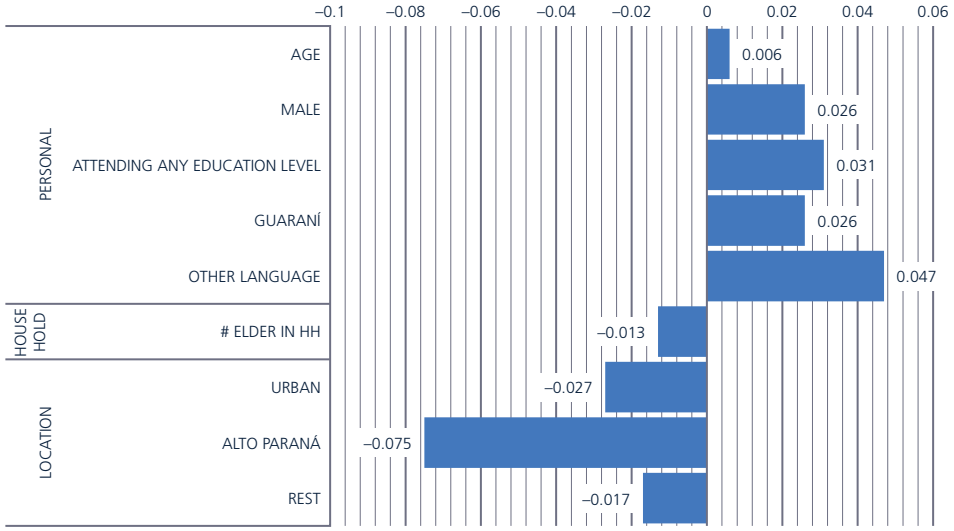
The likelihood of being in formal employment is higher for those with more education, those in Asunción and those working in larger firms, and lower for indigenous workers and within certain

Figure 37
Poverty incidence by employment status, 2008–15
(% of workers in each labor force state whose household income falls below the poverty line)



Sources: Based on SEDLAC data, Encuesta Permanente de Hogares data, and DGEEC poverty measures.

Figure 38
Correlates of being employed versus unemployed, 2015
(average marginal effects, age 15+)



Notes: Logit regressions with weighted observations.
Only statistically sigfnificant variables are shown.
Incomplete primary or less if less than 6 years of education; Primary complete if with 6 years of education and not enrolled; Secondary incomplete if with 6 years of education and enrolled or has (6–12) years of education; Secondary complete if with 12 years of education and not enrolled; Tertiary incomplete if with 12 years of education and enrolled or has (12–16) years of education; Tertiary complete if with more than 15 years of education.
Formal if (i) wage employees contributing to Social Security, (ii) employers of a registered firm (RUC), (iii) self-employed workers with a registered firm (RUC); Informal if (i) farmers/herders/fisherman (self-employed or employer of firm with no RUC), (ii) unpaid family worker, (iii) self-employed, employee or employer of firm with no RUC, (iv) wage employees not contributing to Social Security.
Alone category in firm size includes self-employed and domestic employees.
Source: Staff calculations based on SEDLAC data.

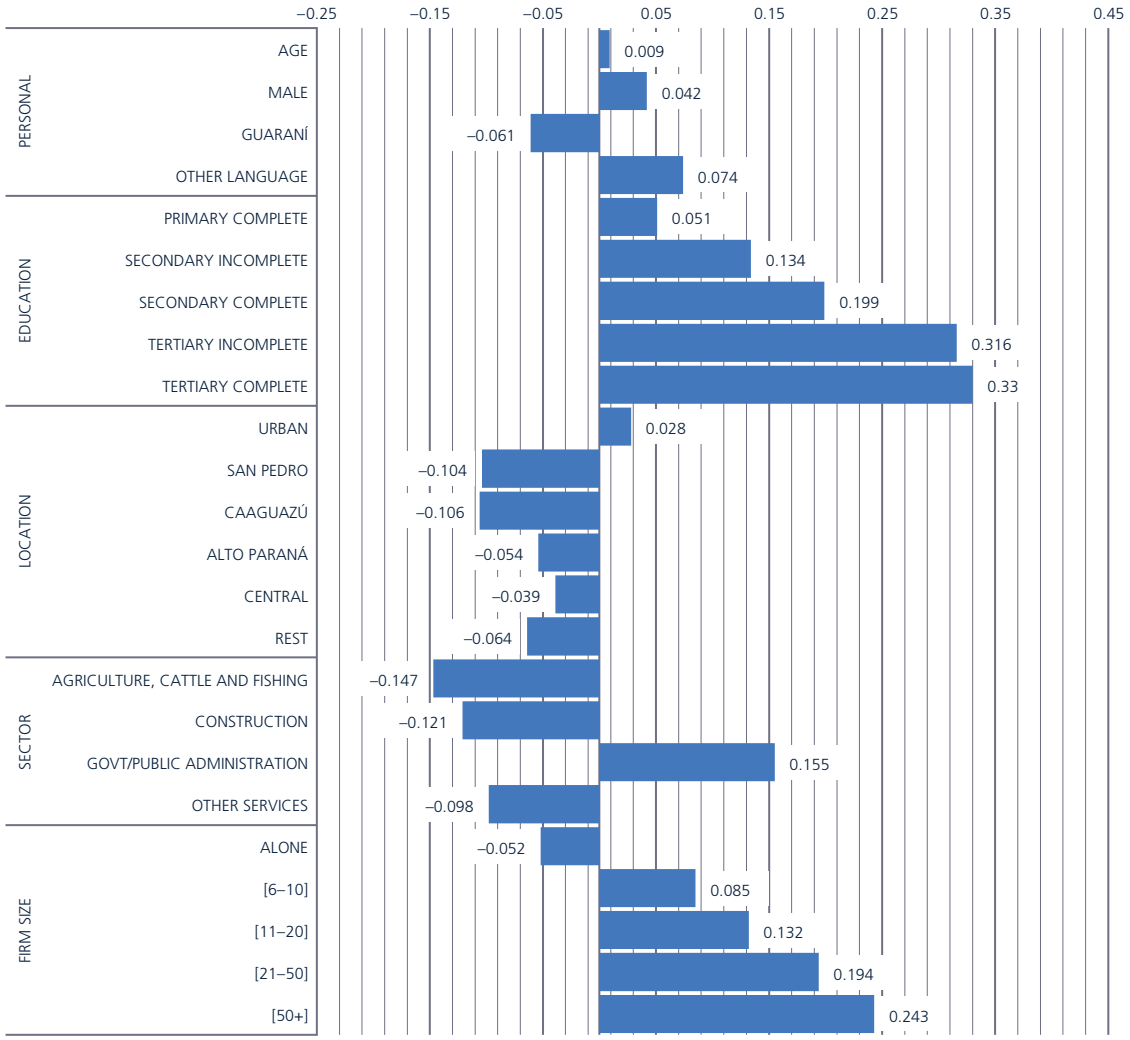
sectors. Secondary and especially tertiary education significantly increase the probability of being in formal work, by 20 and 33 percent, respectively (figure 39; see also annex C, table C2). Being from a Guaraní-speaking household reduces the likelihood of being in formal employment. Most formal jobs are located in Asunción, reflected in the reduced likelihood of formal work among those living in other regions, including Central. Agriculture, construction, and other services have the lowest formality rates, and workers in medium and large firms are much more likely to be formal than those in microenterprises.

LINK BETWEEN EARNINGS, WORK STATUS, AND SKILLS

Earnings differences across employment types are significant, with employers and public sector employees earning the highest wages on average, and the self-employed and farmers earning the lowest (see figure 26). Looking at the entire wage distribution for full-time workers in 2015, farmers and self-employed workers earned significantly less than workers with any other employment status, with most earning less than the minimum wage on average (figure 40). The average wage for informal wage workers is also slightly less than the minimum wage, although a significant share of informal wage workers earns more. This suggests that some firms hire informally to evade minimum wage regulations, which contributes to high informality rates. Formal private sector wages are higher than informal wages but still close to the minimum wage, whereas the average public sector wage is nearly twice the minimum wage. This pattern of wage distribution is in fact very similar to that observed in Peru in 2013 (Ruppert Bulmer et al. 2017).

Wage differences partly reflect worker productivity differences due to higher or lower skills, and more or less education. Earnings are positively correlated with education level, with the largest effect at the tertiary level (figure 41). The observed increases in aggregate real wages are partly due to the fact that educational attainment has increased sharply among younger age cohorts, even in the short space of the last decade (figure 42). The number of workers in the labor force with postsecondary education has

Figure 39
Correlates of being in formal versus informal employment, 2015
(average marginal effects, age 15+)

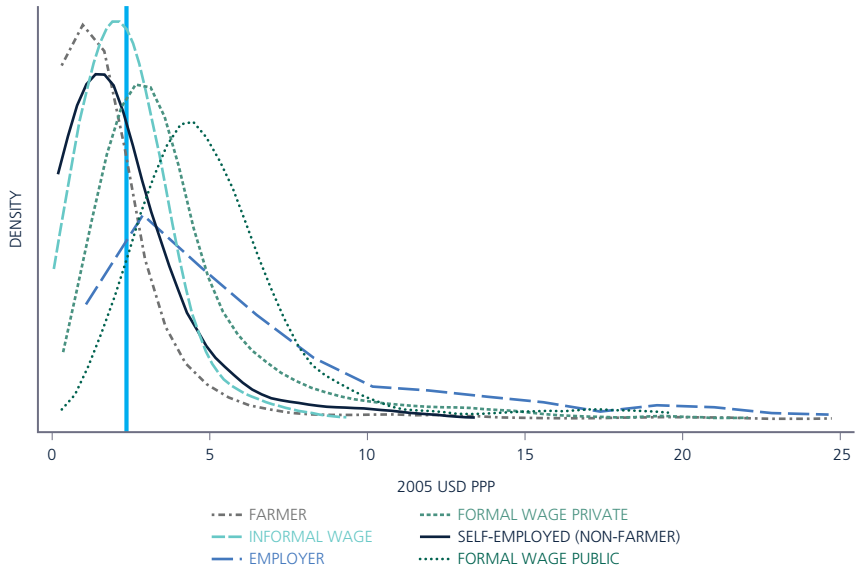


Notes: Logit regressions with weighted observations.
Alone category infirm size includes self-employed and domestic employees.
Source: Staff calculations based on SEDLAC data.

more than doubled since 2005, while the number of those completing a secondary degree increased by three-fourths. Nonetheless, given that these education gains are strongest among new labor force entrants, who in turn tend to have lower wages than more experienced workers, the effect of more education on average wages is likely to be modest over this relatively short reference period. Comparison of relative wages of more and less educated workers over time reveals that the wages of unskilled workers[22] grew faster than those of skilled workers during 2001–2008, implying reduced wage inequality during this period; thereafter, however, skilled wage growth averaged 3 percent per year, compared with only 2 percent for unskilled wage growth, thus exacerbating wage inequality.

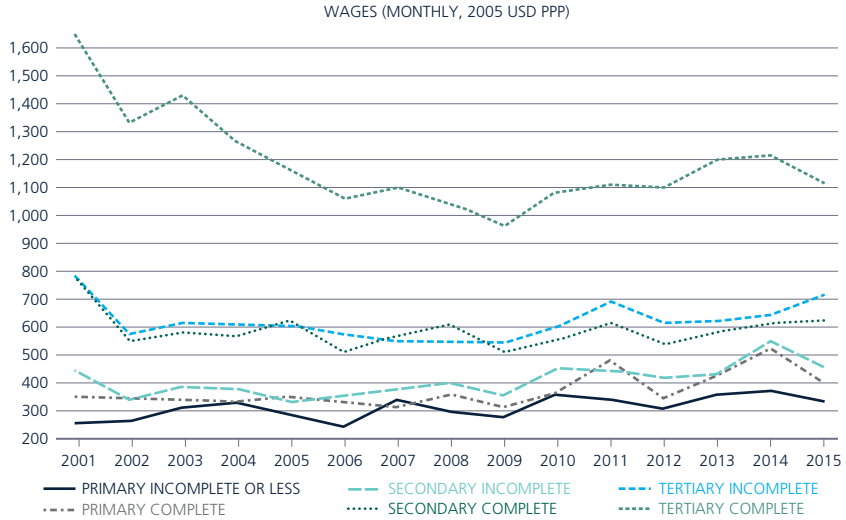
[22] Unskilled workers are defined as those who have an incomplete secondary education or less.

Figure 40
Distribution of wages for full-time workers by employment status, 2015
2005 US$ PPP



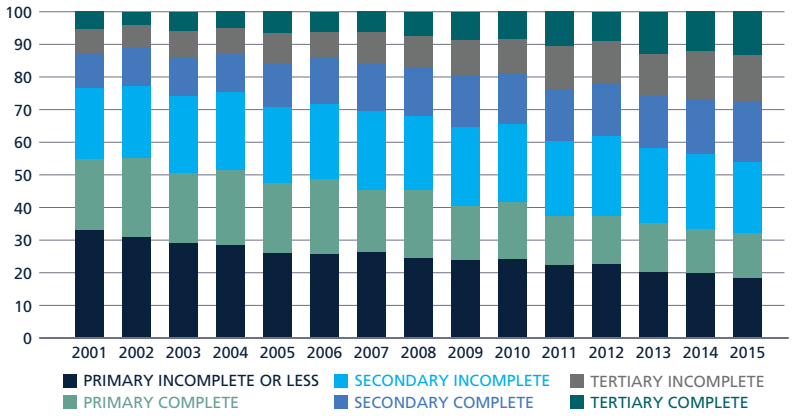
Note: Wage distributions are gross hourly wages plotted for each worker category; vertical line shows national minimum wage in 2015 (2005 USD PPP).
Source: Based on 2015 Encuesta Permanente de Hogares data.

Figure 41
Correlation of wages with education, 2001–2015



Source: Based on Encuesta Permanente de Hogares data.

Figure 42
Positive trends in educational attainment, 2001–15
(% of labor force)



Source: Based on Encuesta Permanente de Hogares data.

Questions about education quality are relevant to whether more education has an impact on wages; this is an area where Paraguay continues to struggle, despite reform efforts. In the last decade, the education system has made considerable strides, including expanded coverage at all levels and improvements in the sector's internal efficiency. Public expenditure on education—at about 4 percent of GDP—is one of the highest in the Region. But the performance of the education system is relatively weak and may be declining: there has been a reduction in net primary school enrollment rates in the last few years, and a still substantial share of children aged 13 to 17 are not in school, pulling Paraguay's secondary enrollment rates below the regional average. Learning is rated as insufficient according to national assessments indicating that more than 50 percent of third graders do not reach the expected proficiency level in mathematics, and 40 percent do not reach the expected proficiency level in Spanish. In a regional assessment of learning outcomes, Paraguay ranked among the lowest five countries (Wodon 2016). The latest World Economic Forum ranking placed Paraguay 140th of 144 countries with respect to the quality of primary education, and 139th with respect to the quality of secondary education and above (Schwab 2015). Together these indicators point to low education quality, which would dampen any positive wage effects of rising educational attainment.

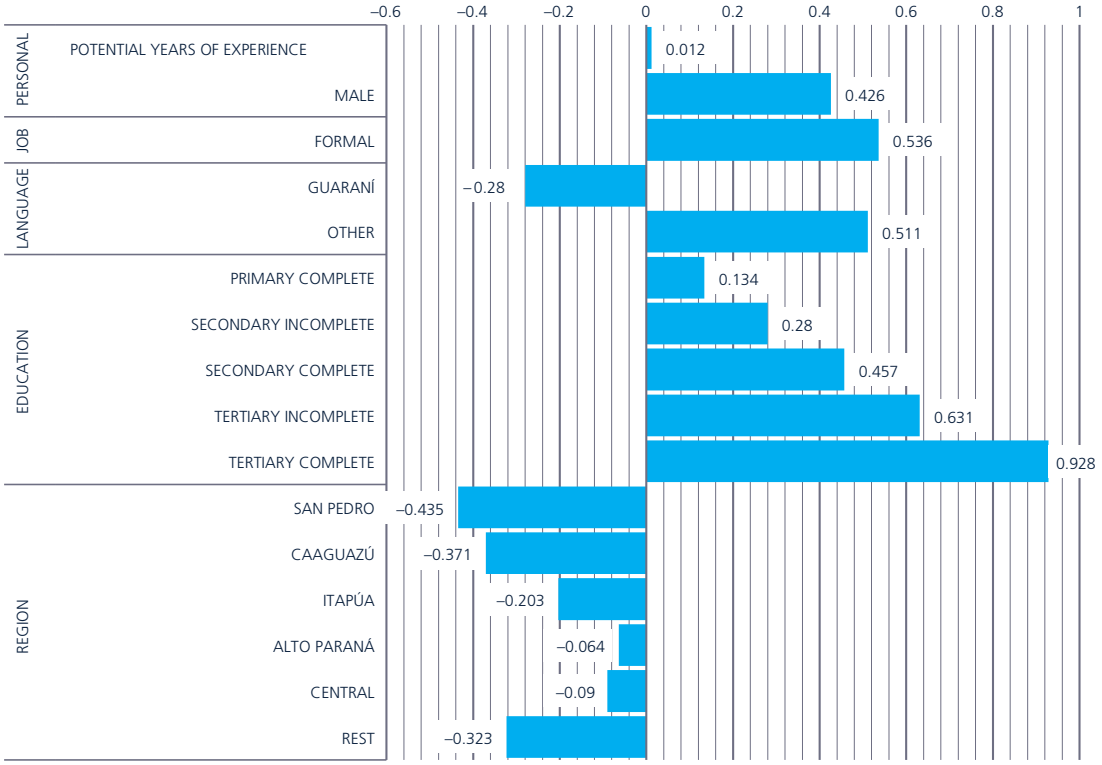
MICRO-DETERMINANTS OF EARNINGS

Education level, work status and other factors have an impact on earnings. Using Mincer-type regressions to control for individual characteristics, we estimate the effects of work status, education level, and sector, among other factors, on workers' monthly earnings.[23] When earnings are compared across workers, being in a formal job raises earnings by over 50 percent, controlling for other factors such as education and region (figure 43 and annex C, table C3). Returns to education increase monotonically with education level: tertiary graduates earn a significant wage premium—equivalent to 93 percent—over similar workers lacking a primary degree (and controlling for formality), and even the relative return to completing university compared with only some tertiary schooling is large at 30 percent. Workers from Guaraní-speaking households earn significantly less than those from non-Guarani-speaking households. And there is a large wage premium for Asunción-based workers. Note that after controlling for selection bias using a Heckman correction, the results are nearly identical to the ordinary least squares (OLS) estimates.

The gender wage gap is estimated at 43 percent, reflecting a very large earnings advantage in favor of men, other things being equal. Several factors contribute to the large gap, including the fact that women work fewer hours on average than men and that women are more likely to be in non-wage work. Looking only

[23] The unit of measure used here—monthly wage earnings in each worker's main occupation—reflects actual hours worked.

Figure 43
Correlates of earnings, real (2005) monthly wages, 2015



Note: OLS regressions with robust standard errors and income weights. Only show significant average marginal effects.
Wages calculated as average of monthly earnings from main occupation transformed in 2005 US$ PPP using SEDLAC CPI and PPP conversion factors. Include monetary income and all other income related to the job, such as bonuses and implicit value of rent, food, and uniform, received regularly. Transformed in 2005 US$ PPP using SEDLAC CPI and PPP conversion factors.
Experience = Age – Years of education + 6
Formal if (i) wage employees contributing to Social Security, (ii) employers of a registered firm (RUC), (iii) selfemployed workers with a registered firm (RUC); informal if (i) farmers, herders or fishers (self-employed or employer of firm with no RUC), (ii) unpaid family worker, (iii) self-employed, employee, or employer of firm with no RUC, (iv) wage employees not contributing to Social Security.
To explore for selection bias we also estimated Heckman models. Results are identical to OLS and can be supplied by request.
Source: Based on SEDLAC data.

at wage workers (excluding self-employed and employers), the gender gap narrows to 33 percent, and limiting the comparison to full-time workers only shows that the gap narrows still further, to 27 percent. By using monthly earnings as the unit of measure, the estimates reflect the relative wellbeing of male and female workers. But in a more specific comparison of wages for the same hour of work, the gender wage gap is around 25 percent (see annex C, table C4, in which the regressions are run using hourly wages of full-time wage workers as the dependent variable). The wage discrimination encountered by Paraguayan women is slightly less than the average for the LAC region when estimated using a simplified specification (Ruppert Bulmer et al., 2018).

Other factors affect wage levels, such as sector of work and firm size. In order to consider additional factors that might affect earnings, a number of regression specifications were tested (reported in annex C, table C3, columns 2–5). The results suggest that earnings vary significantly across sectors even after controlling for personal characteristics such as language, region, and education. The returns to education are much higher when formality is not accounted for, implying that workers with higher education levels tend to select into formal jobs. The public sector wage premium is significant and therefore distortionary, ranging from 18 to 23 percent compared to a private sector job, other things being equal.[24] Agriculture workers earn 55 percent

[24] For hourly wages, the public sector premium is 32 percent.

less than those in the retail sector, itself characterized by low productivity and wages. Manufacturing work is not well-remunerated (0.7 percent less than retail), whereas workers in transport and communications and in construction earn significantly more than retail workers (18 and 19 percent, respectively).[25] Note that the difference in sectoral returns changes when considering hourly wages of full-time employees only. For example, full-time wage work in agriculture pays 20 percent less than retail for workers with otherwise similar characteristics, driven by the fact that workers in retail work longer hours. Similarly, when comparing hourly wages, workers in manufacturing earn 16 percent more than those in retail, transport workers earn 24 percent more, and construction workers earn 32 percent more.[26]

Firm size is positively correlated with earnings, even within the formal sector; employees in firms with 6–10 employees or 11–20 employees earn 16 percent more than those in firms with 5 or fewer workers. Although this premium declines slightly for larger firms, the premium is still 12 percent for firms with over 50 employees.

The time trends in gender wage gap, formality premium, and educational returns do not tell a consistent story. Repeating the Mincer regression analysis for each year between 2008 and 2015 can provide insight into how wages have evolved in conjunction with the changing composition of employment. Nonetheless, caution is required in interpreting the large observed year-to-year variations—both positive and negative—in the estimated coefficient values, particularly if they stem from year-to-year data comparability issues. The regressions show no consistent trend in the gender wage gap, formality premium, and educational returns between 2008 and 2015, but rather a declining trend from 2008 to 2010, a rising trend between 2010 and 2012, and a declining trend from 2012 to 2014 (see annex C, tables C5 and C6). With respect to education, returns rose and fell the sharpest in the middle education levels, while the returns to a primary education and a complete tertiary education changed by relatively less. When comparing the skill premium for workers who have a complete tertiary education over those who have an incomplete secondary education or less, there is no consistent trend, which rules out a "degraded tertiary education effect."[27] Given that educational attainment increased monotonically over the past decade, these fluctuating trends in educational returns may suggest that supply-side factors were not the only driver of recent wage trends, but rather that changing labor demand also played a role.[28] Returns bumped up sharply for all education levels in 2015, which is difficult to explain.[29]

The time trends in sectoral returns also do not tell a consistent story, as shown by irregular annual fluctuations. In fact, relative to wages in retail, the returns to working in all other sectors more or less stagnated between 2008 and 2015 (figure 44; annex C, table C6).[30] A closer look at the last two years indicates a jump in agriculture earnings in 2014 but a drop in 2015. This is observed both in the average sectoral wage and in the sectoral returns based on regression analysis.

LABOR TRANSITIONS INTO, OUT OF, AND BETWEEN JOBS

Whereas the preceding analysis allows estimation of the correlates of labor outcomes based on a very large sample of workers, it does not allow tracking of individual workers over time. Using a smaller panel dataset from the labor force survey, Encuesta Continua de Empleo, makes it possible to track workers' labor outcomes and movements during repeated survey periods. Doing so enables studying the labor transitions of workers—e.g., out of inactivity into the labor market, into or out of unemployment, or between informal and formal jobs—to gain insight into patterns of labor mobility and the characteristics that help workers make successful labor transitions. The analysis in this section draws on a multiyear panel component of the quarterly Encuesta Continua

[25] See specification 5 in annex C, table C3.

[26] See specification 5 in annex C, table C4.

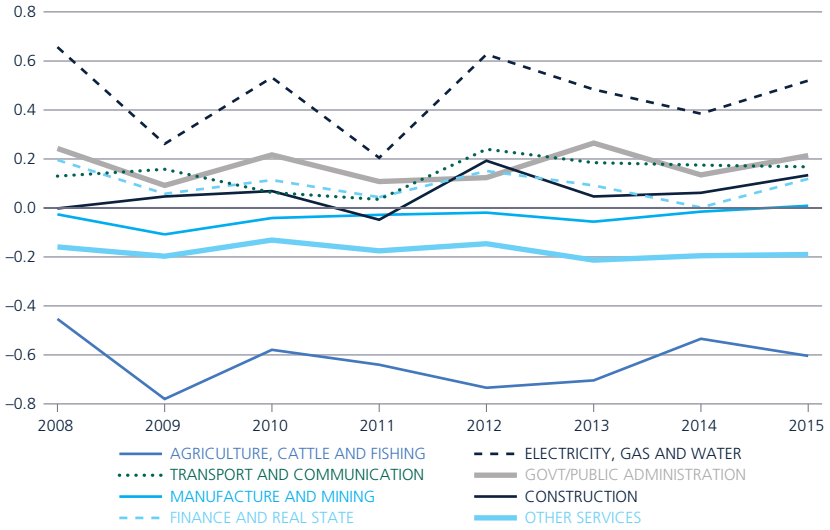
[27] A "degraded" education effect at the tertiary level, tested by Campos-Vazquez et al. (2014) in Mexico, would result from an influx of students into tertiary education which dilutes the quality of the education itself due to system limitations.

[28] World Bank (2016a) explores a range of transmission channels on both the supply and demand sides to explain the declining skills premium observed in Latin America and the Caribbean in the 2000s.

[29] The largest increases are at the high end of the education spectrum. The sample frame used in the 2015 household survey was adjusted, but the educational composition of the new sample frame does not vary significantly from previous years.

[30] Sectoral returns are relative to reference sector retail/hotels/restaurants, and control for individual characteristics and regions.

Figure 44
Sectoral returns, regression results, 2008–15



Note: Estimates from OLS Mincer regressions controlling for individual characteristics, Specification 3, with robust standard errors and income weights. For full results, see annex C, table C6. Retail was the base category. Wages are calculated as average of monthly earnings from main occupation transformed into 2005 US$ PPP using SEDLAC CPI and PPP conversion factors. Includes monetary income and all other income related to the job, such as regular bonuses and implicit value of rent, food, and uniform.
Source: Staff calculations based on Encuesta Permanente de Hogares data.

de Empleo spanning 2010–14.[31] It begins with a description of average quarterly labor transitions, followed by probabilistic regressions to assess how individual and household characteristics correlate with these transitions.

The labor market is dynamic, but labor transition patterns between labor market states are highly segmented. Averaging the quarterly changes in work status for each person in the panel dataset (over the four-year period) reveals evidence of large transitions between some labor states—mostly into informal jobs and into and out of unemployment—but rigidities in formal sector job turnover. Table 2 summarizes the share of workers in a given work status in period *t*–1 who transition to another work status in period *t*. The share of workers who make no transition, i.e., the "stayers," appears along the downward-sloping diagonal.

Transitions out of inactivity are fairly common, but they take place mainly into unemployment, self-employment, or informal wage employment. Each quarter, of the 18 percent of the inactive population who enter the labor market, one-third become self-employed, one-fifth become informal wage employees, and one-third fail to find work. Direct transitions from inactivity into formal employment are very rare; only 0.4 percent of inactive workers succeed in doing so.

In line with the economic literature, the main drivers of entry into the labor market are gender, education, and to some extent age. This was confirmed using logistics regressions estimating the likelihood of transition between one labor market state and another. In terms of gender, men are 12 percent more likely than women to transit from inactivity to activity, other things being equal (figure 45; see also annex C, table C7). The observed gender differences in aggregate participation rates shown in figure 32 are larger because they reflect other differences in individual characteristics. Education is an important correlate as well: those who have postsecondary education have a likelihood of entering the labor market that is 7 to 10 percentage points higher than those who have a primary education or less. Relative to 15–19 year olds, workers in their twenties are more likely to become active, whereas slightly older workers—those aged 45–49—are less likely to enter the workforce (controlling for

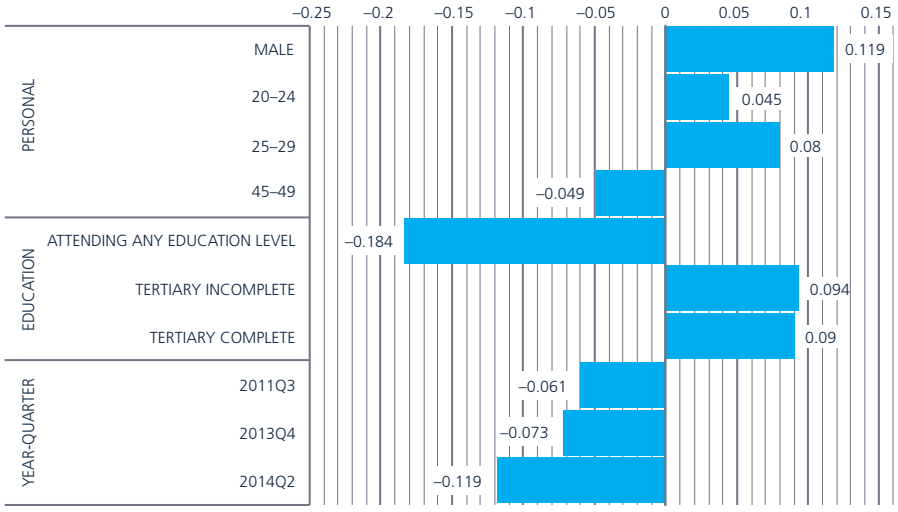
[31] The dataset includes 62,957 observations of 19,150 individuals over a period of 20 quarters from Q2 2010 to Q4 2014. The geographic coverage of the survey includes Asunción as well as urban areas in the Central department, together representing about 40 percent of the national workforce and a little more than 60 percent of the urban workforce. The panel is unbalanced in that data are not available for all quarters for all individuals. The data for 2015 are not included in the analysis because the panel changed in that year.

Table 2
Transitions between labor market states, by quarter, as average shares of initial work status

Labor state at t–1	Shares								
	Labor State at t								
	Inactive	Unemployed	Unpaid	Farmer	Employer	Self-employed (non-farmer)	Informal wage	Formal wage private	Formal wage public
Inactive	81.7	5.6	1.4	0.5	0.6	5.7	4.1	0.3	0.1
Unemployed	27.1	34.8	1.1	0.4	1.5	10.9	21.4	2.5	0.3
Unpaid	24.3	3.0	35.8	0.4	4.4	18.0	13.8	0.3	0.0
Farmer	14.9	1.4	0.8	68.1	2.3	4.4	4.7	2.5	0.8
Employer	3.8	2.3	1.3	0.4	60.2	22.5	8.1	0.7	0.8
Self-employed (non-farmer)	12.8	3.2	2.0	0.3	7.0	65.5	8.0	0.8	0.3
Informal wage	7.2	5.5	1.2	0.2	2.3	6.7	67.0	9.6	0.3
Formal wage private	1.1	1.9	0.2	0.3	0.5	1.3	10.1	84.0	0.7
Formal wage public	0.7	0.3	0.0	0.1	0.2	0.7	0.7	1.5	95.9

Note: The vertical axis of the matrix indicates the labor market state in period f-1, and the horizontal axis indicates the labor market state in period *t*. Values are the average of quarterly transitions (as a percentage of the labor force), Q2 2010 to Q4 2014. Values on the diagonal reflect the share of workers who did not change work status. Formality is defined on the basis of pension contribution, as information on the firm registration (RUC) is not available for 2010 and 2011.
Source: Staff calculations based on Encuesta Continua de Empleo data.

Figure 45
Likelihood of entering the labor force



Note: Weighted logistic regressions from panel data. Average marginal effects with p value of 0.1 or less. Only significant values are charted.
Source: Staff calculations based on Encuesta Continua de Empleo data.

other factors). Household characteristics such as size or number of dependents do not have a statistically significant impact on participation decisions.

The informal labor market is largely separate from the formal labor market. The matrix of worker transitions in table 2 illustrates a very high degree of worker mobility into and out of activity, into and out of unemployment, and between informal jobs. Only 37 percent of unemployed workers remain unemployed from one quarter to the next; 27 percent exit the labor force, and nearly 40 percent find some type of work, mostly informal wage work (21 percent) or self-employment (11 percent). Unpaid family workers also experience significant turnover. Farmers tend to stick with farming or exit the labor force, but employers, the self-employed and informal wage workers show high rates of rotation among these three work states.

The formal sector exhibits much lower turnover. Among formal private wage employees, for example, over four-fifths do not change work status from one quarter to the next, although there are significant flows between informal wage jobs and formal private wage jobs. Among public sector workers, however, whose employment contracts tend to be stable and open-ended and to have attractive benefits, turnover is extremely limited: 96 percent on average remain in government posts from quarter to quarter. Together these results imply that the majority of workers in Paraguay struggle to access these higher-quality formal jobs which tend to come with higher wages, benefits including social insurance coverage, and better working conditions. The lack of turnover in the public sector, while normal in many developing countries, could have distortionary effects on the labor market if job-seekers eschew opportunities for productive employment in favor of queuing for a government job. The economic costs include output losses due to foregone production, and an inherent anti-entrepreneurship bias that could limit innovation and ultimately productivity gains and job creation in the private sector.

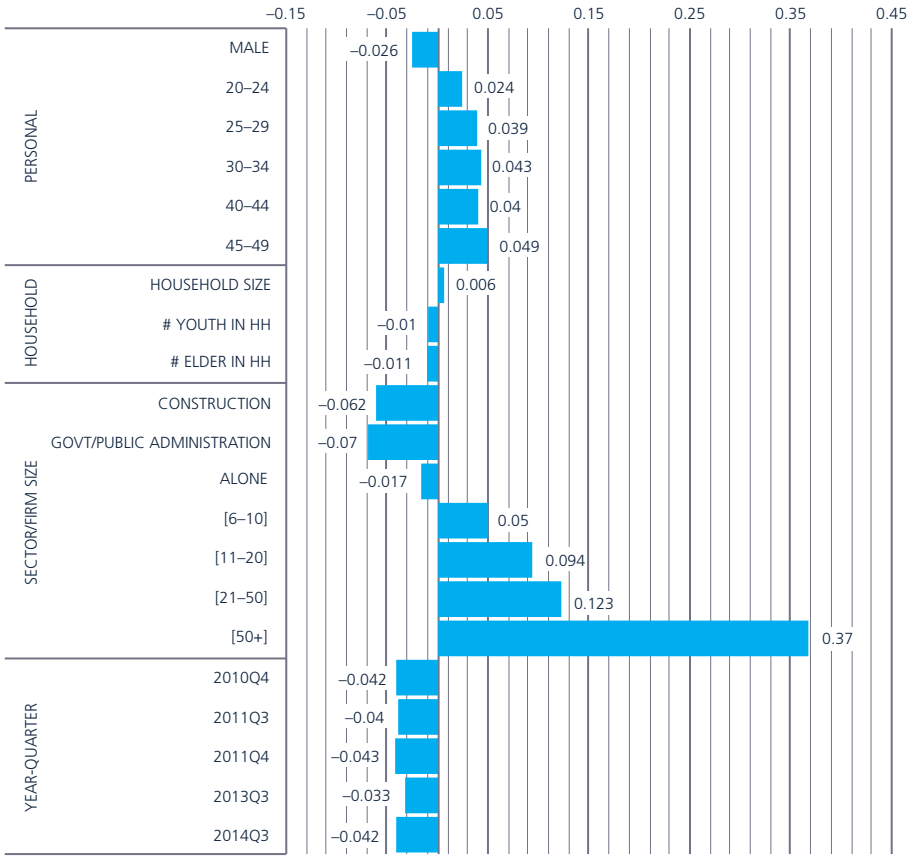
Men have a slightly lower probability of transitioning from informal to formal work than women, and the likelihood of landing a formal job increases with age up to age 49 (figure 46), as shown by using logistic regressions to estimate the correlates of successful transitions into formal jobs. The sectoral variables indicate that workers in construction are less likely than those in the retail sector to transition into formal work. The same is true for workers in government jobs; the likelihood of an informal worker transitioning into the public sector is extremely low (consistent with the low inflows shown in table 2). Firm-size variables are included in the regression to capture formality differences across firms of varying size. Tracking informal-to-formal worker flows by firm size (table 3), we find that regardless of the size of the firm in which the worker was informally employed in period t-1, the likelihood that their new formal employer was a large firm of over 50 employees is very high, and significantly higher than any other firm size category. It is also the case that informal workers employed in larger firms are more likely to become formal than those employed in smaller firms.

Higher levels of education do not increase the likelihood of transitioning out of informality, even though the average education level of those in formal jobs is significantly higher than those in informal work. This *education paradox* contrasts with similar estimations for Peru, where secondary or tertiary education increased the likelihood of landing a formal job by 3 or 6 percent, respectively (Ruppert Bulmer et al. 2017). The lack of statistical significance of education in Paraguay suggests that other factors—such as regulatory impediments, weak governance, structural factors, and/or sectoral composition effects—play a larger role in impeding access to formal jobs. Another potential explanation could be that upon entering the labor force, recent graduates with higher education levels are being recruited directly into formal jobs, rather than passing through a period of informal employment, a pattern widely observed in Brazil, for example (Arias-Vazquez et al. 2013).

Overall, the evidence suggests a dynamic yet segmented labor market. Movements in and out of inactivity and unemployment and between informal jobs are common, but transitions from informal to formal jobs are rare, and individual characteristics—such as education level—have only modest effects on the likelihood of transitioning from informal to formal sector jobs.

When informal workers manage to become formal, their wages do not necessarily rise. There is a high degree of wage heterogeneity, even comparing wages within work status. Although formal jobs pay

Figure 46
Likelihood of transitioning from informal to formal work



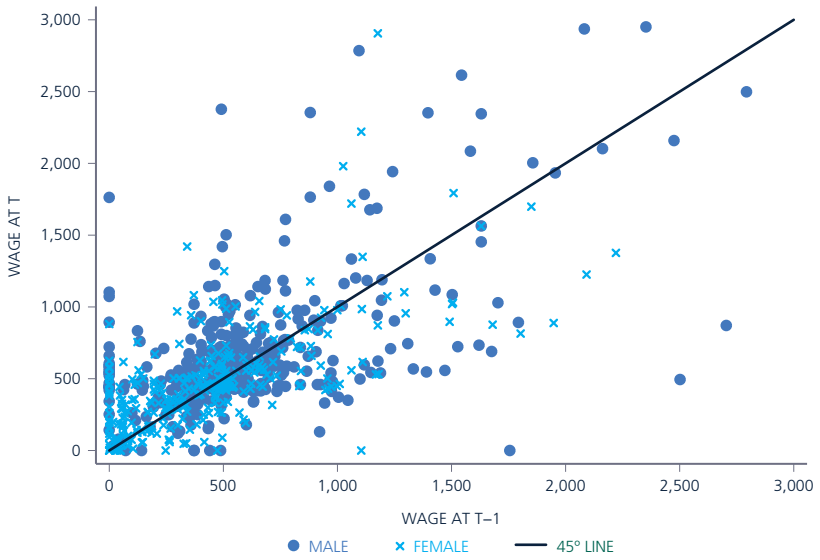
Note: Weighted logistic regressions from panel data. Average marginal effects with p value of 0.1 or less.
Only significant values are charted. Individual characteristics relate to status in period *t*-1. Firm size refers to period *t* (end-period). The reference sector is retail; the reference age group is age 15–24; the reference firm size is 2–5 employees.
Source: Staff calculations based on Encuesta Continua de Empleo data.

Table 3
Informal-to-formal transitions by firm size, annual average

Firm size at *t*–1	Shares					
	Firm size at *t*					
	Alone	**2–5**	**6–10**	**11–20**	**21–50**	**50+**
Alone	9.3	2.8	0.9	3.7	5.6	77.6
2–5	1.9	27.0	8.8	3.8	5.0	53.5
6–10	0.0	20.8	29.2	12.5	8.3	29.2
11–20	0.0	5.2	17.2	34.5	17.2	25.9
21–50	0.0	4.1	8.1	12.2	20.3	55.4
50+	0.0	1.6	1.6	2.6	10.9	83.4

Note: Column indicates firm size of informal employer in period *t*-1, row indicates firm size of formal employer in period *t*. Values are average of annualized transitions, Q2 2010 to Q4 2014. Values on the diagonal reflect the share of workers who did not change firm size. Formality is defined on the basis of pension contribution, as information on firm registration (RUC) is not available for 2010 and 2011.
Source: Staff calculations based on Encuesta Continua de Empleo data.

Figure 47
Pre-transition versus post-transition wages of workers age 15+ moving from informal to formal jobs, quarterly observations 2010–2014 (monthly wages in 2005 USD PPP)



Note: Formality defined on the basis of pension contribution.
Source: Staff calculations based on Encuesta Continua de Empleo (ECE) data.

higher net wages on average than informal jobs (see figure 26), the data from the panel labor force survey show that workers transitioning into formal work sometimes incur a loss in earnings. Figure 47 shows that whereas a majority of both men and women experience wage gains following a shift from informal to formal work (reflected by the wages plotted above the 45 degree line), a significant share experience a reduction in wages. This implies that workers change jobs for many different reasons, not only in search of higher earnings. For example, a government job may be less exciting but may bring stability in earnings, fewer hours of work, and a safer working environment, in addition to providing higher non-wage remuneration in terms of social insurance coverage, paid holidays, and the like. Workers also change jobs for family reasons or personal preference, factors that are unobservable and therefore cannot be measured using statistical analysis.[32]

[32] For an extensive treatment of labor mobility and labor adjustment costs, see Hollweg et al. (2014).

4. CONCLUSIONS, REMAINING KNOWLEDGE GAPS, AND NEXT STEPS

Paraguay has enjoyed strong economic growth over the past decade and a half; at the same time, employment and the labor market have undergone a dynamic transformation. This Jobs Diagnostic examines employment and labor market outcomes over the past 15 years to assess the magnitude of job creation, the sectoral distribution of employment, the types of jobs that have been created, and the types of workers who have benefited from these jobs. These employment patterns have implications for productivity and future growth prospects. They also have implications for worker welfare and household living standards. The degree to which different types of workers are benefiting from improved labor outcomes—for example, through increased labor demand or higher wages—will in turn have spillover effects on social cohesion and Paraguay's broader development objectives of poverty reduction and inclusion of vulnerable groups.

The high rate of demographic growth put considerable pressure on the labor market, expanding the labor force by 2.6 percent annually. Job creation kept pace, however, as employment grew by 2.8 percent in the same period. GDP growth—highly dependent on agricultural output and exports—was sufficient to absorb new labor force entrants and still accommodate productivity increases: in the aggregate, value added per worker grew by 2.1 percent per year since 2001.

The economy is in the throes of a structural transformation from an agriculture-based economy to a service-based one. The majority of recent job growth was concentrated in retail (accounting for 45 percent of net new jobs) and government services (over 20 percent), followed by manufacturing (13 percent), construction (11 percent), finance and real estate (10 percent), and other services (9 percent).

Whereas all sectors except agriculture experienced solid job growth, the sectoral distribution of labor productivity growth was mixed, and is reflected in the types of jobs created. Paraguay's high average rate of productivity growth was driven by large gains in agricultural productivity during 2001–08, but after 2008, the gains were more widely dispersed. Between 2008 and 2015, the services subsector comprising transport, communications, finance, real estate, and other services experienced the largest productivity gains, and these gains were observed in both the formal and informal sides of this sector. Government services also experienced large productivity growth, a reflection of wage increases rather than a significant increase in the services delivered per government employee. Construction saw a jump in productivity as well, primarily among informal construction workers.

The large productivity gains in agriculture since 2008 had a mixed impact on jobs and job quality. The number of workers informally employed in agriculture, mostly self-employed farmers, contracted by 51,000 (an 8 percent drop) and farmers' incomes fell by 5 percent per year on average, but 3,600 formal and relatively skilled agriculture jobs were added in the same period, which partially offset the decline in average wages for the entire agriculture sector. These outcomes reflect the dual nature of agriculture in Paraguay: large-scale, capital-intensive commodity production for export on the one hand, and smallholding, labor-intensive production of staple products for local markets on the other hand. The small-scale production model is not contributing to significant output gains or generating productivity or income gains for small farmers, but it nevertheless plays an essential role in feeding and generating income for unskilled rural workers who lack alternative employment options.

Formal (net) job creation outstripped informal job creation by two to one, driving the informality rate from 78 percent of total employment in 2008 to 71 percent by 2015, a remarkable achievement that resulted in improved job quality, as reflected in higher average wages and wider access to social insurance. In fact, real wages increased across the board—for both formal workers (3 percent annual growth since 2008) and informal workers (1.2 percent). Whereas farmer incomes fell, mainly due to the weak performance in 2015, self-employed earnings rose sharply (by 5.5 percent annually), as did the wages of formal public sector workers (4.8 percent).

The resulting improvements in job quality contributed to better living standards and significant reductions in inequality and in both extreme and moderate poverty in urban and rural settings. Extreme poverty fell from 21 percent in 2003 to 11 percent in 2015 in rural areas, and from 6 to 2 percent in urban areas. This translates into significant welfare gains for large numbers of Paraguayans, including vulnerable population groups. On balance, therefore, the country's recent path of job creation has been good for development due to positive contributions in terms of productivity growth, wage growth, reduced informality, and boosted earnings at the low end of the income and skills spectra.

Not all workers benefited equally, however. Workers have unequal access to good jobs: women, rural, less educated, and younger workers are significantly more likely to be stuck in informal employment, and the gap between men's and women's earnings is large, even when controlling for individual characteristics and sector of work. In 2015, men's monthly earnings were 43 percent higher than women's, and the hourly wage gender gap was 25 percent (among full-time wage workers). The monthly wage gap between informal and formal workers is also very large, although the returns to being formal fell slightly from 58 percent in 2012 to 54 percent in 2015 (not controlling for sector of work).

Despite improved labor outcomes for many, employment remains dominated by informal jobs that are low-productivity, poorly paid, and require relatively low skills. The segmented nature of the labor market is reflected in the small number of worker transitions between informal and formal jobs. Although the labor market exhibits dynamism with respect to worker transitions into and between informal jobs, formal jobs—and especially public sector jobs—reflect more stable employment contracts and therefore have very limited labor turnover, effectively precluding other workers from accessing formal jobs.

The continued dominance of the informal sector raises questions about the sustainability of Paraguay's future growth path and the degree to which income inequality can be bridged. On the one hand, educational attainment is rising and rural workers are moving to more productive jobs in urban areas, leading to relative income gains for previously excluded groups. On the other hand, education quality is weak and rural workers are still mostly unskilled, factors that undermine the potential boost to labor productivity. Moreover, a majority of urban employment remains in less productive sectors such as retail, construction, and other services, which absorb youth in particular. These sectors are unlikely to be the source of dynamic growth or innovation that can lead to widely shared productivity gains in the future. The preference of workers with a tertiary degree to enter public employment could ultimately have productivity-dampening effects if the country's most skilled workers are not becoming innovators or entering or creating businesses with high productivity. Another fundamental challenge is Paraguay's small domestic market, which means that it needs to seek new or expanded external markets for a more diversified basket of exports, preferably with higher labor content.

Paraguay's economy has two bright spots, agriculture and manufacturing, which—despite inherent limitations—have great potential for inclusive growth:

- Agricultural output is highly concentrated in a small number of products using capital-intensive technology with limited domestic processing and therefore limited opportunities for adding domestic value. But Paraguay has abundant land and excellent growing conditions, providing smallholders with production opportunities that require inexpensive inputs. There is scope to better exploit this comparative advantage through producing for niche markets (for export) or extending domestic production chains for common food products, particularly those in demand by large trading partners. Agro-processing at a larger scale ultimately requires investment and quality and safety standards, but has the potential to generate formal manufacturing jobs in locations that are closer to rural producers, and to raise job quality for currently excluded groups (e.g., rural, less educated, women, informal), thereby generating positive social externalities.

- The manufacturing sector has generated 42,000 formal jobs since 2008, and most of these were created by large firms. These two facts suggest an important role for manufacturing investments in generating more and better jobs, particularly for job seekers with only secondary education. But a maquila-based strategy that relies on unskilled labor-intensive technologies and imported inputs will have limited productivity spillovers beyond direct job creation. The challenge will be to attract investments in production lines that can create opportunities for local firms to enter along the production chains, preferably located in lagging regions to foster geographic diversification as well, and raise the level of domestic value added. The range of existing production activities remains narrow, and the quality and/or sophistication level of production is relatively low and in some cases inadequate to compete globally.

The demographic bulge has helped economic performance, but sustaining welfare gains and more inclusive GDP growth will require additional policy effort to address key impediments. In order for Paraguay to continue to benefit from the demographic dividend, the economy will need to average over 3 percent real annual growth and add 970,000 jobs between 2015 and 2030. Recent employment creation and growth trends indicate that this is feasible, but the challenge will be to generate better jobs in terms of higher productivity, higher wages, and/or that create more opportunities for vulnerable groups to participate in productive work that raises living standards and household welfare at the low end of the income distribution.

Addressing these various challenges will require a multi-pronged approach. Prior to designing policy interventions or programs to promote certain types of job creation, some key knowledge gaps need to be filled. A wide range of potential factors can impede access to good jobs or act as obstacles to creating more and better jobs or undermine efforts to upgrade job quality. Whereas the analysis herein provides valuable insights into labor supply behavior in conjunction with economic performance and job creation, the interplay of labor supply and labor demand cannot be well understood using only household survey data. Several fundamental knowledge gaps need to be filled to help policymakers design interventions that facilitate a pro-jobs, pro-growth, pro-poor dynamic for Paraguay's future economic path.

This Jobs Diagnostic will be complemented by the following analytical activities under the Let's Work Paraguay program:

- Labor demand. The 2011 firm census and 2015–16 firm survey[33] can provide insight into firm productivity and growth through data on key firm variables. Analyzing firms' decision-making related to hiring and/or substituting non-labor investment for labor inputs is essential to a comprehensive understanding of labor demand.
- Youth perspectives. Paraguay's demographic situation points to continuing rapid labor force growth and the associated pressures of new entrants looking for work, and looking for better work compared to earlier generations. The Let's Work Paraguay program plans to carry out qualitative analysis using focus groups targeting both male and female youth in rural and urban zones in order to understand the factors driving their decisions regarding education, job search, employment expectations, and migration.

The findings of these analyses will inform the design and prioritization of policies aimed at helping Paraguay reach its development potential through more, better, and inclusive jobs.

[33] A survey of micro, small, medium and large formal firms was carried out by DGEEC in 2015–16.

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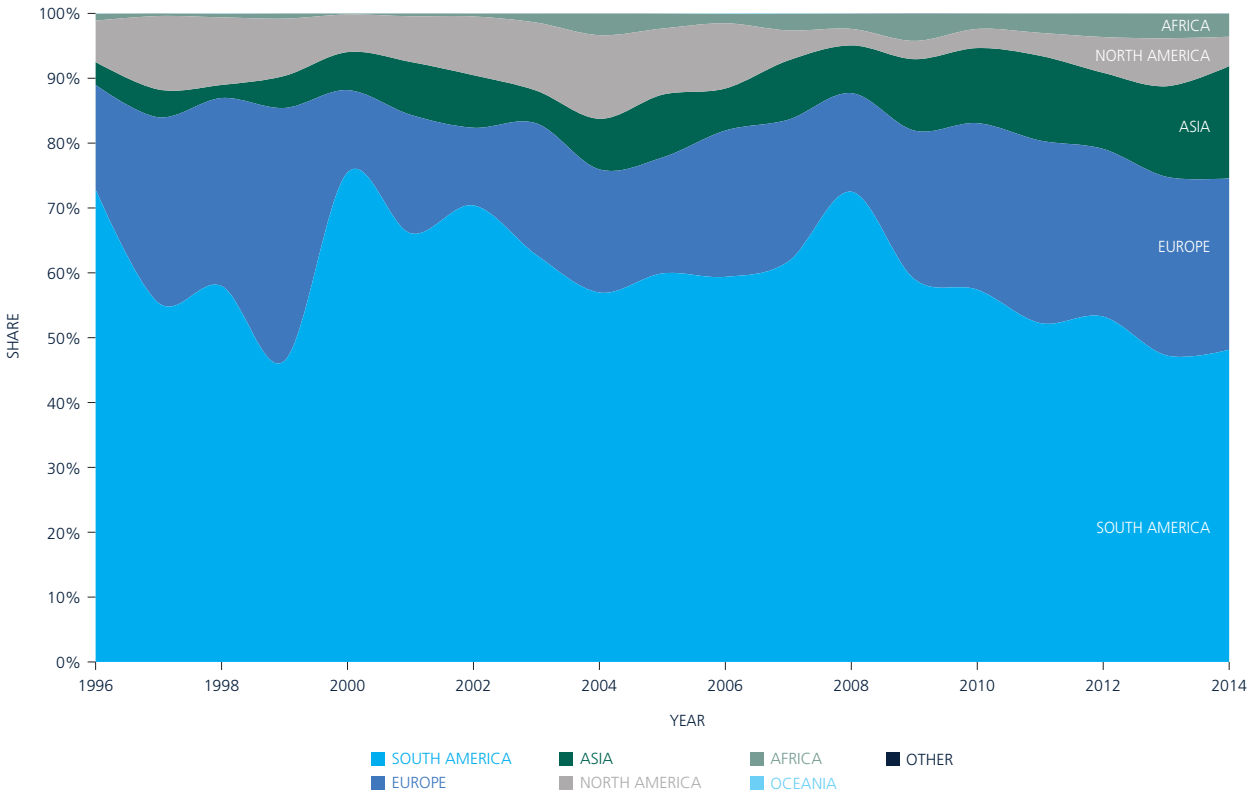
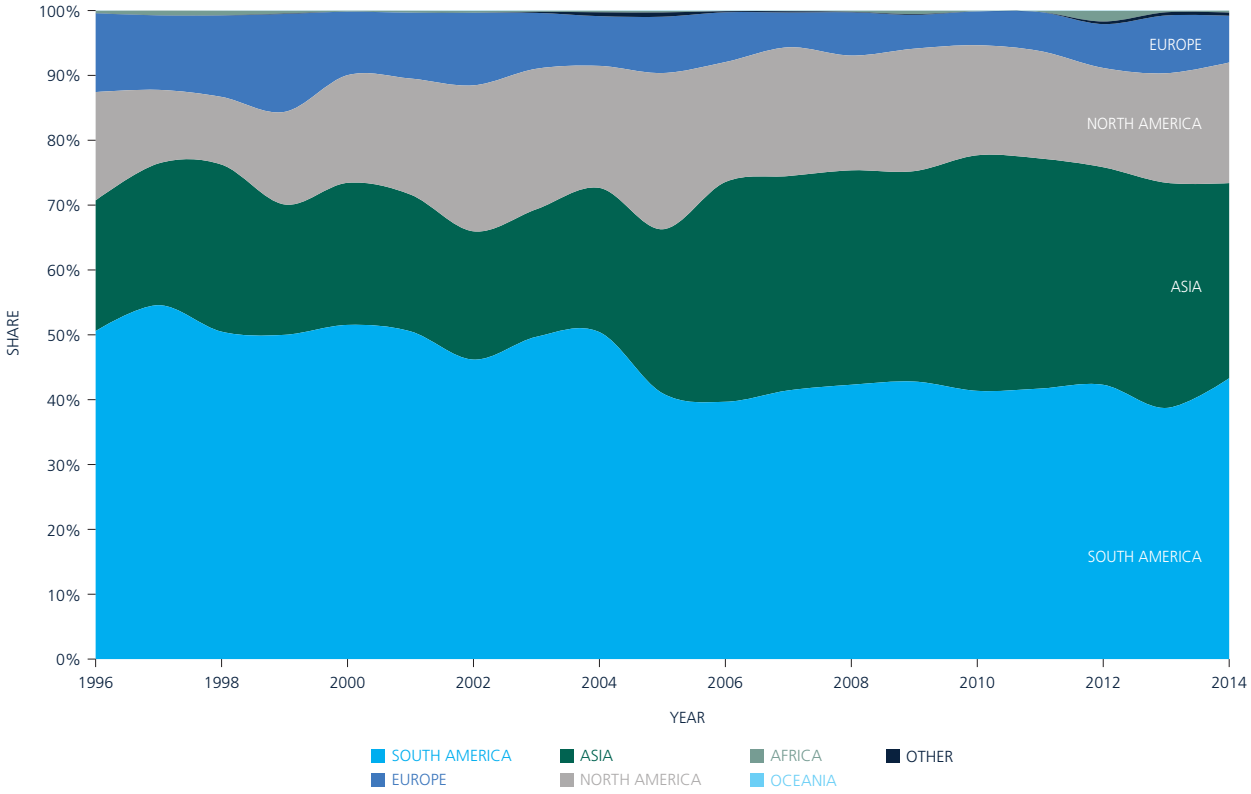
ANNEX A

Figure A1
Destination markets for exports



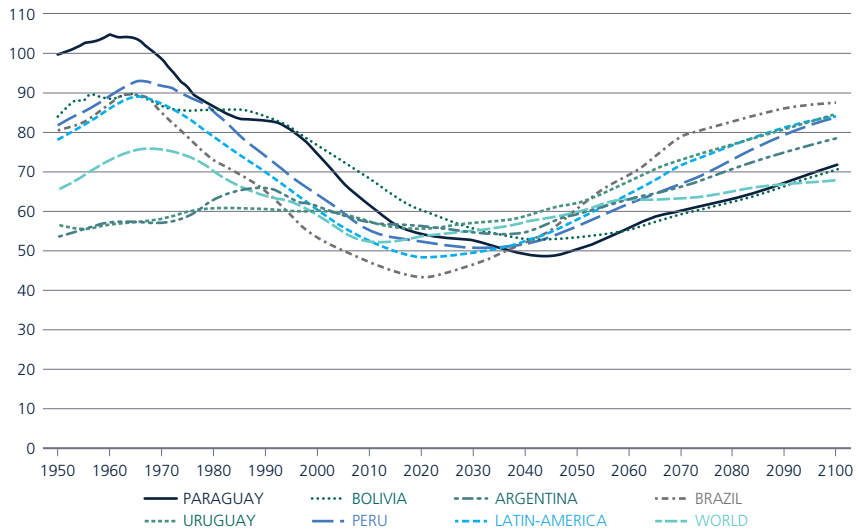
Source: *Atlas of Economic Complexity*, Harvard University (http://atlas.cid.harvard.edu).

Figure A2
Source markets for imports



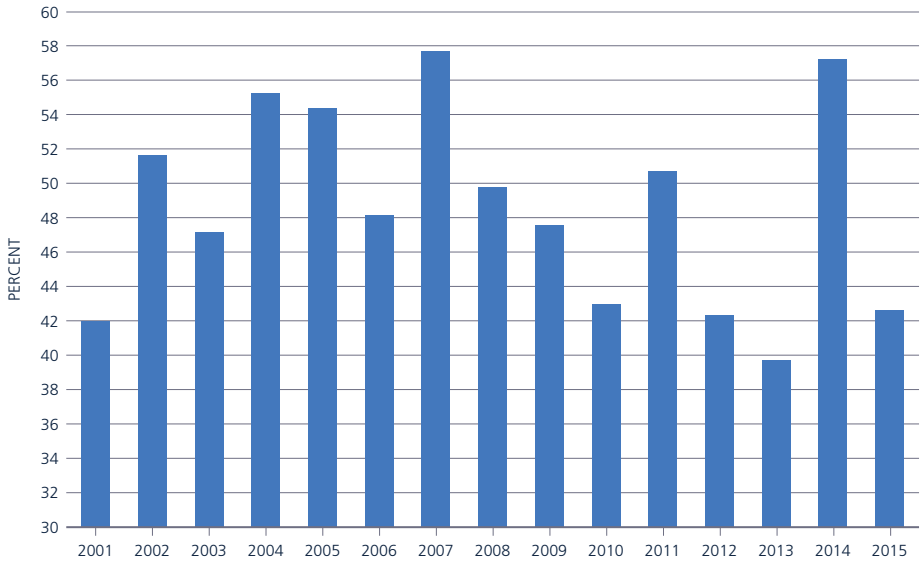
Source: *Atlas of Economic Complexity*, Harvard University (http://atlas.cid.harvard.edu).

Figure A3
Dependency ratios, Paraguay, region, and world, 1950–2100



Note: Total dependency ratio = (Population age <15 and 65+)/(Population age 15–64), for the period 1950–2100.
Source: UNDESA.

Figure A4
Average gender wage gap, male to female, 2001–15



Source: Based on Encuesta Permanente de Hogares data.

ANNEX B

Table B1
Jobs structure decomposition tool

Period: 2001 to 2015					
Aggregate data and indicators	**Unit**	**2001**	**2015**	**% change 2001–2015**	**CAGR 2001–2015**
Aggregate Data:					
Total value added	Thousand 2005 PPP USD	18,667	36,113	93.46	4.83
Population, total	1000 people	5,283	6,655	25.96	1.66
Population 15+	1000 people	3,268	4,634	41.79	2.53
Labor force 15+	1000 people	2,259	3,209	42.07	2.54
Employment 15+	1000 people	2,090	3,038	45.32	2.71
Dependent population <15	1000 people	2,015	2,021	0.28	0.02
Indicators:					
Value added per capita	per 1000 people	3.53	5.43	53.59	3.11
Value added per worker	per 1000 people	8.93	11.89	33.12	2.06
Share of working age population	% of population	61.85	69.63	12.57	0.85
Labor force participation	% of WAP	69.13	69.27	0.20	0.01
Employment rate	% of labor force	92.53	94.65	2.29	0.16
Unemployment rate	% of labor force	7.47	5.35	–28.35	–2.35
Dependents/WAP	Ratio	0.62	0.44	–29.27	–2.44
Dependents/LF	Ratio	0.89	0.63	–29.41	–2.46
Dependents/employed	Ratio	0.96	0.67	–30.99	–2.61

Source for Total Value Added: *Manually added data*

Shapley aggregate decomposition	**2001**	**2015**	**Notation**	**Shapley change**	**% contribution to change**	**% yearly contribution to growth**
Change in per capita value added	3.5	5.4	y	1.9	100%	3.11
Due to changes in productivity	9	12	w	1.3	67%	2.07
Due to changes in employment rate	93%	95%	e	0.1	5%	0.17
Due to changes in participation rate	69%	69%	P	0.0	0%	0.01
Due to changes in share of working age population	62%	70%	a	0.5	28%	0.86
			Check:			

(continued on next page)

Table B1 (continued)
Jobs structure decomposition tool

Shapley equation seqment	w	e	P	a
I	1.2	0.1	0.0	0.4
II	1.4	0.1	0.0	0.6
III	1.2	0.1	0.0	0.6
IV	1.2	0.1	0.0	0.5
V	1.3	0.1	0.0	0.4
VI	1.2	0.1	0.0	0.6
VII	1.3	0.1	0.0	0.6
VIII	1.3	0.1	0.0	0.5

Sectoral employment data (1000 people)	2001	2015	CAGR 2001–2015	Share in 2001	Share in 2015	Average share	Change in share
Total Employment	**2,090**	**3,038**	**2.71**	**100%**	**100%**		
Agriculture	666	609	–0.64	31.9%	20.0%	26.0%	–11.8%
Manufacturing and mining	243	377	3.19	11.6%	12.4%	12.0%	0.8%
Electricity, gas and water	10	17	3.87	0.5%	0.6%	0.5%	0.1%
Construction	98	210	5.58	4.7%	6.9%	5.8%	2.2%
Retail, restaurants and hotels	502	812	3.50	24.0%	26.7%	25.4%	2.7%
Transport, comm, finance, real estate and other	440	699	3.35	21.1%	23.0%	22.0%	1.9%
Gov't, public administration	131	315	6.46	6.3%	10.4%	8.3%	4.1%
Agriculture	666	609	–0.64	31.9%	20.0%	26.0%	–11.8%
Industry	351	603	3.95	16.8%	19.9%	18.3%	3.1%
Services etc.	1,073	1,826	3.87	51.3%	60.1%	55.7%	8.7%

Sectoral value added data (thousand 2005 PPP USD)	2001	2015	CAGR 2001–2015	Average	2001	2015	Average productivity 2001–2015
Total Value Added	**18,667**	**36,113**	**4.83**		**8.9**	**11.9**	**10.4**
Agriculture	3,322	7,219	5.70		5.0	11.9	8.4
Manufacturing and mining	3,262	4,658	2.58		13.4	12.4	12.9
electricity, gas and water	505	469	–0.53		50.5	27.5	39.0
Construction	936	3,436	9.73		9.5	16.4	13.0
Retail, restaurants and hotels	3,745	6,567	4.09		7.5	8.1	7.8
Transport, comm, finance, real estate and other	4,788	8,547	4.23		10.9	12.2	11.6
Gov't, public administration	2,108	5,217	6.69		16.1	16.5	16.3
Agriculture	3,322	7,219	5.70		5.0	11.9	8.4
Industry	4,703	8,563	4.37		13.4	14.2	13.8
Services etc.	10,642	20,332	4.73		9.9	11.1	10.5

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Table B1 (continued)
Jobs structure decomposition tool

Shapley decomposition—by major sector		2001	2015	Absolute change	Average	Shapley change	% Contribution to change	Yearly contribution to growth
Total change in per capita value added		**4**	**5**	**1.9**				**3.11**
Total change in productivity (value added per worker)		**9**	**12**	**3.0**	**10**	**3.0**	**100.0%**	**2.07**
Contribution of within-sector productivity change						**2.6**	**88.2%**	**1.83**
Agriculture		5	12	6.9	8	1.8	60.3%	1.25
Industry		13	14	0.8	14	0.1	4.9%	0.10
Services etc.		10	11	1.2	11	0.7	23.0%	0.48
Intersectoral Shift						**0.3**	**11.8%**	**0.24**
Agriculture		666	609	–57.4		0.2	7.9%	0.16
Industry		351	603	252.6		0.1	3.5%	0.07
Services etc.		1,073	1,826	752.2		0.0	0.3%	0.01
Contribution of sectoral changes in employment rate		**92.5**	**94.6**	**2.1**			**100.0%**	**0.17**
Agriculture		29.5	19.0	–10.5			–497.0%	–0.82
Industry		15.5	18.8	3.3			154.6%	0.26
Services etc.		47.5	56.9	9.4			442.4%	0.73
Total change in participation rate		**69.1**	**69.3**	**0.1**				**0.01**
Total change in share of working age population		**61.9**	**69.6**	**7.8**				**0.86**

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Table B1 (continued)
Jobs structure decomposition tool

Shapley decomposition—by sector		2001	2015	Absolute change	Average	Shapley change	% Contribution to change	Yearly contribution to growth
Total change in per capita value added		**4**	**5**	**1.9**				**3.11**
Total change in productivity (value added per worker)		**9**	**12**	**3.0**	**10**	**3.0**	**100.0%**	**2.07**
Contribution of within-sector productivity change						**2.4**	**82.2%**	**1.70**
Agriculture		5	12	6.9	8	1.8	60.3%	1.25
Manufacturing and mining		13	12	–1.1	13	–0.1	–4.3%	–0.09
Electricity, gas and water		51	28	–23.0	39	–0.1	–4.0%	–0.08
Construction		10	16	6.8	13	0.4	13.4%	0.28
Retail, restaurants and hotels		7	8	0.6	8	0.2	5.4%	0.11
Transport, comm, finance, real estate and other		11	12	1.4	12	0.3	10.1%	0.21
Gov't, public administration		16	17	0.5	16	0.0	1.3%	0.03
Intersectoral shift						**0.527191911**	**17.8%**	**0.37**
Agriculture		666	609	–57.4		0.2	7.9%	0.16
Manufacturing and mining		243	377	134		0.0	0.7%	0.01
Electricity, gas and water		10	17	7		0.0	0.8%	0.02
Construction		98	210	112		0.1	1.9%	0.04
Retail, restaurants and hotels		502	812	310		–0.1	–2.4%	–0.05
Transport, comm, finance, real estate and other		440	699	258		0.0	0.7%	0.02
Gov't, public administration		131	315	184		0.2	8.2%	0.17

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Table B1 (continued)
Jobs structure decomposition tool

Shapley decomposition—by sector		2001	2015	Absolute change	Average	Shapley change	% Contribution to change	Yearly contribution to growth
Contribution of sectoral changes in employment rate		**92.5**	**94.6**	**2.1**			**100.0%**	**0.17**
Agriculture		29.5	19.0	–10.5			–497.0%	–0.82
Manufacturing and mining		10.7	11.7	1.0			46.8%	0.08
Electricity, gas and water		0.4	0.5	0.1			4.1%	0.01
Construction		4.3	6.5	2.2			103.6%	0.17
Retail, restaurants and hotels		22.2	25.3	3.1			145.4%	0.24
Transport, comm, finance, real estate and other		19.5	21.8	2.3			107.4%	0.18
Gov't, public administration		5.8	9.8	4.0			189.6%	0.31
Total change in participation rate		**69.1**	**69.3**	**0.1**				**0.01**
Total change in share of working age population		**61.9**	**69.6**	**7.8**				**0.86**

ANNEX C

Table C1
Average marginal effects from multinomial logit regression, employed age 15+, 2015

	Unpaid (1)	Farmer (2)	Employer (3)	Self employed non farmer (4)	Informal wage (5)	Formal wage private (6)	Formal wage public (7)
Age	–0.004***	0.002***	0.002***	0.006***	–0.012***	0.002***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Male	–0.072***	0.070***	0.055***	–0.024***	–0.033***	0.022***	–0.018***
	(0.006)	(0.006)	(0.007)	(0.009)	(0.012)	(0.008)	(0.006)
Highest education level (relative to incomplete primary or less)							
Primary complete	–0.024**	–0.028***	0.014**	0.019	–0.019	0.033***	0.006
	(0.010)	(0.010)	(0.006)	(0.013)	(0.022)	(0.013)	(0.008)
Secondary incomplete	–0.021**	–0.088***	0.032***	0.083***	–0.094***	0.080***	0.010*
	(0.010)	(0.009)	(0.006)	(0.014)	(0.020)	(0.013)	(0.006)
Secondary complete	–0.049***	–0.113***	0.042***	0.116***	–0.153***	0.120***	0.036***
	(0.011)	(0.010)	(0.009)	(0.017)	(0.021)	(0.014)	(0.009)
Tertiary incomplete	–0.062***	–0.140***	0.078***	0.052***	–0.201***	0.068***	0.204***
	(0.012)	(0.010)	(0.015)	(0.019)	(0.022)	(0.013)	(0.013)
Tertiary complete	–0.052***	–0.152***	0.096***	0.128***	–0.248***	0.099***	0.130***
	(0.015)	(0.009)	(0.013)	(0.020)	(0.021)	(0.014)	(0.010)
Region (relative to Asunción)							
San Pedro	0.123***	0.213***	–0.039***	–0.119***	–0.102***	–0.145***	0.070***
	(0.017)	(0.014)	(0.012)	(0.022)	(0.026)	(0.016)	(0.014)
Caaguazú	0.130***	0.153***	–0.021*	–0.093***	–0.073***	–0.127***	0.031***
	(0.015)	(0.012)	(0.012)	(0.021)	(0.024)	(0.015)	(0.011)
Itapúa	0.023*	0.096***	–0.025**	–0.062**	0.003	–0.030	–0.004
	(0.013)	(0.012)	(0.013)	(0.024)	(0.031)	(0.023)	(0.019)
Alto Paraná	0.007	0.037***	–0.019	0.009	0.029	–0.035**	–0.028***
	(0.012)	(0.009)	(0.012)	" (0.023)	(0.025)	(0.016)	(0.009)
Central	0.008	0.020**	–0.013	–0.020	0.036	–0.027*	–0.003
	(0.012)	(0.009)	(0.012)	(0.022)	(0.024)	(0.015)	(0.010)
Rest	0.064***	0.135***	–0.024**	–0.085***	–0.032	–0.092***	0.034***
	(0.011)	(0.009)	(0.010)	(0.019)	(0.021)	(0.013)	(0.009)

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Table C1 (continued)
Average marginal effects from multinomial logit regression, employed age 15+, 2015

	Unpaid (1)	Farmer (2)	Employer (3)	Self employed non farmer (4)	Informal wage (5)	Formal wage private (6)	Formal wage public (7)
Large firm	0.066***	–0 294***	0.053***	–0.565***	0.482***	0.170***	0.087***
	(0.021)	(0.071)	(0.011)	(0.074)	(0.041)	(0.008)	(0.006)
Observations	12,608	12,608	12,608	12,608	12,608	12,608	12,608

Notes
Multinomial Logit regressions. Informal wage as base category. Unweighted observations with robust standard errors. Introducing weights or using different firm sizes introduce non-convergence in MLE estimation.
Incomplete primaryor less if less than 6 years of education; Primary complete if with 6 years of education and not Formal if (i) wage employees contributing to Social Security, (ii) employers of a registered firm (RUC), (iii) self- Large firm if more than 5 employees
Standard errors in parentheses.* p <0.1 ** p <0.05 *** p <0.01
Source: Staff calculations based on SEDLAC data.

Table C2
Logit estimates and average marginal effects (AME), age 15+, 2015

	Inactive (0) to active (1)		Unemployed (0) to employed (1)		Informal (0) to formal (1)		Unemployed (0) to inactive (1)	
	Estimate (1)	**AME (2)**	**Estimate (3)**	**AME (4)**	**Estimate (5)**	**AME (6)**	**Estimate (7)**	**AME (8)**
Age	0.326***	0.013***	0.262***	0.006***	0.256***	0.009***	–0.139**	–0.001
	(0.024)	(0.001)	(0.052)	(0.001)	(0.049)	(0.001)	(0.059)	(0.001)
Age^2	–0.004***		–0.003***		–0.003***		0.002***	
	(0.000)		(0.001)		(0.001)		(0.001)	
Male	1.992***	0.275***	0.486***	0.026***	0.374***	0.042***	–1.671***	–0.164***
	(0.063)	(0.008)	(0.120)	(0.006)	(0.100)	(0.011)	(0.143)	(0.013)
Attending any education level	–1.174***	–0.162***	0.582***	0.031***	–0.295*	–0.033*	2.036***	0 199***
	(0.102)	(0.014)	(0.191)	(0.010)	(0.162)	(0.018)	(0.227)	(0.021)
Language most spoken at home (relative to Spanish)								
Guaraní	0.270**	0.038**	0.511***	0.026***	–0.541***	–0.061***	0.319	0.031
	(0.106)	(0.015)	(0.186)	(0.010)	(0.148)	(0.017)	(0.203)	(0.020)
Guaraní and Spanish	0.167*	0.024*	0.105	0.006	–0.112	–0.013	0.058	0.006
	(0.089)	(0.013)	(0.172)	(0.011)	(0.118)	(0.014)	(0.181)	(0.019)
Other	–0.068	–0.010	1.170***	0.047***	0.599**	0.074**	0.920**	0.075***
	(0.158)	(0.023)	(0.372)	(0.012)	(0.250)	(0.032)	(0.393)	(0.027)
Highest education level (relative to incomplete primary or less)								
Primary complete	0.343***	0.055***	–0.350	–0.020	0.619***	0.051***	–0.540**	–0.043**
	(0.104)	(0.017)	(0.227)	(0.013)	(0.232)	(0.018)	(0.232)	(0.018)
Secondary incomplete	0.357***	0.057***	–0.213	–0.011	1.388***	0.134***	–0.506**	–0.040**
	(0.111)	(0.018)	(0.200)	(0.010)	(0.228)	(0.019)	(0.231)	(0.017)
Sector (relative to retail) complete	0.824***	0.125***	–0.025	–0.001	1 892***	0 199***	–0.635**	–0.052***
	(0.121)	(0.018)	(0.220)	(0.011)	(0.234)	(0.021)	(0.250)	(0.020)

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Table C2 (continued)
Logit estimates and average marginal effects (AME), age 15+, 2015

	Inactive (0) to active (1)		Unemployed (0) to employed (1)		Informal (0) to formal (1)		Unemployed (0) to inactive (1)	
	Estimate (1)	**AME (2)**	**Estimate (3)**	**AME (4)**	**Estimate (5)**	**AME (6)**	**Estimate (7)**	**AME (8)**
Tertiary incomplete	1.312***	0.186***	–0.237	–0.013	2.687***	0.316***	–1.331***	–0.133***
	(0.144)	(0.019)	(0.241)	(0.013)	(0.253)	(0.027)	(0.278)	(0.028)
Tertiary complete	1.985***	0.253***	0.382	0.016	2.781***	0.330***	–1.268***	–0.125***
	(0.172)	(0.019)	(0.331)	(0.013)	(0.255)	(0.028)	(0.364)	(0.042)
Household size	–0.027	–0.004	0.001	0.000	–0.025	–0.003	0.038	0.004
	(0.029)	(0.004)	(0.050)	(0.003)	(0.043)	(0.005)	(0.057)	(0.006)
Number children younger than 13 in hh	–0.015	–0.002	0.020	0.001	0.045	0.005	0.003	0.000
	(0.044)	(0.006)	(0.079)	(0.004)	(0.067)	(0.007)	(0.087)	(0.009)
Numberyouth in hh	0.149***	0.021***	–0.012	–0.001	–0.003	–0.000	–0.175**	–0.017**
	(0.042)	(0.006)	(0.072)	(0.004)	(0.066)	(0.007)	(0.076)	(0.007)
Number elder age ≥60 in hh	–0.037	–0.005	–0.247**	–0.013**	–0.032	–0.004	–0.082	–0.008
	(0.059)	(0.008)	(0.110)	(0.006)	(0.093)	(0.010)	(0.109)	(0.011)
Urban	–0.050	–0.007	–0.498***	–0.027***	0.251**	0.028**	–0.388***	–0.038***
	(0.073)	(0.010)	(0.139)	(0.007)	(0.127)	(0.014)	(0.146)	(0.014)
Region (relative to Asunción)								
San Pedro	0.153	0.021	–0.283	–0.012	–0.925***	–0.104***	–0.526*	–0.046
	(0.149)	(0.021)	(0.282)	(0.013)	(0.209)	(0.023)	(0.317)	(0.029)
Caaguazú	0.006	0.001	0.480	0.015	–0.942***	–0.106***	0.605*	0.037*
	(0.136)	(0.019)	(0.311)	(0.009)	(0.186)	(0.021)	(0.330)	(0.020)
Itapúa	0.308*	0.042*	–0.189	–0.008	–0.294	–0.035	–0.561*	–0.050
	(0.161)	(0.022)	(0.322)	(0.014)	(0.216)	(0.026)	(0.338)	(0.032)
Alto Paraná	0.130	0.018	–1.179***	–0.075***	–0.473***	–0.056***	–1.164***	–0.123***
	(0.122)	(0.017)	(0.221)	(0.014)	(0.167)	(0.020)	(0.246)	(0.024)

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Table C2 (continued)
Logit estimates and average marginal effects (AME), age 15+, 2015

	Inactive (0) to active (1)		Unemployed (0) to employed (1)		Informal (0) to formal (1)		Unemployed (0) to inactive (1)	
	Estimate (1)	**AME (2)**	**Estimate (3)**	**AME (4)**	**Estimate (5)**	**AME (6)**	**Estimate (7)**	**AME (8)**
Region (relative to Asunción) (continued)								
Central	0.111	0.015	–0.341	–0.015	–0.330**	–0.039**	–0.479*	–0.042**
	(0.120)	(0.017)	(0.219)	(0.009)	(0.154)	(0.019)	(0.246)	(0.021)
Rest	–0.042	–0.006	–0.382*	–0.017**	–0.549***	–0.064***	–0.340	–0.028
	(0.110)	(0.016)	(0.197)	(0.008)	(0.138)	(0.017)	(0.226)	(0.018)
Sector (relative to retail)								
Agriculture, cattle and fishing					–1.286***	–0.147***		
					(0.260)	(0.026)		
Manufacture and mining					–0.050	–0.007		
					(0.139)	(0.019)		
Electricity, gas and water					0.413	0.057		
					(0.418)	(0.060)		
Construction					–1.015***	–0.121***		
					(0.218)	(0.024)		
Transport and communication					0.042	0.006		
					(0.211)	(0.028)		
Finance and real state					0.221	0.030		
					(0.190)	(0.026)		
Other services					–0.801***	–0.098***		
					(0.154)	(0.018)		

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Table C2 (continued)
Logit estimates and average marginal effects (AME), age 15+, 2015

	Inactive (0) to active (1)		Unemployed (0) to employed (1)		Informal (0) to formal (1)		Unemployed (0) to inactive (1)	
	Estimate (1)	**AME (2)**	**Estimate (3)**	**AME (4)**	**Estimate (5)**	**AME (6)**	**Estimate (7)**	**AME (8)**
Firm size (relative to [2–5])								
Alone					–0.470***	–0.052***		
					(0.138)	(0.015)		
[6–10]					0.661***	0.085***		
					(0.141)	(0.019)		
[11–20]					0 991***	0.132***		
					(0.164)	(0.023)		
[21–50]					1.404***	0.194***		
					(0.158)	(0.023)		
[50+]					1.731***	0.243***		
					(0.175)	(0.026)		
Constant	–5.827***		–1.810**		–8.121***		4.919***	
	(0.427)		(0.861)		(0.875)		(0.969)	
Weighted observations	15,893	15,893	11,479	11,479	10,248	10,248	5,164	5,164
Pseudo R^2	0.267		0.106		0.411		0.189	

Notes
Logit regressions with weighted observations
Incomplete primary or less if less than 6 years of education; Primary complete if with 6 years of education and not enrolled; Secondary incomplete if with 6 years of education and enrolled or has (6–12) years of education; Secondary complete if with 12 years of education and not enrolled; Tertiary incomplete if with 12 years of education and enrolled or has (12–16) years of education; Tertiary complete if with more than 15 years of education.
Formal if (i) wage employees contributing to Social Security, (ii) employers of a registered firm (RUC), (iii) self-employed workers with a registered firm (RUC); Informal if (i) farmers/herders/fisherman (self-employed or employer of firm with no RUC), (ii) unpaid family worker, (iii) self-employed, employee or employer of firm with no RUC, (iv) wage employees not contributing to Social Security.
Standard errors in parentheses.* $p<0.1$ ** $p<0.05$ *** $p<0.01$
Govt/public administration and Firm size [21–50] not estimable as perfectly predict formality.
Alone category in Firm size includes self-employed and domestic employees.
(+) Not estimable as perfectly predicts zero.
Source: Own calculations based on SEDLACdata.

Table C3
Mincer regressions, OLS, dep, variable log monthly real wage (2005 USD PPP), paid workers age 15+, 2015

	(1)	(2)	(3)	(4)	(5)
Experience	0.042***	0.053***	0.047***	0.047***	0.038***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Experience^2	–0.000***	–0.001***	–0.001***	–0.001***	–0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.426***	0.469***	0.423***	0.320***	0.397***
	(0.021)	(0.021)	(0.024)	(0.022)	(0.023)
Formal	0.536***			0.417***	0.477***
	(0.023)			(0.027)	(0.026)
Public		0.228***			
		(0.027)			
Job tenure (years)	–0.002	–0.001	0.006***	–0.002*	0.004***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Language most spoken at home (relative to Spanish)					
Guaraní	–0.280***	–0.357***	–0.266***	–0.270***	–0.212***
	(0.039)	(0.040)	(0.040)	(0.039)	(0.039)
Guaraní and Spanish	–0.035	–0.071***	–0.079***	–0.037	–0.050*
	(0.026)	(0.026)	(0.026)	(0.026)	(0.025)
Other	0.511***	0.505***	0.606***	0.499***	0.604***
	(0.072)	(0.076)	(0.074)	(0.071)	(0.071)
Does not speak	–0.051	0.154***	0.201***	–0.204**	0.012
	(0.109)	(0.044)	(0.043)	(0.088)	(0.098)
Highest education level (relative to incomplete primary or less)					
Primary complete	0.134***	0.157***	0.101**	0.113***	0.088**
	(0.043)	(0.043)	(0.041)	(0.041)	(0.041)
Secondary incomplete	0.280***	0.363***	0.257***	0.269***	0.196***
	(0.048)	(0.049)	(0.048)	(0.047)	(0.047)
Secondary complete	0.457***	0.610***	0.476***	0.427***	0.360***
	(0.050)	(0.051)	(0.055)	(0.051)	(0.052)
Tertiary incomplete	0.631***	0.851***	0.694***	0.543***	0.511***
	(0.053)	(0.054)	(0.057)	(0.054)	(0.055)
Tertiary complete	0.928***	1.198***	1.024***	0.854***	0 799***
	(0.055)	(0.056)	(0.059)	(0.056)	(0.058)

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Table C3 (continued)
Mincer regressions, OLS, dep, variable log monthly real wage (2005 USD PPP), paid workers age 15+, 2015

	(1)	(2)	(3)	(4)	(5)
Region (relative to Asunción)					
San Pedro	–0.435***	–0.522***	–0.366***	–0.443***	–0.301***
	(0.050)	(0.052)	(0.051)	(0.050)	(0.050)
Caaguazú	–0.371***	–0.454***	–0.366***	–0.393***	–0.300***
	(0.044)	(0.047)	(0.045)	(0.045)	(0.043)
Itapúa	–0.203***	–0.259***	–0.214***	–0.216***	–0.172***
	(0.052)	(0.054)	(0.053)	(0.051)	(0.052)
Alto Paraná	–0.064*	–0.107***	–0.120***	–0.099***	–0.078**
	(0.036)	(0.037)	(0.036)	(0.037)	(0.035)
Central	–0.090***	–0.108***	–0.109***	–0.127***	–0.093***
	(0.033)	(0.034)	(0.034)	(0.034)	(0.032)
Rest	–0.323***	–0.388***	–0.313***	–0.349***	–0.263***
	(0.031)	(0.033)	(0.032)	(0.032)	(0.030)
Sector (relative to retail)					
Agriculture, cattle and fishing			–0.619***		–0.552***
			(0.051)		(0.050)
Manufacture and mining			0.014		–0.007
			(0.036)		(0.035)
Electricity, gas and water			0.544***		0.429***
			(0.091)		(0.088)
Construction			0.122***		0.187***
			(0.036)		(0.036)
Transport and communication			0.206***		0.176***
			(0.043)		(0.044)
Finance and real state			0.107**		0.067
			(0.043)		(0.042)
Govt/public administration			0.175***		0.028
			(0.031)		(0.031)
Other services			–0.196***		–0.124***
			(0.033)		(0.033)
Firm size (relative to [2–5])					
Alone				–0.381***	
				(0.030)	
[6–10]				0.165***	
				(0.029)	
[11–20]				0.161***	
				(0.035)	

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Table C3 (continued)
Mincer regressions, OLS, dep, variable log monthly real wage (2005 USD PPP), paid workers age 15+, 2015

	(1)	(2)	(3)	(4)	(5)
[21–50]				0.087***	
				(0.032)	
[50+]				0.124***	
				(0.035)	
Constant	4.741***	4.614***	4.845***	4.854***	4.923***
	(0.088)	(0.092)	(0.097)	(0.094)	(0.092)
Weighted observations	11,838	11,845	11,845	11,319	11,838
R sq	0.384	0.345	0.387	0.419	0.417

Notes
OLS regressions with robust standa rd errors and income weights.
Standard errors in parentheses.* p <0.1 ** p <0.05 *** p <0.01
Wages calculated as average of monthly earnings from main occupation transformed in 2005 USD PPP using SEDLAC CPI and PPP conversion factors. Include monetary income and all other income related with the job, like bonuses and implicit rent/food/uniform value, received regularly. Transformed in 2005 USD PPP using SEDLAC CPI and PPP conversion
Experience = Age – Years of education + 6
Formal if (i) wage employees contributing to Soda I Security, (ii) employers of a registered firm (RUC), (iii) self-employed workers with a registered firm (RUC); Informal if (i) farmers/herders/fisherman (self-employed or employer of firm with no RUC), (ii) unpaid family worker, (iii) self-employed, employee or employer of firm with no RUC, (iv) wage employees
Tenure defined as number of years in main occupation.
Incomplete primary or less if less than 6 years of education; Primary complete if with 6 years of education and not enrolled; Secondary incomplete if with 6 years of education and enrolled or has (6–12) years of education; Secondary complete if with 12 years of education and not enrolled; Tertiary incomplete if with 12 years of education and enrolled
To explore for selection bias we estimated Heckman models. Results are identical to OLS and can be supplied by request.
Source: Staff calculations based on SEDLAC data.

Table C4
Mincer regressions, OLS, dep, variable log hourly real wage (2005 USD PPP), full-time workers age 15+, 2015

	(1)	(2)	(3)	(4)	(5)
Experience	0.032***	0.039***	0.036***	0.035***	0.028***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Experience^2	–0.000***	–0.000***	–0.000***	–0.000***	–0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.252***	0.279***	0.236***	0.177***	0.225***
	(0.022)	(0.023)	(0.025)	(0.024)	(0.025)
Formal	0.414***			0.319***	0.372***
	(0.026)			(0.031)	(0.028)
Public		0.321***			
		(0.031)			
Job tenure (years)	0.005***	0.006***	0.008***	0.006***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)

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Table C4 (continued)
Mincer Regressions, OLS, dep, variable log hourly real wage (2005 USD PPP), full-time workers age 15+, 2015

	(1)	(2)	(3)	(4)	(5)
Language most spoken at home (relative to Spanish)					
Guaraní	–0.249***	–0.309***	–0.271***	–0 229***	–0.228***
	(0.038)	(0.039)	(0.037)	(0.039)	(0.036)
Guaraní and Spanish	–0.088***	–0.120***	–0.127***	–0.077***	–0.105***
	(0.026)	(0.026)	(0.026)	(0.027)	(0.026)
Other	0.443***	0.431***	0.503***	0.451***	0.508***
	(0.079)	(0.083)	(0.084)	(0.079)	(0.081)
Does not speak	–0.300***	–0.053	0.035	–0.437***	–0.166***
	(0.045)	(0.057)	(0.050)	(0.046)	(0.039)
Highest education level (relative to incomplete primary or less)					
Primary complete	0.008	0.037	0.022	0.010	0.005
	(0.048)	(0.048)	(0.047)	(0.047)	(0.046)
Secondary incomplete	0.170***	0.248***	0.205***	0 179***	0.147***
	(0.048)	(0.049)	(0.049)	(0.048)	(0.048)
Secondary complete	0.313***	0.443***	0.398***	0.316***	0.289***
	(0.052)	(0.053)	(0.058)	(0.053)	(0.055)
Tertiary incomplete	0.541***	0.691***	0.642***	0.505***	0.477***
	(0.053)	(0.055)	(0.058)	(0.054)	(0.056)
Tertiary complete	0.878***	1.056***	0.973***	0.839***	0.786***
	(0.055)	(0.057)	(0.061)	(0.056)	(0.059)
Region (relative to Asunción)					
San Pedro	–0.323***	–0.424***	–0.331***	–0.328***	–0.262***
	(0.056)	(0.058)	(0.058)	(0.057)	(0.056)
Caaguazú	–0.292***	–0.375***	–0.312***	–0.304***	–0.247***
	(0.048)	(0.050)	(0.050)	(0.049)	(0.048)
Itapúa	–0.106**	–0.158***	–0.145***	–0.119**	–0.105**
	(0.050)	(0.049)	(0.048)	(0.050)	(0.049)
Alto Paraná	–0.037	–0.081**	–0.072*	–0.066*	–0.024
	(0.037)	(0.039)	(0.039)	(0.039)	(0.038)
Central	–0.087**	–0.110***	–0.107***	–0.142***	–0.086**
	(0.036)	(0.038)	(0.038)	(0.039)	(0.036)
Rest	–0.241***	–0.308***	–0.261***	–0.267***	–0.213***
	(0.035)	(0.036)	(0.036)	(0.036)	(0.034)
Sector (relative to retail)					
Agriculture, cattle and fishing			–0.250***		–0.197
			(0.058)		(0.056)
Manufacture and mining			0.183***		0.164***
			(0.034)		(0.033)

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Table C4 (continued)
Mincer Regressions, OLS, dep, variable log hourly real wage (2005 USD PPP), full-time workers age 15+, 2015

	(1)	(2)	(3)	(4)	(5)
Electricity, gas and water			0.635***		0.561***
			(0.102)		(0.100)
Construction			0.267***		0.315***
			(0.038)		(0.038)
Transport and communication			0.259***		0.241***
			(0.052)		(0.051)
Finance and real state			0.178***		0.141***
			(0.044)		(0.043)
Govt/public administration			0.389***		0.297***
			(0.035)		(0.036)
Other services			–0.005		0.048
			(0.035)		(0.035)
Firm size (relative to [2–5])					
Alone				–0.262***	
				(0.035)	
[6–10]				0.175***	
				(0.033)	
[11–20]				0.217***	
				(0.040)	
[21–50]				0.137***	
				(0.037)	
[50+]				0.208***	
				(0.040)	
Constant	–0.124	–0.199**	–0.189*	–0.112	–0.110
	(0.086)	(0.092)	(0.098)	(0.091)	(0.093)
Weighted observations	7,893	7,899	7,899	7,477	7,893
R sq	0.345	0.317	0.344	0.373	0.373

Notes
OLS regressions with robust standard errors and income weights.
Standard errors in parentheses.* p <0.1 ** p <0.05 *** p <0.01
Wages calculated as average of monthly earnings from main occupation transformed in 2005 USD PPP using SEDLAC CPI and PPP conversion factors. Include monetary income and all other income related with the job, like bonuses and implicit rent/food/uniform value, received regularly. Transformed in 2005 USD PPP using SEDLAC CPI and PPP conversion factors.
Experience = Age – Years of education + 6
Formal if (i) wage employees contributing to Social Security, (ii) employers of a registered firm (RUC), (iii) self-employed workers with a registered firm (RUC); Informal if (i) farmers/herders/fisherman (self-employed or employer of firm with no RUC), (ii) unpaid family worker, (iii) self-employed, employee or employer of firm with no RUC, (iv) wage employees not
Tenure defined as number of years in main occupation.
Incomplete primary or less if less than 6 years of education; Primary complete if with 6 years of education and not enrolled; Secondary incomplete if with 6 years of education and enrolled or has (6–12) years of education; Secondary complete if with 12 years of education and not enrolled; Tertiary incomplete if with 12 years of education and enrolled or has (12–15) years of education; Tertiary complete if with more than 15 years of education.
To explore for selection bias we estimated Heckman models. Results are identical to OLS and can be supplied by request.
Source: Staff calculations based on SEDLAC data .

Table C5
OLS Mincer regressions, specification 1, dependent variable log monthly real wage (2005 USD PPP), paid workers age 15+

	2008 (1)	2009 (2)	2010 (3)	2011 (4)	2012 (5)	2013 (6)	2014 (7)	2015 (8)
Experience	0.045***	0.045***	0.042***	0.043***	0.049***	0.042***	0.039***	0.042***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Experience^2	–0.001***	–0.001***	–0.000***	–0.001***	–0.001***	–0.001***	–0.000***	–0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.474***	0.459***	0.423***	0.436***	0.479***	0.480***	0.444***	0.426***
	(0.024)	(0.028)	(0.023)	(0.024)	(0.022)	(0.024)	(0.022)	(0.021)
Formal	0.548***	0.612***	0.518***	0.517***	0.576***	0.561***	0 529***	0.536***
	(0.028)	(0.031)	(0.027)	(0.029)	(0.024)	(0.026)	(0.024)	(0.023)
Job tenure (years)	0.001	–0.004**	–0.007***	–0.003*	–0.009***	–0.001	–0.000	–0.002
	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Language most spoken at home (relative to Spanish)								
Guaraní	–0.316***	–0.272***	–0.329***	–0.300***	–0.318***	–0.277***	–0.358***	–0.280***
	(0.036)	(0.044)	(0.033)	(0.037)	(0.035)	(0.038)	(0.035)	(0.039)
Guaraní and Spanish	–0.104***	–0.111***	–0.046*	–0.095***	–0.102***	–0.075***	–0.111***	–0.035
	(0.030)	(0.034)	(0.027)	(0.029)	(0.025)	(0.029)	(0.027)	(0.026)
Other	0.637***	0.681***	0.780***	0 922***	0.609***	0.732***	0.772***	0.511***
	(0.078)	(0.085)	(0.089)	(0.099)	(0.088)	(0.101)	(0.086)	(0.072)
Does not speak	0.512	–0.288	–0.201	0.097	–0.622***	–0.530**	0.158	–0.051
	(0.401)	(0.309)	(0.366)	(0.441)	(0.148)	(0.220)	(0.464)	(0.109)
Highest education level (relative to incomplete primary or less)								
Primary complete	0191***	0.156***	0.134***	0.137***	0.178***	0.125**	0.091**	0.134***
	(0.037)	(0.051)	(0.041)	(0.049)	(0.044)	(0.051)	(0.043)	(0.043)
Secondary incomplete	0.354***	0.354***	0.212***	0.294***	0.395***	0.204***	0.180***	0.280***
	(0.037)	(0.052)	(0.041)	(0.044)	(0.043)	(0.047)	(0.041)	(0.048)

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Table C5 (continued)
OLS Mincer regressions, specification 1, dependent variable log monthly real wage (2005 USD PPP), paid workers age 15+

	2008 (1)	2009 (2)	2010 (3)	2011 (4)	2012 (5)	2013 (6)	2014 (7)	2015 (8)
Secondary complete	0.474***	0.509***	0.415***	0.476***	0.506***	0.328***	0.290***	0.457***
	(0.044)	(0.068)	(0.044)	(0.051)	(0.049)	(0.052)	(0.044)	(0.050)
Tertiary incomplete	0.616***	0.651***	0.536***	0.606***	0 729***	0.436***	0.436***	0.631***
	(0.048)	(0.066)	(0.050)	(0.055)	(0.051)	(0.054)	(0.048)	(0.053)
Tertiary complete	0.909***	0 925***	0.867***	0.926***	1.012***	0.842***	0.727***	0.928***
	(0.059)	(0.071)	(0.050)	(0.058)	(0.057)	(0.057)	(0.053)	(0.055)
Region (relative to Asunción)								
San Pedro	–0.134***	–0.151***	–0.228***	–0.276***	–0.156***	–0.200***	–0.285***	–0.435***
	(0.049)	(0.053)	(0.049)	(0.056)	(0.050)	(0.049)	(0.051)	(0.050)
Caaguazú	–0.248***	–0.080*	–0.243***	–0.305***	–0.225***	–0.212***	–0.215***	–0.371***
	(0.045)	(0.048)	(0.044)	(0.046)	(0.043)	(0.041)	(0.044)	(0.044)
Itapúa	–0.189***	–0.271***	–0.268***	–0.181***	–0.455***	–0.389***	–0.401***	–0.203***
	(0.043)	(0.051)	(0.040)	(0.052)	(0.048)	(0.061)	(0.048)	(0.052)

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Table C5 (continued)
OLS Mincer regressions, specification 1, dependent variable log monthly real wage (2005 USD PPP), paid workers age 15+

	2008 (1)	2009 (2)	2010 (3)	2011 (4)	2012 (5)	2013 (6)	2014 (7)	2015 (8)
Alto Paraná	0.081**	0 129***	0.091***	0.123***	0.008	–0.098***	–0.007	–0.064*
	(0.035)	(0.038)	(0.033)	(0.040)	(0.035)	(0.037)	(0.037)	(0.036)
Central	–0.108***	–0.025	–0.103***	–0.094***	–0.081***	–0.037	–0.090***	–0.090***
	(0.033)	(0.038)	(0.029)	(0.034)	(0.031)	(0.032)	(0.034)	(0.033)
Rest	–0.223***	–0.251***	–0.258***	–0.309***	–0.324***	–0.276***	–0.270***	–0.323***
	(0.036)	(0.042)	(0.037)	(0.040)	(0.037)	(0.039)	(0.036)	(0.031)
Constant	4.462***	4.373***	4.720***	4.678***	4.468***	4.805***	4.985***	4.741***
	(0.080)	(0.102)	(0.073)	(0.080)	(0.077)	(0.077)	(0.076)	(0.088)
Observations	7,492	6,671	7,625	7,470	8,565	8,515	8,101	11,838
R sq	0.348	0.353	0.358	0.368	0.402	0.372	0.370	0.384

Notes
OLS regressions with robust standard errors and income weights.
Standard errors in parentheses.* p <0.1 ** p <0.05 *** p <0.01
Wages calculated as average of monthly earnings from main occupation transformed in 2005 USD PPP using SEDLAC CPI and PPP conversion factors. Include monetary income and all other income related with the job, like bonuses and implicit rent/food/uniform value, received regularly. Transformed in 2005 USD PPP using SEDLAC CPI and PPP conversion factors.
Experience = Age – Years of education + 6
Formal if (i) wage employees contributing to Social Security, (ii) employers of a registered firm (RUC), (iii) self-employed workers with a registered firm (RUC); Informal if (i) farmers/herders/fisherman (self-employed or employer of firm with no RUC), (ii) unpaid family worker, (iii) self-employed, employee oremployerof firm with no RUC, (iv) wage employees Tenure defined as numberof years in main occupation.
Incomplete primary or less if less than 6 years of education; Primary complete if with 6 years of education and not enrolled; Secondary incomplete if with 6 years of education and enrolled or has (6–12) years of education; Secondary complete if with 12 years of education and not enrolled; Tertiary incomplete if with 12 years of education and enrolled or has (12–16) years of education; Tertiary complete if with more than 15 years of education.
To explore for selection bias we also estimated Heckman models. Results are identical to OLS and can be supplied by request.
Source: Staff calculations based on SEDLAC data.

Table C6
OLS Mincer regressions, specification 3, dependent variable log monthly real wage (2005 USD PPP), employed age 15+

	2008 (1)	2009 (2)	2010 (3)	2011 (4)	2012 (5)	2013 (6)	2014 (7)	2015 (8)
Experience	0.051***	0.052***	0.048***	0.048***	0.053***	0.045***	0.045***	0.047***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Experience^2	–0.001***	–0.001***	–0.001***	–0.001***	–0.001***	–0.001***	–0.001***	–0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.476***	0.493***	0.443***	0.461***	0.484***	0.475***	0.442***	0.423***
	(0.027)	(0.032)	(0.027)	(0.027)	(0.024)	(0.026)	(0.025)	(0.024)
Job tenure (years)	0.008***	0.008***	0.001	0.005***	0.001	0.008***	0.006***	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Language most spoken at home (relative to Spanish)								
Guaraní	–0.297***	–0.234***	–0.293***	–0.260***	–0.240***	–0.216***	–0.329***	–0.266***
	(0.037)	(0.043)	(0.033)	(0.038)	(0.034)	(0.038)	(0.036)	(0.040)
Guaraní and Spanish	–0.128***	–0.114***	–0.056**	–0.128***	–0.114***	–0.101***	–0.140***	–0.079***
	(0.031)	(0.035)	(0.027)	(0.029)	(0.026)	(0.029)	(0.028)	(0.026)
Other	0.743***	0.822***	0 917***	1.025***	0.785***	0.932***	0.919***	0.606***
	(0.082)	(0.086)	(0.096)	(0.105)	(0.097)	(0.105)	(0.093)	(0.074)
Does not speak	0.650	–0.277	–0.141	–0.020	–0.598***	–0.481***	–0.129	0.201***
	(0.406)	(0.328)	(0.426)	(0.484)	(0.149)	(0.146)	(0.454)	(0.043)
Highest education level (relative to incomplete primary or less)								
Primary complete	0.173***	0.080	0.099**	0.088*	0.127***	0.086*	0.072*	0.101**
	(0.037)	(0.050)	(0.041)	(0.048)	(0.043)	(0.050)	(0.043)	(0.041)
Secondary incomplete	0.346***	0.234***	0.184***	0.235***	0 297***	0.135***	0.173***	0.257***
	(0.038)	(0.053)	(0.042)	(0.045)	(0.042)	(0.046)	(0.043)	(0.048)
Secondary complete	0.514***	O.443***	0.433***	0.452***	0.475***	0.310***	0.342***	0.476***
	(0.045)	(0.066)	(0.045)	(0.053)	(0.049)	(0.052)	(0.046)	(0.055)

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Table C6 (continued)
OLS Mincer regressions, specification 3, dependent variable log monthly real wage (2005 USD PPP), employed age 15+

	2008 (1)	2009 (2)	2010 (3)	2011 (4)	2012 (5)	2013 (6)	2014 (7)	2015 (8)
Tertiary incomplete	0.699***	0.652***	0.616***	0.646***	0.704***	0.425***	0.506***	0.694***
	(0.051)	(0.066)	(0.052)	(0.058)	(0.052)	(0.054)	(0.050)	(0.057)
Tertiary complete	1.035***	0.985***	1.015***	1.026***	1.035***	0.894***	0.871***	1.024***
	(0.060)	(0.075)	(0.053)	(0.060)	(0.059)	(0.057)	(0.055)	(0.059)
Region (relative to Asunción)								
San Pedro	–0.048	–0.028	–0.113**	–0.140**	–0.046	–0.122**	–0.201***	–0.366***
	(0.052)	(0.052)	(0.050)	(0.056)	(0.050)	(0.051)	(0.053)	(0.051)
Caaguazú	–0.215***	–0.073	–0.174***	–0.245***	–0.159***	–0.215***	–0.193***	–0.366***
	(0.047)	(0.047)	(0.044)	(0.046)	(0.043)	(0.043)	(0.046)	(0.045)
Itapúa	–0.169***	–0.149***	–0.174***	–0.104**	–0.352***	–0.339***	–0.352***	–0.214***
	(0.044)	(0.050)	(0.041)	(0.051)	(0.047)	(0.056)	(0.050)	(0.053)
Alto Paraná	0.051	0.099***	0.070**	0.087**	–0.036	–0.170***	–0.050	–0.120***
	(0.035)	(0.037)	(0.033)	(0.040)	(0.036)	(0.037)	(0.038)	(0.036)
Central	–0.124***	–0.044	–0.100***	–0.086**	–0.101***	–0.071**	–0.103***	–0.109***
	(0.033)	(0.039)	(0.029)	(0.034)	(0.032)	(0.032)	(0.035)	(0.034)
Rest	–0 219***	–0.161***	–0.186***	–0.251***	–0.268***	–0.264***	–0.256***	–0.313***
	(0.037)	(0.041)	(0.037)	(0.040)	(0.037)	(0.040)	(0.037)	(0.032)
Sector (relative to retail)								
Agriculture, cattle and fishing	–0.448***	–0 797***	–0.591***	–0.654***	–0.738***	–0.740***	–0.532***	–0.619***
	(0.044)	(0.051)	(0.045)	(0.051)	(0.045)	(0.054)	(0.046)	(0.051)
Manufacture and mining	–0.017	–0.111**	–0.039	–0.028	–0.010	–0.054	–0.011	0.014
	(0.039)	(0.050)	(0.036)	(0.039)	(0.034)	(0.034)	(0.033)	(0.036)
Electricity, gas and water	0.643***	0.265**	0.561***	0.146	0.636***	0.459***	0.396***	0.544***
	(0.095)	(0.113)	(0.103)	(0.121)	(0.093)	(0.092)	(0.119)	(0.091)

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Table C6 (continued)
OLS Mincer regressions, specification 3, dependent variable log monthly real wage (2005 USD PPP), employed age 15+

	2008 (1)	2009 (2)	2010 (3)	2011 (4)	2012 (5)	2013 (6)	2014 (7)	2015 (8)
Construction	–0.013	0.042	0.069*	–0.054	0.193***	0.038	0.069**	0.122***
	(0.038)	(0.051)	(0.039)	(0.043)	(0.037)	(0.036)	(0.033)	(0.036)
Transport and communication	0.220***	0.083	0.203***	0.098**	0.125***	0.264***	0.141***	0.206***
	(0.050)	(0.061)	(0.053)	(0.046)	(0.049)	(0.051)	(0.042)	(0.043)
Finance and real state	0.198***	0.049	0.084*	0.034	0.145***	0.097**	0.006	0.107**
	(0.057)	(0.054)	(0.045)	(0.050)	(0.045)	(0.048)	(0.052)	(0.043)
Govt/public administration	0.128***	0.138***	0.044	0.025	0.230***	0.181***	0.175***	0.175***
	(0.040)	(0.040)	(0.036)	(0.036)	(0.033)	(0.035)	(0.035)	(0.031)
Other services	–0.174***	–0.198***	–0.135***	–0.177***	–0.145***	–0.230***	–0.187***	–0.196***
	(0.035)	(0.043)	(0.035)	(0.036)	(0.035)	(0.037)	(0.035)	(0.033)
Constant	4.503***	4.510***	4.737***	4.786***	4.616***	5.007***	5.037***	4.845***
	(0.085)	(0.099)	(0.077)	(0.086)	(0.080)	(0.079)	(0.079)	(0.097)
Observations	7,495	6,675	7,627	7,471	8,569	8,519	8,100	11,845
R sq	0.339	0.368	0.366	0.372	0.421	0.389	0.363	0.387

Notes
OLS regressions with robust standard errors and income weights.
Standard errors in parentheses.* p <0.1 ** p <0.05 *** p <0.01
Wages calculated as average of monthly earnings from main occupation transformed in 2005 USD PPP using SEDLAC CPI and PPP conversion factors. Include monetary income and all other income related with the job, like bonuses and implicit rent/food/uniform value, received regularly. Transformed in 2005 USD PPP using SEDLAC CPI and PPP conversion
Experience = Age – Years of education + 6
Formal if (i) wage employees contributing to Social Security, (ii) employers of a registered firm (RUC), (iii) self-employed workers with a registered firm (RUC); Informal if (i) farmers/herders /fisherman (self-employed or employer of firm with no RUC), (ii) unpaid family worker, (iii) self-employed, employee or employer of firm with no RUC, (iv) wage Tenure defined as number of years in main occupation.
Incomplete primary or less if less than 6 years of education; Primary complete if with 6 years of education and not enrolled; Secondary incomplete if with 6 years of
To explore for selection bias we estimated Heckman models. Results are identical to OLS and can be supplied by request.
Source: Staff calculations based on SEDLAC data.

Table C7
Logit regressions from panel data, age 15+, estimates and average marginal effects (AME), quarter to quarter transitions

	2010–2014							
	Active if started as inactive		Employed if started as unemployed or Inactive		Formal if started as informal		Inactive if started as unemployed	
	Estimate	AME	Estimate	AME	Estimate	AME	Estimate	AME
Male	0.671***	0 119***	0.926***	0.147***	–0.452***	–0.026***	–0.527***	–0.115***
	(0.087)	(0.015)	(0.077)	(0.012)	(0.116)	(0.007)	(0.186)	(0.040)
Age group (relative to [15–19])								
[20–24]	0.242*	0.045*	0.377***	0.057***	0.500**	0.024**	–0.180	–0.039
	(0.125)	(0.024)	(0.111)	(0.017)	(0.231)	(0.010)	(0.208)	(0.045)
[25–29]	0.416**	0.080**	0.760***	0.126***	0.755***	0.039***	0.058	0.013
	(0.169)	(0.034)	(0.150)	(0.026)	(0.257)	(0.012)	(0.327)	(0.072)
[30–34]	0.043	0.008	0.714***	0.117***	0.820***	0.043***	0.037	0.008
	(0.191)	(0.034)	(0.168)	(0.030)	(0.279)	(0.014)	(0.372)	(0.082)
[35–39]	–0.187	–0.031	0.255	0.037	0.457	0.021	–0.075	–0.016
	(0.193)	(0.032)	(0.177)	(0.027)	(0.289)	(0.013)	(0.467)	(0.102)
[40–44]	–0.018	–0.003	0.708***	0.116***	0.779***	0.040***	0.482	0.107
	(0.197)	(0.034)	(0.179)	(0.032)	(0.288)	(0.015)	(0.565)	(0.124)
[45–49]	–0.298	–0.049*	0.282	0.041	0.912***	0.049***	–0.203	–0.044
	(0.185)	(0.029)	(0.175)	(0.027)	(0.290)	(0.015)	(0.569)	(0.123)
[50–54]	–0.433	–0.069	0.060	0.008	0.993*	0.054	0.605	0.133
	(0.295)	(0.042)	(0.265)	(0.037)	(0.514)	(0.033)	(0.711)	(0.154)
[55–59]								
60 or more								
Attending any education	–1.032***	–0.184***	–0.844***	–0.134***	0.227	0.013	0.806***	0.176***
	(0.126)	(0.022)	(0.113)	(0.018)	(0.172)	(0.010)	(0.255)	(0.054)
Highest education level (relative to incomplete primary or less)								
Primary complete	0.021	0.004	–0.056	–0.009	0.138	0.007	–0.060	–0.013
	(0.187)	(0.033)	(0.175)	(0.028)	(0.394)	(0.020)	(0.586)	(0.130)

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Table C7 (continued)
Logit regressions from panel data, age 15+, estimates and average marginal effects (AME), quarter to quarter transitions

	2010–2014							
	Active if started as inactive		Employed if started as unemployed or Inactive		Formal if started as informal		Inactive if started as unemployed	
	Estimate	AME	Estimate	AME	Estimate	AME	Estimate	AME
Secondary incomplete	–0.179	–0.031	–0.184	–0.029	0.089	0.005	–0.022	–0.005
	(0.172)	(0.030)	(0.161)	(0.026)	(0.384)	(0.020)	(0.521)	(0.115)
Secondary complete	–0.025	–0.004	–0.101	–0.016	0.340	0.019	–0.536	–0.120
	(0.175)	(0.031)	(0.163)	(0.026)	(0.380)	(0.020)	(0.527)	(0.117)
Tertiary incomplete	0.481**	0.094***	0.226	0.038	0.332	0.018	–1.169**	–0.255**
	(0.192)	(0.036)	(0.178)	(0.030)	(0.397)	(0.021)	(0.556)	(0.120)
Tertiary complete	0.462**	0.090**	0.322	0.056	0.311	0.017	–0.992	–0.219*
	(0.229)	(0.045)	(0.204)	(0.035)	‘ (0.402)	(0.021)	(0.604)	(0.131)
Household size	0.006	0.001	–0.032	–0.005	0.111*	0.006*	–0.066	–0.014
	(0.037)	(0.007)	(0.033)	(0.005)	(0.060)	(0.004)	(0.076)	(0.017)
Number children young	–0.023	–0.004	0.077*	0.012*	–0.180**	–0.010**	0.082	0.018
	(0.050)	(0.009)	(0.047)	(0.007)	(0.083)	(0.005)	(0.128)	(0.028)
Number youth in hh	0.020	0.004	0.087*	0.014*	–0.048	–0.003	0.039	0.008
	(0.055)	(0.010)	(0.049)	(0.008)	‘ (0.090)	(0.005)	(0.113)	(0.025)
Number elder age ≥ 60	0.011	0.002	–0.040	–0.006	–0.185*	–0.011*	0.188	0.041
	(0.065)	(0.012)	(0.063)	(0.010)	(0.103)	(0.006)	(0.154)	(0.033)
Job Tenure					0.005	0.000		
					(0.010)	(0.001)		
Sector (relative to retail)								
Agriculture, cattle and fishing					–0.428	–0.026		
					(0.539)	(0.029)		
Manufacture and mining					0.002	0.000		
					(0.171)	(0.011)		

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Table C7 (continued)
Logit regressions from panel data, age 15+, estimates and average marginal effects (AME), quarter to quarter transitions

	2010–2014							
	Active if started as inactive		Employed if started as unemployed or Inactive		Formal if started as informal		Inactive if started as unemployed	
	Estimate	AME	Estimate	AME	Estimate	AME	Estimate	AME
Electricity, gas and water					0.316	0.022		
					(0.683)	(0.051)		
Construction					–1.274***	–0.062***		
					(0.341)	(0.013)		
Transport and communication					–0.125	–0.008		
					(0.232)	(0.015)		
Finance and real state					0.093	0.006		
					(0.199)	(0.013)		
Govt/public administration					–1.563***	–0.070***		
					(0.213)	(0.009)		
Other services					0.198	0.014		
					(0.156)	(0.011)		
Firm size at time t (relative to [2–5])								
Alone					–1.784***	–0.017***		
					(0.416)	(0.003)		
[6–10]					1.308***	0.050***		
					(0.212)	(0.010)		
[11–20]					1.858***	0.094***		
					(0.224)	(0.016)		
[21–50]					2.123***	0.123***		
					(0.224)	(0.019)		
[50+]					3.575***	0.370***		
					(0.183)	(0.020)		

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Table C7 (continued)
Logit regressions from panel data, age 15+, estimates and average marginal effects (AME), quarter to quarter transitions

	2010–2014							
	Active if started as inactive		Employed if started as unemployed or Inactive		Formal if started as informal		Inactive if started as unemployed	
	Estimate	AME	Estimate	AME	Estimate	AME	Estimate	AME
Year-quarter (relative to 2010q2)								
2010q3	–0.249	–0.046	–0.324*	–0.057*	–0.404	–0.025	–0.226	–0.050
	(0.184)	(0.034)	(0.169)	(0.030)	(0.268)	(0.017)	(0.471)	(0.104)
2010q4	–0.019	–0.004	–0.098	–0.018	–0.735**	–0.042**	–0.362	–0.081
	(0.186)	(0.036)	(0.167)	(0.031)	(0.294)	(0.017)	(0.456)	(0.102)
2011ql	0.020	0.004	–0.473***	–0.081***	–0.095	–0.006	–0.083	–0.018
	(0.184)	(0.036)	(0.177)	(0.030)	(0.261)	(0.017)	(0.450)	(0.098)
2011q2	–0.132	–0.025	–0.137	–0.025	–0.293	–0.019	–0.489	–0.110
	(0.326)	(0.061)	(0.283)	(0.051)	(0.416)	(0.026)	(0.613)	(0.139)
2011q3	–0.335*	–0.061*	–0 579***	–0.096***	–0.689**	–0.040**	–0.973**	–0.222**
	(0.202)	(0.037)	(0.185)	(0.031)	(0.310)	(0.018)	(0.454)	(0.100)
2011q4	–0.162	–0.031	–0.344*	–0.060*	–0.761***	–0.043**	–0.365	–0.082
	(0.191)	(0.036)	(0.180)	(0.031)	(0.294)	(0.017)	(0.461)	(0.103)
2012ql	–0.246	–0.046	–0.679***	–0.110***	–0.155	–0.010	–2.090***	–0.438***
	(0.198)	(0.037)	(0.194)	(0.031)	(0.285)	(0.019)	(0.530)	(0.095)
2012q2	–0.165	–0.031	–0.477***	–0.081***	–0.451	–0.028	–0.826*	–0.188**
	(0.192)	(0.036)	(0.177)	(0.030)	(0.310)	(0.019)	(0.428)	(0.095)
2012q3	–0.412	–0.074	–0.396*	–0.069*	0.156	0.011	–1.306**	–0.295**
	(0.265)	(0.046)	(0.234)	(0.039)	(0.393)	(0.028)	(0.652)	(0.138)
2012q4	–0.197	–0.037	–0.427**	–0.073**	–0.113	–0.007	–0.912**	–0.208**
	(0.198)	(0.037)	(0.183)	(0.031)	(0.311)	(0.021)	(0.453)	(0.100)
2013ql	–0.187	–0.035	–0.499***	–0.084***	–0.309	–0.020	–1 191***	–0.270***
	(0.201)	(0.038)	(0.188)	(0.032)	(0.308)	(0.019)	(0.451)	(0.097)
2013q2	–0.194	–0.036	–0.189	–0.034	0.003	0.000	–0.826*	–0.188*
	(0.197)	(0.037)	(0.177)	(0.032)	(0.278)	(0.019)	(0.451)	(0.100)

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Table C7 (continued)
Logit regressions from panel data, age 15+, estimates and average marginal effects (AME), quarter to quarter transitions

	2010–2014							
	Active if started as inactive		Employed if started as unemployed or Inactive		Formal if started as informal		Inactive if started as unemployed	
	Estimate	AME	Estimate	AME	Estimate	AME	Estimate	AME
2013q3	–0.216	–0.040	–0.368**	–0.064**	–0.545*	–0.033*	–0.878**	–0.200**
	(0.195)	(0.036)	(0.179)	(0.031)	(0.279)	(0.017)	(0.445)	(0.099)
2013q4	–0.409*	–0.073*	–0.587***	–0.097***	–0.318	–0.020	–1.560***	–0.346***
	(0.229)	(0.040)	(0.202)	(0.033)	(0.298)	(0.019)	(0.543)	(0.110)
2014ql	–0.158	–0.030	–0.466**	–0.080**	–0.405	–0.025	–1.515***	–0.337***
	(0.202)	(0.038)	(0.184)	(0.031)	(0.305)	(0.019)	(0.495)	(0.102)
2014q2	–0.713***	–0.119***	–0.578***	–0.096***	–0.014	–0.001	–1 352***	–0.304***
	(0.219)	(0.036)	(0.193)	(0.032)	(0.274)	(0.019)	(0.464)	(0.098)
2014q3	–0.242	–0.045	–0.438**	–0.075**	0.040	0.003	–0.865**	–0.197**
	(0.207)	(0.038)	(0.191)	(0.032)	(0.291)	(0.020)	(0.423)	(0.093)
2014q4	–0.213	–0.040	–0.248	–0.044	–0.739**	–0.042**	–0.645	–0.146
	(0.205)	(0.038)	(0.180)	(0.032)	(0.322)	(0.018)	(0.457)	(0.102)
Year-quarter (relative to 201Bq2)								
2015q3								
2015q4								
Constant	–0.693***		–1.208***		–4.421***		1.220*	
	(0.250)		(0.234)		(0.510)		(0.636)	
Weighted observation	5,481	5,481	6,989	6,989	7,476	7,476	893	893
Pseudo R sq	0.0B8		0.073		0.300		0.089	

Notes
Weighted Logit regressions from Panel Data.
Standard errors in parentheses.* p <0.1 ** p <0.05 *** p <0.01
Incomplete primary or less if less than 6 years of education; Primary complete if with 6 years of education and not enrolled; Secondary incomplete if with 6 years of education and enrolled or has (6–12) years of education; Secondary complete if with 12 years of education and not enrol led; Tertiary incomplete if with 12 years of education and enrolled or has (12–16) years of education; Tertiary complete if with more than 15 years of education. Years of education calculated by Paraguay's Statistical Department (DGEEC).
As RUC data unavailable for years 2010–2011 but pension contributions available for all years then formality definition is changed for ECE panel dataset. Formal if (i) wage employees contributing to a pension fund, (ii) employers contributing to a pension fund, (iii) self-employed and domestic workers contributing to a pension fund; Informal if (i) farmers/herders/fisherman (self-employed or employer not contributing to pension fund), (ii) unpaid family worker, (iii) self-employed, employee or employer not contributing to a pension fund, (iv) wage employees not contributing to a pension fund and (v) domestic workers not contributing to a pension fund.
Language spoken dropped for clarity of exposition. Regression sample too small. Language groups generate biased estimates.
Data description. Total observations 62,957, individuals 19,150, Quarters 20, Years 2010–2014. Geographically it covers Asunción and Urban areas in the Central department, which represents about 40% of the National workforce and a little more than 60% of urban workforce. Unbalanced panel; data not available for all quarters for all individuals.
Source: Own calculations based on Encuesta Continua de Empleo (ECE) data.

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