PARAGUAY

SELECTED ISSUES

July 2017

This Selected Issues paper on Paraguay was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on July 7, 2017.

**International Monetary Fund
Washington, D.C.**

INTERNATIONAL MONETARY FUND

PARAGUAY

SELECTED ISSUES

July 7, 2017

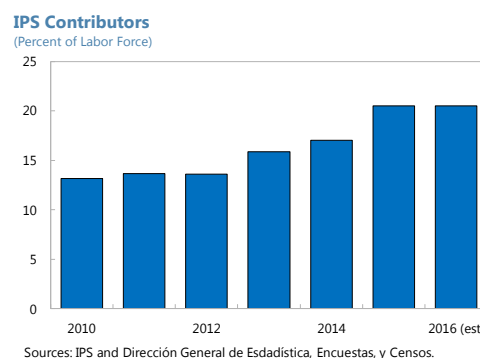| Approved By **Western Hemisphere Department**	Prepared by Geoffrey Keim

CONTENTS

PARAGUAY'S PENSION AND HEALTH SYSTEMS[1]

A. Introduction

1.   Paraguay has several public and private institutions that provide contributory old-age pension programs (Table 1).[2] Within the public sector, there are contributory defined benefit programs, of which the largest, by far, is the Instituto de Provisión Social (IPS), Paraguay's main social security institution. In addition, the main public employee retirement program, Caja Fiscal also has sizable coverage. The other public sector programs as well as those in the private sector are smaller and more narrow, mainly focused on one sector.[3]

2.   While a relatively large young population is a key strength for Paraguay's pension and health systems, a demographic shock will pose a key challenge. Fertility rates, measured as the number of children per woman, have already dropped substantially—from 6½ children per woman in the 1950s to 2.6 children per woman over 2010–15. This downward trend is expected to continue and stabilize at just under 2 children per woman by about 2040. At the same time, life expectancies have already risen substantially and are expected to continue doing so, from 63 years in the 1950s, to around 77 years now, and eventually 83 years by 2100. In parallel, life expectancy at age 65—an indicator for pension sustainability—has risen from around 13½ years in the 1950s to 17 years in 2015, and is expected to climb to just under 22 years by 2100. These trends are good news, as they embody rising living standards. However, taken together, Paraguay's demographic outlook points to a rising share of retirement-age people and a shrinking share of working-age people, which will have important implications for pension and health programs going forward.

3.   A rise in social security coverage will also impact the IPS pension program over the longer term. Contributors have risen from 13 percent of the labor force in 2010 to around 21 percent in recent years.[4] On the upside, the added coverage provides IPS with additional contribution revenues in the near term, and many citizens with access to old-age benefits over the longer run. However, the new entrants will become eligible to receive retirement benefits over the next 25–30 years, about the same time that the demographic shock becomes profound. This possibility also highlights the need for proactive management to reduce the measures required to assure sustainability.

IPS Contributors
(Percent of Labor Force)

Sources: IPS and Dirección General de Esdadística, Encuestas, y Censos.

---

[1] We gratefully acknowledge guidance from the Fiscal Affairs Department (Mauricio Soto). The health expenditure projections use an FAD template and pension projections are inspired by another FAD template, with some modifications.

[2] There are also public sector non-contributory programs managed by the Ministry of Hacienda exist for vulnerable and eminent Paraguayans, veterans of the 1932–35 Chaco War, and survivors of police officers killed on duty, which are not considered in this paper.

[3] While most contributors to Caja Bancaria, the banking employee retirement program, are affiliated with private sector banks, the program is a decentralized public sector entity created by Law No. 105 of 23 August 1951.

[4] The rise in coverage reflects efforts to expand coverage, and the government's efforts to improve formality has likely contributed also.

Table 1. Contributory Pension Programs in Paraguay

Name	Main Participants	Contributors		Beneficiaries		Contributions (pct of GDP)	Benefits (pct of GDP)	Average Benefit (pct of GDP per capita)	Assets (pct of GDP)
		Thous.	Pct of labor force	Thous.	Pct of pop. 65+				
Public Contributory									
Instituto de Prevision Social 1/	Contributors to social security	716.0	20.5	47.9	8.0	3.2	1.1	157.1	10.2
Caja Fiscal 2/	Public sector employees	214.6	6.1	50.8	8.5	1.4	1.5	190.7	0.4
Caja Municipal 3/	Local government employees	n.a.	n.a.	1.6	0.3	0.0	0.0	n.a.	0.2
Caja Bancaria	Banking sector employees	12.8	0.4	2.7	0.4	0.3	0.2	449.6	1.0
Caja de la ANDE	Electricity utility employees	4.1	0.1	1.4	0.2	0.0	0.1	267.0	0.6
Caja de Itaipu Binacional	Itaipu employees	1.7	0.0	1.6	0.3	0.2	0.2	780.8	1.2
Caja Parliamentaria 4/	Members of Congress	0.1	0.0	0.2	0.0	n.a.	n.a.	n.a.	n.a.
Caja Ferroviaria 5/	Former railroad workers	0.0	0.0	0.5	0.1	n.a.	n.a.	n.a.	n.a.
Private Contributory									
Caja Mutual de Cooperativistas	Cooperative sector employees	28.5	0.8	2.6	0.4	0.2	0.0	40.3	0.4
Caja Medica	Medical and university emp.	0.7	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	0.2
Caja de Prof. de la Univ. Catolica 6/	Catholic University profesors	1.0	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	0.1

Sources: Instituto de Prevision Social; Direccion General de Seguridad Social, Ministerio de Trabajo, Empleo, y Seguridad Social; Navarro and Ortiz (2014); annual reports of pension funds; and Fund staff calculations.
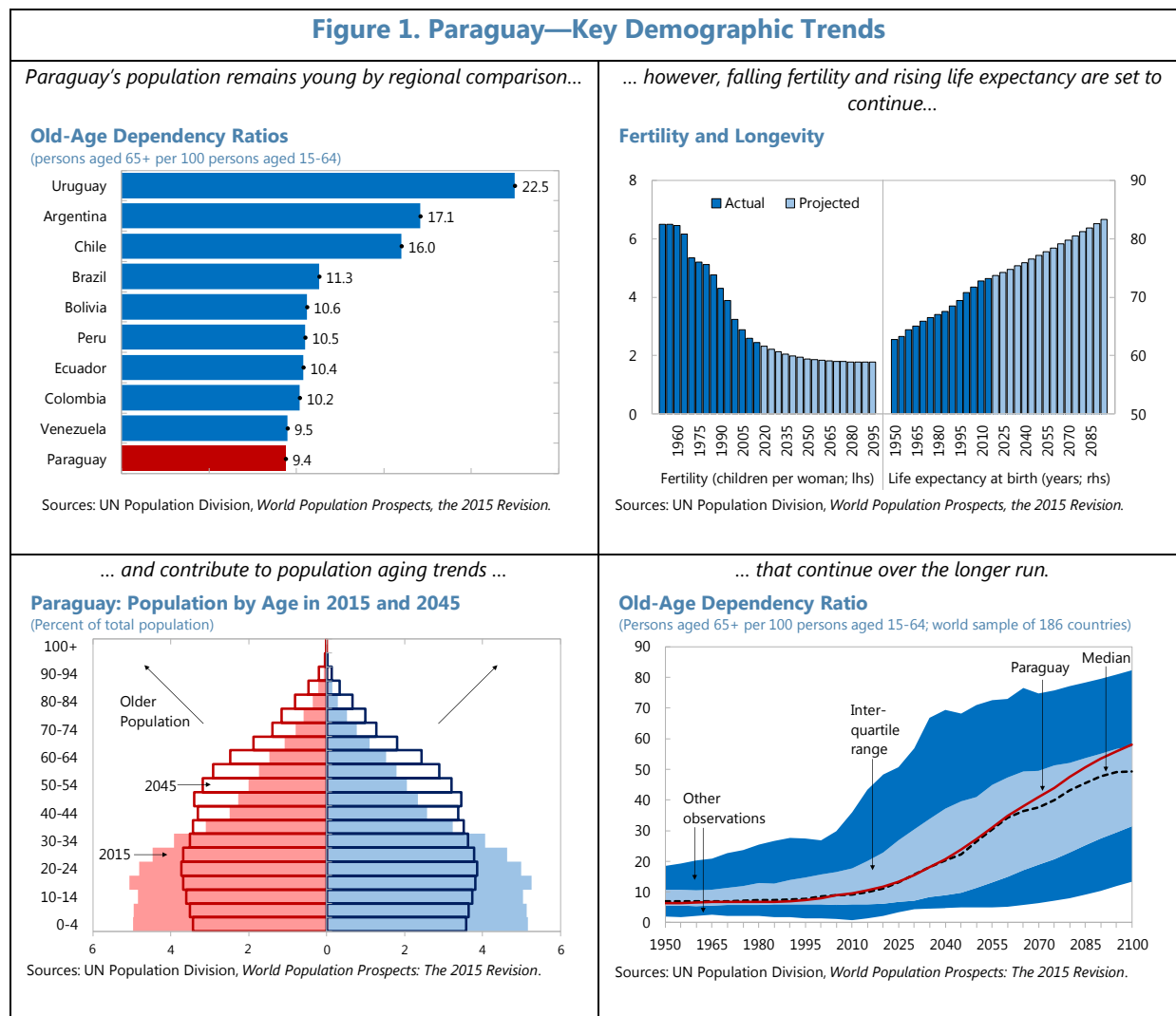1/ Contributors are those under general regime.
2/ Contributors in 2014.
3/ Contributions and benefits data for 2014.
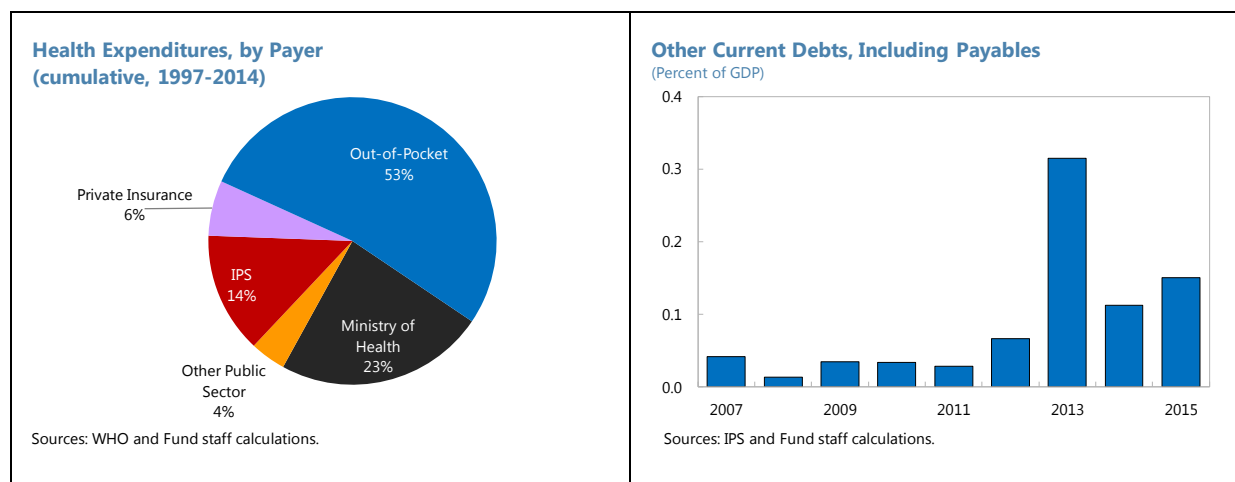4/ Contributors and Beneficiaries in 2013.
5/ Contributors in 2004.
6/ Contributors in 2011.

Figure 1. Paraguay—Key Demographic Trends

Paraguay's population remains young by regional comparison...

Old-Age Dependency Ratios
(persons aged 65+ per 100 persons aged 15-64)

Country	Value
Uruguay	22.5
Argentina	17.1
Chile	16.0
Brazil	11.3
Bolivia	10.6
Peru	10.5
Ecuador	10.4
Colombia	10.2
Venezuela	9.5
Paraguay	9.4

Sources: UN Population Division, *World Population Prospects, the 2015 Revision.*

... however, falling fertility and rising life expectancy are set to continue...

Fertility and Longevity

Fertility (children per woman; lhs)   Life expectancy at birth (years; rhs)

Sources: UN Population Division, *World Population Prospects, the 2015 Revision.*

... and contribute to population aging trends ...

Paraguay: Population by Age in 2015 and 2045
(Percent of total population)

Older Population

2045

2015

Sources: UN Population Division, *World Population Prospects: The 2015 Revision.*

... that continue over the longer run.

Old-Age Dependency Ratio
(Persons aged 65+ per 100 persons aged 15-64; world sample of 186 countries)

Paraguay   Median

Inter-quartile range

Other observations

Sources: UN Population Division, *World Population Prospects: The 2015 Revision.*

4.   In addition to providing pensions, the IPS also maintains a health program. While the largest share of health expenditures payments is out-of-pocket, the IPS program, which provides health services to its members, is significant. To finance these services, a portion of IPS contributors' payments is earmarked for the health program: in 2015 health contributions amounted to about 1½ percent of GDP. Additionally, health expenditures both overall and for the IPS have risen substantially since the mid-2000s, and expenditure per contributor amounted to around 27½ percent of GDP per capita in 2015. In the IPS's case, this rise has led to higher degrees of health program under-funding, as illustrated by increasing payables owed. With this vulnerability emerging while the population is still young, these gaps are likely to rise further as the population ages.

Health Expenditures, by Payer (cumulative, 1997-2014)

Out-of-Pocket 53%

Private Insurance 6%

IPS 14%

Other Public Sector 4%

Ministry of Health 23%

Sources: WHO and Fund staff calculations.

Other Current Debts, Including Payables
(Percent of GDP)

Sources: IPS and Fund staff calculations.

5.   The authorities are also proposing new legislation to reform pensions oversight and investments. While Paraguay's financial system remains bank-based, the IPS and other pension funds are key institutional investors. If managed prudently, well-designed investment strategies for pensions can serve to efficiently mobilize national savings. However, revisions to investment guidelines can alter existing financial linkages, which should be understood and monitored closely to maintain stability.

6.   Reflecting these developments, this paper attempts to address key questions, as follows: The next section illustrates the implications of demographic change for the pension programs. Afterward, we turn to the question of healthcare expenditures, benchmarking Paraguay's healthcare expenditures relative to other countries and computing the outlook for Paraguay generally and the IPS program specifically. In doing so, we consider the demographic profile and other factors—termed excess cost growth. Finally, we illustrate the financial performance of the pension funds and their links to the financial system.

B. Pensions

7.   To illustrate the implications of demographic change for the IPS, we present longer-term projections for pension program revenues and expenditures. In this exercise, we only consider programs (i) within the public sector, and thus could entail a fiscal risk in the event of a funding gap; (ii) that are contributory, (iii) have at least 1,700 contributors as of their most recent report; and (iv) have assets of at least Gs. 500 billion or about 0.4 percent of GDP. Considering these criteria, we include the IPS pension program, Caja Fiscal, Caja Bancaria, Caja de la ANDE, and Caja Itaipu.

8.   The projections are based on a mix of data and assumptions from local and international sources. Demographic projections are those of the United Nations Population Division while data on labor force come from the International Labor Organization. Macroeconomic projections are those of the IMF staff. Data on particular pensions come from information requests from the IPS and the Ministry of Labor, Employment and Social Security. We also obtained data from

annual reports from several pension funds regarding contributors and beneficiaries as well as financial performance.

9. **The calculation for benefits comprises four key components**.[5]

- *Demographics*: We account for population ageing by using the old-age dependency ratio, defined as the population aged 60 (retirement-age population) as a share of the population aged 15–59 (working-age population). In Paraguay's case, this ratio is set to rise consistently through the forecast horizon, with a strong acceleration around 2030–2055.

- *Pension benefit generosity*: We express pension benefits per beneficiary—a measure of the average pension benefit—as a percent of GDP per worker. GDP per worker can be interpreted as a proxy for income levels. Over the forecast horizon, this is assumed to be constant from the 2015 level for each pension program, implicitly assuming that pension benefit formulas remain unchanged on average.

- *Coverage*: Pension coverage is defined as the number of beneficiaries as a percent of the old-age population. In the case of the IPS, where there was a recent rise in beneficiaries, there is a corresponding increase in pensioner coverage around 30 years hence.[6] In the other pension program forecasts, this ratio is held fixed at the 2015 level.

- *Employment*: The variable used in the projection is employment as a percent of the working age population. To forecast employment, we begin by calculating labor force participation rates for each gender by 5-year age cohorts (with one group for workers 65 and over). For the forecast, the calculated labor force participation rates for every cohort are assumed constant.[7] These participation rates are then applied to the demographic forecasts for the populations to calculate projected labor forces going forward. Expected employment can be calculated assuming that the total unemployment rate remains constant at its 2015 level of 5.3 percent over the horizon.

---

[5] Specifically, benefits are calculated as:

$$\frac{B^{Total}}{GDP} = \frac{P_{60+}}{P_{15-59}} \cdot \frac{B}{GDP/E} \cdot \frac{R}{P_{60+}} \cdot \left(\frac{E}{P_{15-59}}\right)^{-1}$$

Where B^{Total} and B are the pension benefits in total and per beneficiary, respectively. *GDP* refers to total nominal gross domestic product. The old-age dependency ratio is given by P_{60+}/P_{15-59}. *R* stands for the number of beneficiaries and *E* refers to employment.

[6] We assume than half of the new entrants continue making all payments over the next 30 years to meet qualification criteria. As a simplifying assumption, the projection supposes that new entrants opt to receive the ordinary pension, entailing 30 years of contributions and an age of 60 or the anticipated pension. Other retirement options exist for the IPS including anticipated pensions, which require 30 years of contributions and a minimum age of 55, or proportional pensions, which require 15 years of contributions and a minimum age of 65. Such an analysis requires a more micro-based approach which is beyond the scope of this exercise.
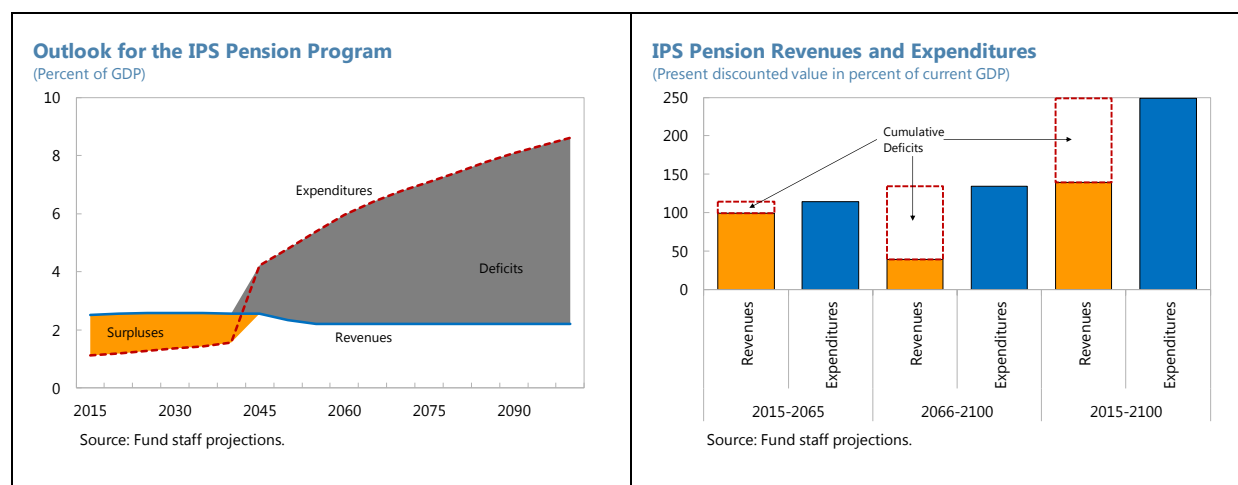
[7] Mixing the two data sources can in a few cases result in labor force participation rates above 100 percent. In these cases, participation rates were set at 100 percent for the forecast.

10.   Projections for revenues include both contributions as well as returns on investment income:

- *Contributions*: Contribution income for each pension plan was calculated under an assumption that contributions per contributor remained constant as a share of GDP per capita. The levels of aggregate contributions could then be estimated from assumed evolution of GDP per capita taking the UN's population projections and staff's assumptions of 3¾ percent real GDP growth and 4 percent inflation on average per year.

- *Investment income*: The key assumption is for net non-contribution, non-benefit income in percent of total assets. For the IPS, this is assumed to remain flat at the 2015 level, which is around 3.1 percent. For all other pensions except Caja Fiscal, this value is set to the 2015 average across programs and held fixed. We then apply this ratio to the prior-year's total assets. Assets are themselves calculated recursively, taking prior levels and adding the total net income (including contributions, benefits, and investment income). In the case of a deficit, assets are liquidated by the amount of negative net income. Unlike the others, Caja Fiscal is assumed to continue rolling over its existing investments in bonds and receive the associated investment income; deficits would instead by covered by other sources, for example, resources from the treasury.

11.   For the IPS, as the recent entrants begin to retire, deficits will begin to emerge. Reflecting the current demographic profile of Paraguay's population, the current annual surpluses are expected to continue for a while. However, around 2045, when the new entrants will have begun retiring, benefit payments will rise significantly. Contribution revenue on the other hand will have less scope to rise and offset the higher payments, as the demographic shock will be materializing at the same time. Thus, deficits would continue over the remainder of the forecast horizon. Under staff's projection the present discounted value of the unfunded liability amounts to around 15 percent of current GDP over a 50-year horizon and 110 percent of current GDP over an 85-year span. The IPS (2015), in their internal actuarial projections also finds deficits beginning around the middle of this century.

Outlook for the IPS Pension Program
(Percent of GDP)
Source: Fund staff projections.

IPS Pension Revenues and Expenditures
(Present discounted value in percent of current GDP)
Source: Fund staff projections.

12. **Most other pensions will also experience deficits at some point over the 85-year forecast horizon**. The imbalances in Caja Fiscal are most urgent, as it is a large program and has already reported deficits. Under the longer-term scenario, deficits widen continuously. Over the next 50 years, the present discounted value of deficits amounts to 28 percent of current GDP and rises to 76 percent of current GDP over the 85-year horizon. Caja de la ANDE and Caja Itaipu are expected to continue running annual surpluses for a time, though population ageing will lead to deficits in each by 2050 or earlier. Reflecting their more modest size, however, the gaps in each program are significantly smaller. The present discounted values of the 85-year unfunded liabilities are 3 percent of current GDP for Caja de la ANDE and 9 percent of GDP for Caja Itaipu. Finally, Caja Bancaria's financial position would deteriorate late in the forecast horizon, but there is no unfunded liability.[8] For any of these pensions, in the absence of corrective measures and materialization of a contingent liability for the public sector, equity issues would arise if participants have higher income than the un-covered population.

Outlook for Other Pension Programs
(Present discounted value in percent of current GDP)

Source: Fund staff projections.
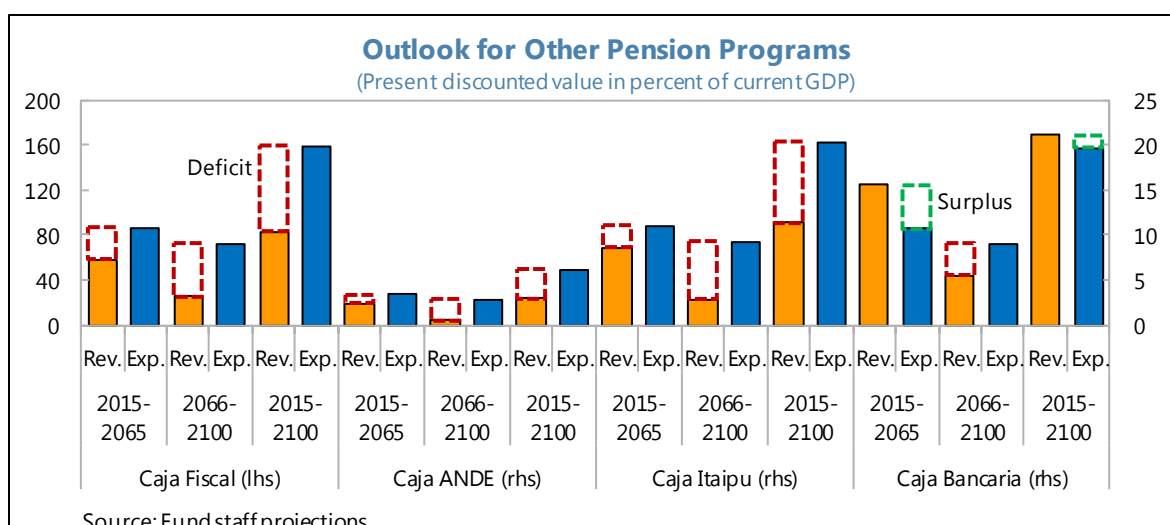
13. **Parametric reforms can remove deficits**. We augment the projection with four reform scenarios: (i) an increase in retirement ages up to age 65; (ii) a 10 percent cut in the ratio of benefits per beneficiary to GDP per worker; (iii) increasing the contribution rate by 10 percent; and (iv) a combination that includes the three reforms simultaneously. For each program that is found to have an unfunded liability, a configuration of reforms exists that could eliminate the gap. For IPS and Caja Bancaria, raising the retirement age is sufficient to more than remove the gap, and it roughly removes the gap at Caja Ande. For Caja Fiscal, which faces the least favorable outlook, a combination of all three reforms is needed.

---

[8] In the projections contributions exceed Caja Bancaria's benefit payments until about 2050 and investment income has been high. If this scenario materializes, reforms may be needed in the longer run to assure sustainability.

Illustrative Scenarios: Unfunded Liability after Parametric Reforms
(present discounted value, 2015-65; percent of current GDP; green shading
indicates that reform eliminates liability)

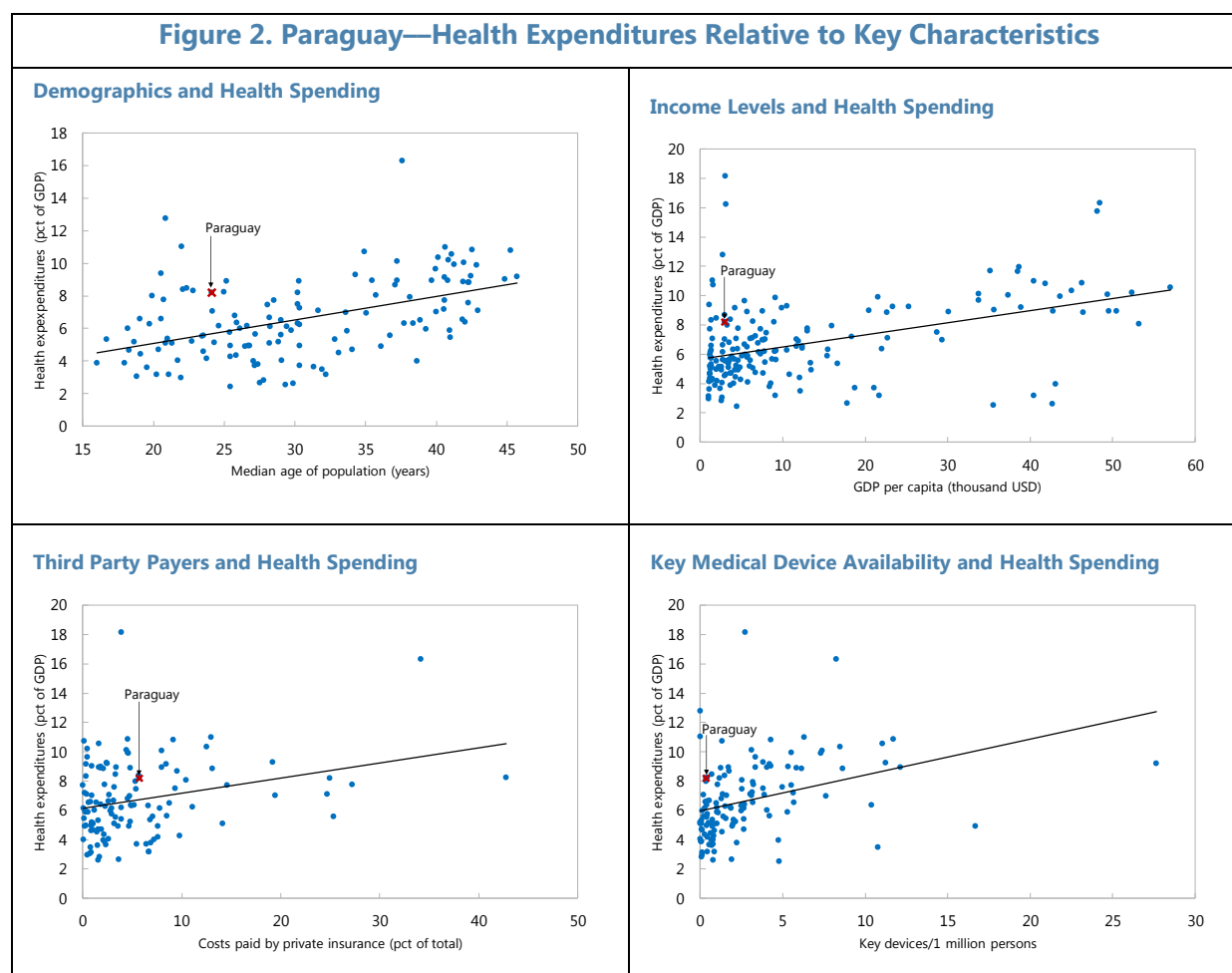|	(1) Retirement age at 65	(2) Benefit cut of 10 pct.	(3) Contribution increase of 10 pct.	(4) Combination (1)-(3)
IPS	-22.1	-3.2	6.8	-37.1
Caja Fiscal	3.7	20.0	23.0	-7.3
Caja Itaipu	-0.7	1.1	1.9	-1.9
Caja ANDE	0.0	0.6	0.9	-0.3
Caja Bancaria 1/	-7.9	-6.2	-5.8	-9.5

Source: Fund staff estimates.
1/ Caja Bancaria is not found to have an unfunded liability and would remain in balance even without reforms. It is included in the table for completeness.

14.   However, reforms must account for other important considerations. Any plan to raise contribution rates would have to account for already high levels in some pensions. If the retirement age were to be lifted, corresponding reforms would be needed for the benefits calculation, so that the savings from deferring retirements are not offset by higher pension payments. Moreover, there may be scope to reduce the magnitude of parametric reforms required in smaller pensions by merging them to achieve savings on fixed administrative costs. Such a consolidation would also improve equity among public employees, by offering them a uniform retirement benefit. Additionally, for the Caja Fiscal, standardizing benefits across career fields could be a means to achieve savings and improve equity.[9] And finally, for the IPS, reforms would have to consider their implications for poverty and inequality as well as informality, given that program's broader coverage of the population.

C. Health Expenditures

15.   Paraguay's health expenditures are somewhat higher than would be expected based on its characteristics. With a median age of 25, for example, Paraguay's population is young both compared to South America and the world. Income levels, as measured by GDP per capita, are also lower than the regional and world averages. Moreover, with about half of all payments for healthcare services paid out-of-pocket, there is limited scope for administrative frictions from third-party payers to raise health costs. On the other hand, availability of medical equipment per million people is a bit higher than in the region. Nevertheless, at an average of 8¼ percent of GDP over the past 10 years, Paraguay's total (public and private) health expenditures appear high in a cross-country context when considering demographics, income, payment methods, and technology (charts). Moreover, with Paraguay having lower presence of doctors and nurses providing health services, elevated expenditures suggest that prices may be high.

---

[9] For example, Caja Fiscal offers retirement benefits and terms (e.g. eligibility ages, benefits formulas) for teachers and police officers that are different from general public employees.

Figure 2. Paraguay—Health Expenditures Relative to Key Characteristics

Demographics and Health Spending

Income Levels and Health Spending

Third Party Payers and Health Spending

Key Medical Device Availability and Health Spending

16.   Moreover, in a longer-term scenario, key pressures could cause Paraguay's health expenditures to continue rising. Four key factors influenced projections for aggregate economy-wide health expenditures over 2015 to 2050:
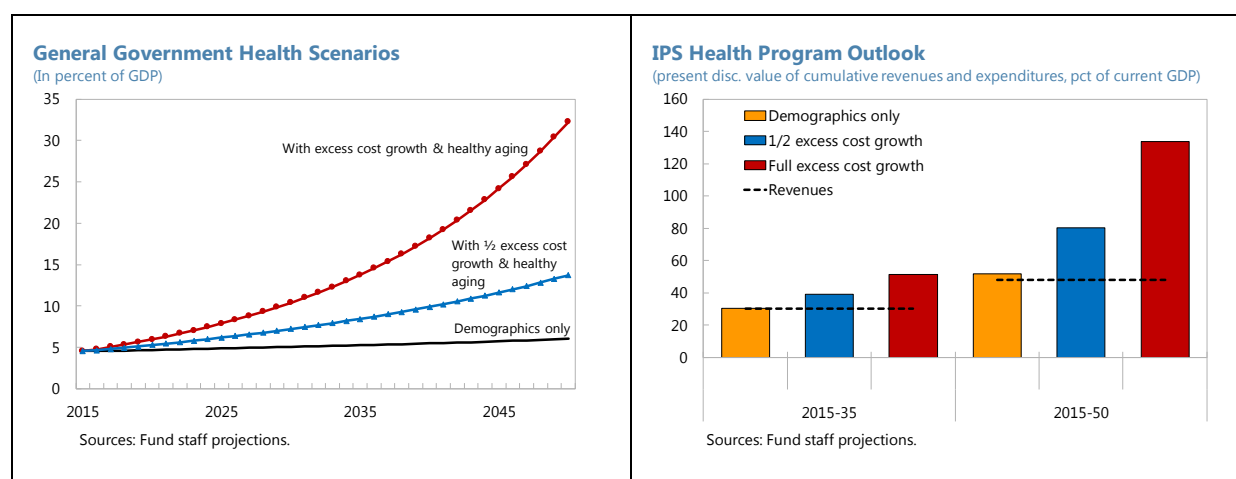
- *Initial conditions for health expenditures*: To begin, we calculate total public health spending per person with the most recently reported public expenditures (2014; IPS and Ministry of Health expenditures) reported by the World Health Organization in their Health Expenditures Database. In the health projections, we express this amount as a percent of GDP per capita and in Paraguay's case, this amounted to 3.9 percent.

- *Age spending profile*: The previous year's health expenditures per person in percent of GDP per capita are updated each year in the forecast horizon by shifts in the demographic composition of the population and the share of health expenditures linked to each age group. Intuitively, for example, health service consumption is typically higher for young children and older adults, while lower for other groups (adolescents, young, and middle-aged adults).[10] Thus, in the

---

[10] This result, which is the pattern for OECD countries is applied in the projections, given the absence of detailed age-related expenditures for Paraguay.
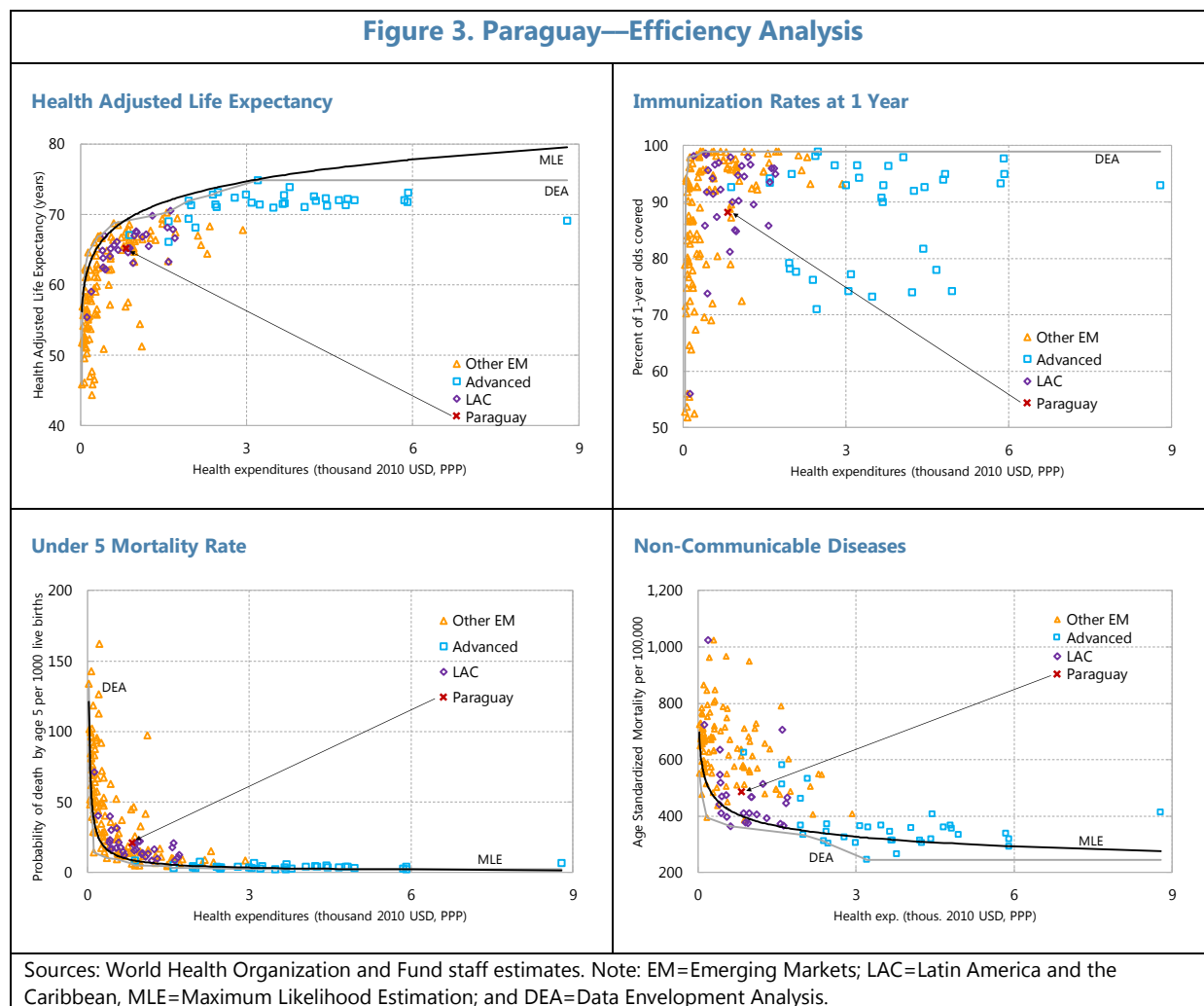
scenario, a shift from very young cohorts towards older ones exerts a downward pressure on projected health expenditures, while population ageing towards more senior age groups causes health expenditures to rise.

- *Healthy aging:* Improvements in health are assumed to result in older adults requiring less health services in the future. In Paraguay's case, this effect is assumed to rise smoothly from 12 to 19 percent over the forecast horizon.

- *Excess cost growth*: These non-demographic factors that raise healthcare expenses are a key element of the projections and are obtained from econometric analysis for South American countries (Box 1). In this scenario, excess cost growth is estimated to relate to a relatively high income elasticity for healthcare in the region as well as a Paraguay-specific effect, which reflects Paraguay's relatively recent history of higher growth for health expenses.

17.   Overall, health spending in Paraguay could rise substantially and weigh on the IPS program's finances further. Under the longer-term scenario, population aging alone would exert a modest effect, raising total public health expenditures to 6 percent of GDP, an increase of about 1½ percentage points. However, estimates of excess cost growth would have a dramatic impact. In a full scenario, containing demographics, excess cost growth, and healthy aging effects, total public health expenditures would reach around 32 percent of GDP. It may be possible that the faster increases observed in the recent past are related to policies to improve public services and the growth associated with these effects will slow down as social inclusion becomes more complete. To account for that possibility, we perform a more benign scenario, in which the excess cost growth factor is halved. While health expenditures grow more slowly in this scenario, they still rise strongly, reaching 14 percent of GDP. Moreover, if the IPS program's share of total health expenditures remains constant going forwards, and contributions remain around their current levels of 1.6 percent of GDP, the program's underfunding would persist and continue growing for any positive level of excess cost growth.

General Government Health Scenarios
(In percent of GDP)

With excess cost growth & healthy aging

With ½ excess cost growth & healthy aging

Demographics only

Sources: Fund staff projections.

IPS Health Program Outlook
(present disc. value of cumulative revenues and expenditures, pct of current GDP)

- Demographics only
- 1/2 excess cost growth
- Full excess cost growth
- - - Revenues

Sources: Fund staff projections.

18.   The possibility of further financial challenges for the IPS health program highlights the need for reforms. The first step for any reform agenda would be a thorough review of the program to identify key spending pressures. Along with the review, it will be essential to have information and management systems configured to provide clear, high-quality information to inform the public how the proposed reforms aim to address the underlying weaknesses. There appears to be scope for introducing cost-sharing arrangements by introducing co-pays, deductibles, or revising fees. Moreover, given the potential for prices to be high, procurement procedures could be examined to identify savings. Importantly, the full reform package should also consider implications on inequality, account for future cost growth, and fully eliminate the existing stock of payables.
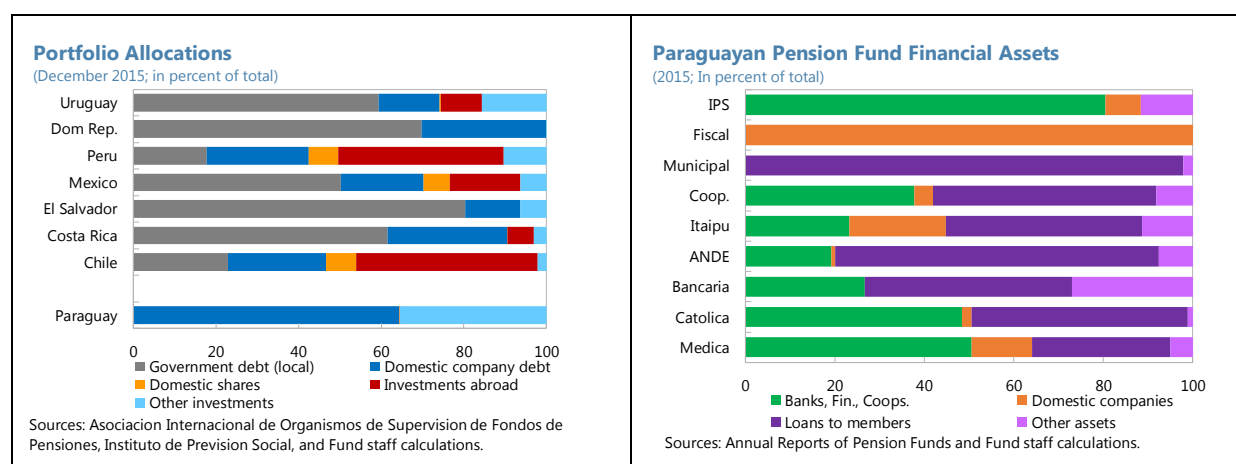

Figure 3. Paraguay—Efficiency Analysis

Sources: World Health Organization and Fund staff estimates. Note: EM=Emerging Markets; LAC=Latin America and the Caribbean, MLE=Maximum Likelihood Estimation; and DEA=Data Envelopment Analysis.

19.   Even with efforts to rein in costs, better efficiency can improve health outcomes. We performed efficiency analysis by estimating frontiers using both data-envelopment analysis and/or stochastic frontier analysis for a world sample of countries. In the analysis, we map health spending per capita in constant international dollars, to various outputs including (i) health-adjusted life expectancy, (ii) the average of key infant immunization rates, (iii) child mortality rates, and the age-

standardized mortality rate from non-communicable diseases (charts).[11] In Paraguay's case, gaps with observations closer to the frontiers exist for each measure, indicating that even with expenditure tightening, there should be room to improve health outcomes.

D. Financial Sector Linkages

20.   Paraguayan pension fund investments are allocated somewhat differently in comparison to the region, though returns broadly similar.

- *Investments*: The IPS primarily holds deposits in the banking system, where its investments in certificates of deposit investments are a major source of long-term liquidity to the banks and financieras. To a lesser extent, the IPS also has other investments, including bonds issued by the Agencia Financiera de Desarollo (AFD). Caja Fiscal also holds AFD bonds as its only investment. Other smaller Paraguayan pensions primarily have various investments in the *banks* and loan portfolios. Conversely, elsewhere in Latin America pension funds largely hold government and domestic company debt, with some countries also possessing sizable investments abroad.

Portfolio Allocations
(December 2015; in percent of total)

Sources: Asociacion Internacional de Organismos de Supervision de Fondos de Pensiones, Instituto de Prevision Social, and Fund staff calculations.

Paraguayan Pension Fund Financial Assets
(2015; In percent of total)

Sources: Annual Reports of Pension Funds and Fund staff calculations.

- *Returns*: On a consolidated basis across its pension, health, and administrative programs, the IPS's real investment-related income was 5.4 percent of assets on average over the past 5 years, in part reflecting the large concentration of deposits in the IPS's portfolio. It is also within the range of real returns reported by other pension plans in the region, notwithstanding the differences in asset allocations. For their part, other pension funds in Paraguay have posted somewhat higher returns than the IPS.

---

[11] Health-adjusted life expectancy is the number of years a person can expect to live in good health. Immunization refers to average of the percentages of 1-year olds receiving the BCG vaccine against tuberculosis; the DTP3 vaccine against diphtheria, tetanus toxoid, and pertussis; and vaccines against hepatitis B, measles, and polio. Age-standard mortality rates are weighted average mortality rates, with the weights corresponding to shares of population age groups relative to a standard. The four main non-communicable diseases include cardiovascular diseases, cancer, diabetes, and chronic lung diseases.

<div style="border:1px solid">

Box 1. Long-Term Health Spending Outlook: Details

Data. Most data used in this analysis come from international institutions' datasets for health and economic variables. Demographic variables, including age cohorts and dependency ratios come from the United Nations Population Division's *World Population Prospects: the 2015 Revision*. Total health expenditures data come from the World Health Organization's *Global Health Expenditure* database, while health expenditure shares by age group are those of the OECD. Finally, cross-country data on real GDP are obtained from the World Bank's *World Development Indicators*.

Excess cost growth. The estimate of excess (non-demographic) cost growth applicable to Paraguay can be obtained from a panel regression. This method is similar to that of FAD (2010). In this case, we begin by estimating this equation using a sample of 11 South American countries over 1995-2014:

$$\log\left(\frac{G_{t-5}^{TOT}}{G_{t-5}^{TOT}}\right) = \beta_0 + \beta_1 \cdot \log\left(\frac{Y_t}{Y_{t-5}}\right) + \beta_2 \cdot \log\left(\frac{D_t}{D_{t-5}}\right) + \beta_i \cdot R_i$$

Where G^{TOT} refers to total healthcare spending per capita, measured in constant 2011 international dollars, Y stands for real GDP per capita, and D refers to the age dependency ration, which is defined as persons aged younger than 15 and over 64 as a share of the population aged 15-64. In this equation, β_1 is related to the income elasticity of health expenditures. The constant, β_1, corresponds to the average growth of health expenditures for the region, while the fixed (country-specific) effect allows for growth to vary in each individual country. In Paraguay's case, this amounted to about 0.3, implying that costs have grown faster than elsewhere in the region (see Appendix Table 1 for more details). The exact estimate for excess cost growth is computed by holding demographic composition constant (e.g. the demographic term goes to zero) and using staff's annual potential real GDP growth estimate of 3¾ percent (converted to a 5-year basis) to capture rises from income growth. Specifically the calculation for excess cost growth (π_{PRY}) is:

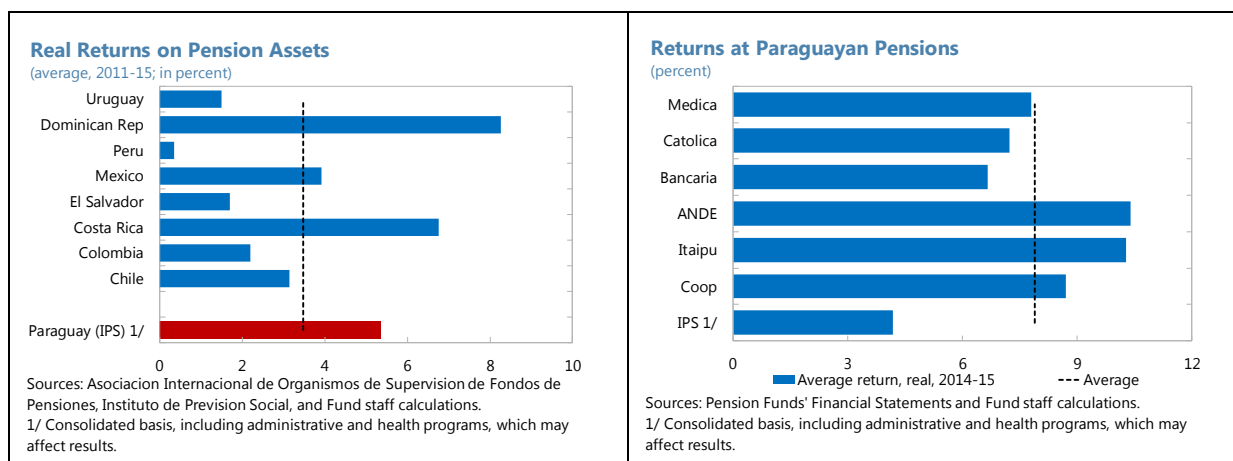$$\pi_{PRY} = \beta_0 + (\beta_1 - 1) \cdot (GDP\ growth) + \beta_{PRY}$$

Finally, to perform the projections, the 5-year excess cost growth estimate was converted back to an annual basis.

Age spending profile. In each year of the forecast horizon, the prior year's health care expenses (in percent of GDP per capita) are adjusted based on the demographic composition of the population and the share of health care expenses associated with that age group. The exact calculation expresses each 5-year cohort ($P_{i,t}^{PRY}$) (with one group for those 80 or over) as a percent of the population ($P_{total,t}^{PRY}$) and the health expenditures in OECD countries consumed by each age cohort (G_i^{OECD}), relative to those aged 40–45 (G_{40-45}^{OECD}).

Overall path for health expenditures. Finally, with the excess cost growth estimate, assumed adjustment for healthy aging (H), health expenditures in percent of GDP per capita (G/Y), and age spending profile are all put together to yield total health expenditures in percent of total GDP (S):

$$S_{PRY} = \left(\sum_{i \in Age\ groups} \frac{P_{i,t}^{PRY}}{P_{total,t}^{PRY}} \cdot \frac{G_i^{OECD}}{G_{40-45}^{OECD}}\right) \cdot \frac{G_{total,t-1}}{Y_{t-1}} \cdot (1 + \pi_t) \cdot (1 + H_t)$$
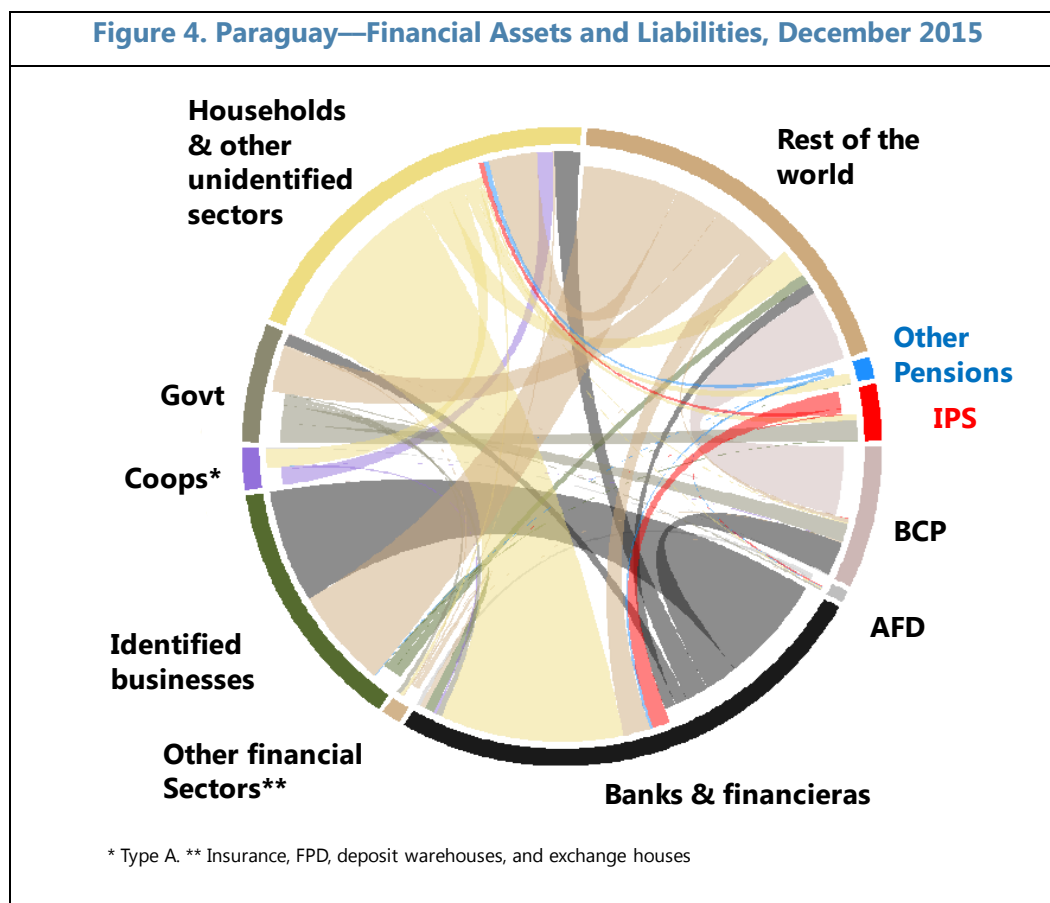
</div>

Real Returns on Pension Assets
(average, 2011-15; in percent)

Sources: Asociacion Internacional de Organismos de Supervision de Fondos de Pensiones, Instituto de Prevision Social, and Fund staff calculations.
1/ Consolidated basis, including administrative and health programs, which may affect results.

Returns at Paraguayan Pensions
(percent)

Sources: Pension Funds' Financial Statements and Fund staff calculations.
1/ Consolidated basis, including administrative and health programs, which may affect results.

21.   The authorities are proposing legislation to change investment possibilities for the pension funds. The current draft of the legislation entails creating a separate Superintendence of Pensions, developing an oversight council, broadening permissible investment instruments (table), and establishing an advisory committee empowered to dictate portfolio allocation limits. If implemented in its current form, pension funds could significantly alter the composition of their investments.

Potential Investment Instruments

Securities issued or guaranteed by the National Treasury
Securities issued or guaranteed by the Central Bank of Paraguay
Instruments issued or guaranteed by Banks and Financieras
Bonds or debt securities emitted in Paraguay or by Paraguayan issuers
Shares in incorporated companies
Shares in investment or mutual funds
Credits to related parties 1/
Securities issued or guaranteed by foregn sovereigns or central banks
Shares, debt, and securities abroad in funds administered by third parties
Urban real estate investments
Other assets authorized by the superintendent.

Source: Draft of pension legislation, article 90, dated April 4, 2017.
1/ Related parties includes retirees, employed affiliates, and employed affiliates of the pension's sponsor. The latter applies only to Caja de la ANDE, Caja Itaipu, and Caja Bancaria.

22.   It will be key to understand the pension funds' financial sector links, especially those of the IPS, to monitor the effects of any change in investment policy. To illustrate the recent configuration of linkages, we collected data from a variety of sectors' balance sheet data and from other statistical releases to create account for the financial assets and liabilities of 11 broad sectors on each other.[12] Based on this exercise, it is clear that the financial system continues to be dominated by the banks and financieras. Because it holds important claims on the banks, the IPS has a key role in the financial system as a major institutional investor, even though it is more moderate in the relative size of its assets and liabilities. When combined, the other pension funds are smaller than the IPS, and their links are spread around to other sectors, reflecting their investments in loans, banks, and other assets.

---

[12] See Appendix Table 2 for detailed sources and assumptions.

Figure 4. Paraguay—Financial Assets and Liabilities, December 2015

* Type A. ** Insurance, FPD, deposit warehouses, and exchange houses

E. Conclusion

23.   Demographic changes that are likely to occur in Paraguay over the longer run require upfront planning to assure the sustainability of pension funds and the IPS's health program. As population aging becomes more significant, most of the larger public pensions will begin to experience deficits. Parametric reforms can remove the underfunding; however, the earlier reforms begin, the smaller and less disruptive they will be. The IPS's health program is already showing underfunding even before the demographic shock. When coupled with unchecked excess cost growth, pressures will become even more significant, underscoring the urgency of reform. As a first step, the authorities must thoroughly review the program to identify specific measures to restore the program's sustainability. These could include improving cost sharing and reforming procurement to save costs. Finally, the authorities are considering new legislation which may introduce stronger oversight and broaden allowable investments. Stronger oversight is welcome and more diversified portfolios could help mobilize national savings more efficiently, if implemented prudently and with a view towards maintaining financial stability.

Appendix I. Additional Estimates and Source Data

Appendix Table 1. Estimates for excess cost growth	
Five-year change in real GDP per capita	1.058**
	(0.146)
Five-year change in log dependency ratio	1.292*
	(0.499)
Bolivia	0.233**
	(0.073)
Brazil	0.234**
	(0.074)
Chile	0.219**
	(0.073)
Colombia	0.135+
	(0.077)
Ecuador	0.368**
	(0.073)
Paraguay	0.356**
	(0.078)
Peru	0.218**
	(0.075)
Uruguay	0.074
	(0.072)
Venezuela	0.208**
	(0.076)
Guayana	0.201**
	(0.072)
Suriname	0.045
	(0.074)
Constant	-0.088
Observations	179
R-squared	0.364
Note: Standard errors in parenthesis, **, *, +, denote significance at the 10, 5, and 1 percent levels, respectively.	

Appendix Table 2. Key Source Data for Balance Sheet Exercise	
Central Bank of Paraguay	BCP financial statements
Government	Public debt statement, other sectors' financial statements
Commercial banks and financieras	BCP monthly statistical bulletin for December 2015
Type "A" S&L Cooperatives	BCP monetary data
Exchange houses, deposit warehouses, and insurance	BCP monthly statistical bulletins for December 2015 and staff assumptions
IPS	IPS financial statements
Other pension funds	Statements for December 2015, except Caja Municipal (October 2015). Caja Fiscal data from data request.
AFD	AFD financial statements
Deposit insurance fund	Financial statements
Rest of the World	IIP tables from Monthly Statistical Annex and IMF monetary data
Private businesses	Assumptions from other sectors
Households and unidentified sectors	Residuals

References

FAD, 2010, Macro-Fiscal Implications of Health Care Reform in Advanced and Emerging Economies, Washington, DC: IMF Policy Paper.

Instituo de Prevision Social, 2015, *Estudios y Proyecciones Actuariales del Regimen de Jubilaciones y Pensiones 2015-2100 del Instituto de Prevision Social*, Asuncion.

Navarro, Bernardo and Emilio Ortiz, 2014, El Eistema de Pensiones de Paraguay: Debilidades Que Exhibe y Perspectivas de la Reforma, Asuncion: Centro de Analisis y Difusion de la Economia Paraguaya.