



### Highlight

This paper uses the FINDEX and administrative data to estimate the gender, age and income composition of workers covered by a mandated pension scheme in a large number of developing countries. We find that the pension coverage gender gap is around 25 percentage points; men and women are 63 and 37 percent of those covered, respectively.

It also provides evidence on the determinants of voluntary savings for old age. Along with the expected positive relationship with income levels within and across countries, we find that individuals are less likely to save for old age the more the government spends on public pensions. Other things constant, men and individuals with an account in a formal financial institution are more likely to voluntarily save for old age.

# What Can We Learn about Pensions from the FINDEX Data?<sup>1,2</sup>

Zaineb Majoka and Robert Palacios

## I. Overview

The life cycle theory of consumption is based on a consumer choice model where individuals try to maximize their utility by adjusting their consumption based on expected income over their lifetime. Since income and consumption needs vary over time, consumption is likely to be highest in middle age, whereas it declines around retirement. Research studies have tried to use this model to understand the savings behavior of older individuals, but the findings are not consistent. Some studies have found that elderly continue to save even in retirement while others find a hump-shaped relationship where savings decrease when individuals retire.<sup>3</sup> Baldacci et al. (2010) look at household consumption and saving patterns in relation to public spending on pensions and find that in emerging Asian economies, a 1 percent increase in public spending on pension raises consumption by 1.5 percent.<sup>4</sup>

Hence, understanding patterns of savings and factors responsible for the variation has important policy implications. The objective of this note is to complement the existing knowledge on saving patterns and pension systems by looking at:

1. Gender, age and income composition of workers potentially covered by mandatory pension schemes; and
2. Micro and macro determinants of voluntary saving for old age.

<sup>1</sup> This note was authored by Zaineb Majoka and Robert Palacios. The authors can be contacted at mzaineb@worldbank.org and rpalacios@worldbank.org

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<sup>3</sup> Crown, W. H. 2002

<sup>4</sup> IMF 2011.

## II. Data and Methodology

This policy note uses the Global Financial Inclusion Database or FINDEX<sup>5</sup> and World Bank administrative data on pension systems around the world.<sup>6</sup> FINDEX provides a rich source of information on a variety of topics, but two questions in particular provide a unique opportunity to understand pension coverage and the determinants of voluntary savings for old age: whether an individual received a wage payment in the last 12 months and if an individual saved for old age in the past 12 months. Binary variables (0/1) of responses to these questions are used in the analysis. Administrative data on coverage, presence of social pensions, median income, and pension spending are used to complement this.

For summary statistics, we look at only low and middle income countries<sup>7</sup> whereas a full range of countries, depending on data availability, is used in the regression analysis. We use a probit model clustered at a country level, to assess the impact of micro and macro variables on the probability to save for old age.<sup>8</sup>

The paper is organized as follows: The next section presents the rationale for estimates of mandated pension coverage and its composition. Section IV presents regression results aimed at identifying the determinants of voluntary savings for old age. Particular attention is paid to the effect of public pension spending given the importance of the subject in the pension literature and for public policy. The last section concludes and suggests areas for further research using the FINDEX database.

## III. What Can Be Inferred from FINDEX about Who Is Covered by Mandated Pensions?

Mandatory pension schemes may apply to self-employed workers or others that do not receive regular wages, but the vast majority of those contributing to these schemes are wage earners. Therefore, we expect a strong correlation between the share of working age people in a country that reports having a regular wage and the share of a working age group contributing to a mandated pension scheme. The FINDEX survey asks whether an individual received a wage in the past 12 months. By comparing this variable for each country with the World Bank's database of administrative data on pension coverage in Figure 1, we can observe that this correlation does indeed hold.

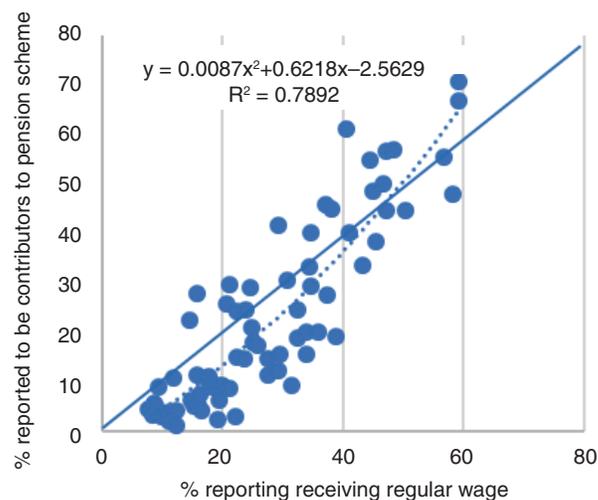
<sup>5</sup> In 2011, the World Bank launched the Global Financial Inclusion database or FINDEX to track progress on a range of indicators related to financial inclusion. The indicators are based on interviews with about 150,000 nationally representative and randomly selected adults age 15 and above in more than 140 economies.

<sup>6</sup> World Bank 2014.

<sup>7</sup> We use median income to define the cutoff range. There are 76 countries left in the sample after dropping high income countries.

<sup>8</sup> Bryan, M. L. and S. Jenkins 2013.

**Figure 1: Pension coverage and regular wage earners compared**



Source: FINDEX data and World Bank pension database; excludes high income countries and five countries that do not have mandated national pension schemes.

Despite the high correlation, the 45 degree line suggests that some wage earners, particularly in lower income countries, are able to avoid payroll taxes. Nevertheless, these workers are the best proxy for contributors for whom individual level data are available at a global level.

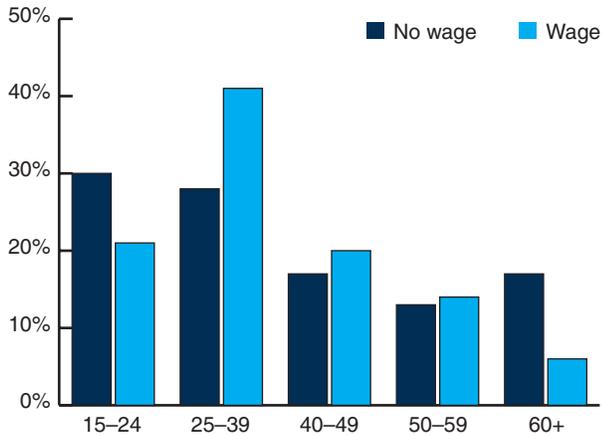
Using wage earners as a proxy, we can begin to roughly estimate the composition of those covered by mandated pensions in each country. To begin with, we find that there is a significant gender difference in most countries, suggesting that men are far more likely to be covered by pensions than women. The figures are shown for each country in Annex 1. By weighting them by the actual adult population we estimate that globally, approximately 6 out of 10 people covered by the pension system are men.<sup>9</sup> The data also allow us to estimate the distribution of covered population in income quintiles<sup>10</sup> and age groups (see Figure 2). The prime working age population covered by pensions is on average older than those not covered. As expected, older workers tend to be nonwage earners reflecting the fact that they are not eligible to receive pensions. Finally, we find that more than 49 percent of those likely to be covered are found in the top 40 percent of the income distribution of their respective countries.<sup>11</sup> Only 13 percent are found in the bottom quintile.

<sup>9</sup> Of the total wage earners, approximately 63 percent are male and 37 percent are female, accounting for the difference of 25 percentage points.

<sup>10</sup> Available on request.

<sup>11</sup> Quintile distribution of population potentially covered by pension schemes in each country is available on request.

**Figure 2: Age distribution of wage earners (potentially covered by mandated pension scheme)**



Source: FINDEX Data.

## IV. Pensions and Savings for Old Age

One of the most important empirical questions in the literature is how a pension system affects an individual's propensity to save for old age. Since the 1970s,<sup>12</sup> researchers have looked for evidence that public pay-as-you-go pension schemes that increased pension wealth were offset by reductions in voluntary savings as individuals adjusted their behavior based on the classic life cycle consumption theory. In more than two dozen studies at both the macro and individual levels, most found evidence of some offset.<sup>13</sup> The policy implication of this finding suggests that the most common form of national pension system is likely to reduce national savings with consequent effects on economic growth and capital market development.

The FINDEX data provide the first opportunity to test this relationship using a global data set, albeit with a discrete rather than continuous dependent variable. The data tell us only whether a person claims to have saved for old age, but not how much they saved. Nevertheless, given that in middle and lower-middle income countries, only 13 percent of individuals claimed to have done so, the determinants of this dichotomous choice are revealing.

In order to test the proposition that greater pension wealth is associated with a reduced tendency for individuals to save for

old age, we use the current ratio of pension spending to GDP as a proxy for pension wealth. Other studies have shown that there is a close relationship between the unfunded pension liability of a country and its current level of pension spending, particularly in mature pension schemes.<sup>14</sup> While this seems intuitive due to the long-term nature of pension obligations, the direct relationship between stock and flow will be weaker in immature schemes and where there have been major reforms which reduce future spending. These conditions apply to a minority of countries.

Median per capita income is used in the analysis to control for the effect of income level on private savings. Several cross-country studies show that the impact of real per capita income on private savings is more pronounced in low income countries as compared to the high income countries.<sup>15</sup> Other macro level variables, such as pension coverage rates and presence of a social pension scheme control for whether an individual is likely to have access to alternate schemes that can negatively affect the probability to save for old age.

Individual characteristics affecting savings behavior are well known and include income level and age. Another study by Demircuc-Kunt et al. (2016), tests the effect of a variety of independent individual and macro variables on probability to save for old age.<sup>16</sup> They find that individuals in the 36–45 age group, belonging to the top income percentile with education and employment are more likely to save for old age. Also, having an account at a financial institution increases this probability while there is only a small overall gender gap in saving for old age. The effects of these variables must be taken into account in order to isolate the pension wealth effect.

This note uses a more parsimonious model and controls for median income per capita in explaining the savings decision. A confounding factor in the analysis relates to what was found in the previous section, namely, that a subset of the individuals tested are covered by a mandated pension scheme. When many of these individuals answer the question 'did you save for old age in the last 12 months?' their positive response may simply confirm that they contributed to the mandated scheme. It is important, therefore, to try to distinguish between this group and those who are not covered by the mandate given our interest in what drives voluntary savings.

Table 1 presents the results for our main specification for both types of worker, those that do and do not earn regular wages.<sup>17</sup>

<sup>12</sup> The earliest empirical tests of this hypothesis include Feldstein 1974 and Munnell 1974. In contrast, there is little evidence supporting Barro's hypothesis around the same time of a kind of Ricardian equivalence that led individuals to save more in anticipation of higher taxes that would be needed to pay off unfunded pension liabilities.

<sup>13</sup> Six of these studies found no significant effect. See IMF 2011 for a summary of the evidence.

<sup>14</sup> See Holzmann, Palacios and Zviniene 2004.

<sup>15</sup> Loayza et al. 2001.

<sup>16</sup> Demircuc-Kunt, et al. 2016.

<sup>17</sup> We also ran two step regression (Bryan, and Jenkins 2013) using the same dependent and independent variables. Country fixed effects were added for individual variables whereas samples were clustered at the country level in regression with macro variables. Results were almost the same. Another set of regressions was run by adding regional dummies to control for social norms and with and without coresidence rates. The results were almost the same and can be shared on request.

**Table 1: Multivariate analysis of the choice to save for old age, workers with and without regular wages**

Dependent Variable: Saved for Old Age in Past 12 Months (yes = 1)		
Independent Variables	Margins (wage earners)	Margins (nonwage earners)
Male	-0.001 [0.008]	0.014*** [0.004]
Respondent Age	0.0016*** [0.003]	0.008*** [0.002]
Respondent Age Squared	-0.000*** [0.000]	-0.000*** [0.000]
Account Holder (Yes/No)	0.183*** [0.020]	0.116*** [0.011]
Household Income per Capita Quintiles: Top	0.122*** [0.014]	0.068*** [0.008]
4th	0.089*** [0.015]	0.062*** [0.008]
3rd	0.052*** [0.013]	0.038*** [0.008]
2nd	0.037*** [0.016]	0.016*** [0.006]
Bottom	<i>Ref.</i>	<i>Ref.</i>
Log of Median Income	0.120*** [0.019]	0.052*** [0.017]
Pension Spending	-0.017*** [0.005]	-0.011** [0.004]
Total Contribution Rate*Coverage	-0.000 [0.000]	0.000 [0.000]
Social Pension (Yes/No)	0.053 [0.041]	0.040 [0.047]
Predicted Probability	0.2890	0.1598
No. of Observations	29,684	55,602
Pseudo R <sup>2</sup>	0.112	0.148

Note: Marginal effects along with robust standard errors in brackets clustered at country level. Asterisks denote the following levels of significance: \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

The regression includes the standard explanatory variables on age but uses the income quintile to which the individual belongs rather than a continuous income variable. Both variables show the expected positive signs and are statistically significant. The quadratic form of age is also added to the analysis to control for variation in trend as an individual grows older. It has the expected negative sign which indicates that the probability to save for old age increases with age until an individual hits the tipping point after which the probability to save decreases.

Another binary variable added to the model is whether an individual has an account at a financial institution. This can be treated as a proxy for financial literacy or access to the formal

financial sector and as expected has a positive and statistically significant effect on probability to save for old age whereby individuals who have an account are 63.3 to 72.6 percent more likely to save for old age.

The median income per capita variable captures the large cross-country variation and is also positive and significant. The main difference in the results for these conditional variables is that men are more likely to save for old age only among those not earning regular wages. This likely reflects the fact that the regular wage earners are the ones covered by the mandated contributory scheme. Whether the formal sector worker is a man or a woman, he or she is forced to contribute so that there will be no difference between the sexes.

The results shown in Table 1 also include two variables related to the design of the pension system in each country that could potentially affect savings for old age. The first is the mandated contribution rate. Again, this should affect only the population covered by the mandate which may choose to save less for retirement in the face of large mandated contributions. The second is the presence of a large noncontributory pension (social pension). This is a dichotomous variable based on an estimate of social pension wealth.<sup>18</sup> Although the signs on the coefficients on both variables are what would be expected, neither is statistically significant.

Meanwhile, the pension spending variable is statistically significant for both types of workers but more so for wage earners as would be expected. A one percentage increase in pension spending is associated with a 5–6 percent reduction in the probability that an individual saves for retirement. Although not shown here, this result held over a number of alternative specifications including those controlling for country.

The results are in line with the most prevalent finding in the empirical literature, namely, that individuals in countries where governments make larger pension commitments tend to save less for old age. Conversely, this implies that reforms that reduce pension wealth—increasing the retirement age, reducing accrual rates, taxing pension income, etc.—should result in higher savings rates.

The result for workers not earning regular wages is surprising at first glance. Why should workers not covered by the pension system also react to high pension spending/wealth? A possible answer is that many of these workers do have accrued pension wealth themselves or through their spouses. In middle income countries, there is much evidence that workers move in and out of the formal sector labor force. To the extent that they can count on some of the future pension spending for their old age, they are likely to save less. The data also confirm that women are much more likely to work without regular wages and therefore not to be covered by the pension system. To the extent that their spouses are covered by the pension system, they are also potentially affected by pension wealth.

## V. Conclusions and Direction for Future Research

This paper has used the FINDEX database to shed light on the likely composition of the population covered by mandatory

pension schemes across the low and middle income countries and to add to the existing evidence that individuals save less when their pension wealth is increased through public pension schemes. In both cases, it is the first time that the evidence is based on such a comprehensive sample of low and middle income countries.

The database also contains other variables that would be worth considering as possible factors influencing savings for old age. For example, the survey covers the propensity to save for other purposes such as emergencies and if an individual borrowed money for medical needs. Combined with information about out-of-pocket health spending at the country level, further analysis might reveal indirect positive effects of expanding health insurance coverage on individual's willingness to save for old age. Also, as time series data become available, the impact of major changes in pension policy can be studied by looking at changes in voluntary savings behavior.

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<sup>18</sup> This measures the present value of future spending (through 2040) on social pension in each country assuming current parameters and country specific demographics. See Palacios and Knox-Vydmanov 2014.

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## Annex 1: Gender Distribution of Wage Earners by Country

Country	Female	Male
Albania	40.66%	59.34%
Angola	27.59%	72.41%
Armenia	38.53%	61.47%
Azerbaijan	29.64%	70.36%
Belize	42.18%	57.82%
Benin	38.57%	61.43%
Bhutan	27.14%	72.86%
Bolivia	37.94%	62.06%
Botswana	41.73%	58.27%
Brazil	39.64%	60.36%
Bulgaria	48.98%	51.02%
Burkina Faso	40.58%	59.42%
Burundi	38.83%	61.17%
Cameroon	32.48%	67.52%
Chad	27.43%	72.57%
China	40.98%	59.02%
Colombia	38.73%	61.27%
Congo, Dem. Rep.	23.70%	76.30%
Congo, Rep.	38.43%	61.57%
Côte d'Ivoire	24.06%	75.94%
Dominican Republic	42.25%	57.75%
Ecuador	33.29%	66.71%
El Salvador	38.91%	61.09%
Ethiopia	35.76%	64.24%
Gabon	41.43%	58.57%
Georgia	42.15%	57.85%
Ghana	31.75%	68.25%
Guatemala	36.68%	63.32%
Guinea	26.05%	73.95%
Haiti	26.74%	73.26%
Honduras	25.53%	74.47%
India	29.49%	70.51%
Indonesia	35.69%	64.31%
Jamaica	44.56%	55.44%
Kazakhstan	51.74%	48.26%
Kenya	46.46%	53.54%
Kyrgyz Republic	49.26%	50.74%
Macedonia, FYR	39.13%	60.87%

Country	Female	Male
Madagascar	49.38%	50.62%
Malawi	34.33%	65.67%
Mali	29.92%	70.08%
Mauritania	38.92%	61.08%
Mauritius	39.01%	60.99%
Mexico	41.95%	58.05%
Moldova	50.41%	49.59%
Mongolia	46.33%	53.67%
Montenegro	46.09%	53.91%
Namibia	36.46%	63.54%
Nepal	33.92%	66.08%
Nicaragua	34.98%	65.02%
Niger	28.17%	71.83%
Nigeria	33.43%	66.57%
Pakistan	16.03%	83.97%
Panama	36.46%	63.54%
Peru	35.35%	64.65%
Philippines	36.88%	63.12%
Romania	45.82%	54.18%
Rwanda	37.88%	62.12%
Senegal	33.36%	66.64%
Serbia	47.34%	52.66%
Sierra Leone	38.53%	61.47%
South Africa	50.85%	49.15%
Sri Lanka	34.31%	65.69%
Sudan	39.14%	60.86%
Tajikistan	32.51%	67.49%
Tanzania	47.17%	52.83%
Thailand	37.05%	62.95%
Togo	36.66%	63.34%
Tunisia	22.39%	77.61%
Turkey	24.87%	75.13%
Uganda	35.95%	64.05%
Ukraine	51.36%	48.64%
Venezuela, RB	39.45%	60.55%
Vietnam	38.01%	61.99%
West Bank and Gaza	15.70%	84.30%
Zambia	40.93%	59.07%

