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Costs of Extending the Non-contributory Pension Program for Elderly: The Mexican Case

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In recent decades, many countries have experienced demographic transitions characterized by aging populations (UN, 2013). Population aging is particularly pronounced in OECD countries, where, in 2013, 15.5 percent of the population was 65 or older, compared to 7.9 percent of the world's population (WDI, 2014). Population aging will place substantial pressure on governments to guarantee income security and health care provision for their old-age population. In OECD countries, 15.1 percent of older persons in 2000 lived in poverty (OECD, 2011).

Aging issues are more challenging still in developing countries with limited resources to provide health care and social-security benefits. To address high poverty in old age, more than 40 low- and middle- income countries have introduced non-contributory pension programs for the elderly (Willmore, 2007; HAI, 2013). Such programs have had many positive effects (see for example, Ardington & Lund, 1995; Case & Deaton, 1998; Delgado & Cardoso, 2000; Barrientos, 2008; Salinas-Rodriguez et al., 2014; Galiani, Gertler, & Bando, 2014; Aguila, Kapteyn & Smith, 2015). Several Latin American countries have allocated resources to these programs (Levy & Schady, 2013).

Yet funding non-contributory pension programs can be challenging to sustain as older populations grow, particularly relative to working-age populations. In this study, we analyze the costs of the non-contributory pension program in Mexico. Mexico is noteworthy both for its rapidly aging population and its high poverty rates for older persons. The non-contributory pension program introduced in 2007 has expanded greatly. While further

expansion and its implications are currently being debated, to our knowledge there has been no previous work quantifying the costs of program expansion. We seek to provide such an estimate.

In the background section, we present an overview of Mexico's demographic transition, poverty in old age, labor market (formal and informal sectors), and government programs for income security in old age. Next, we describe the evolution of Mexico's non-contributory pension program. In the data and methods section, we present our data and empirical methods. In the following section, we show our estimates for program costs. Lastly, we provide our conclusions and policy recommendations.

Background

In 2014, Mexico's over-65 population was 8.0 million, 6.7 percent of the total population (CONAPO, 2012). This population is likely to grow substantially—and will be supported by a working-age population that will eventually diminish. Figure 1 illustrates this through a population pyramid based on CONAPO (2012) projections.¹ The older Mexican population will grow most rapidly when the cohorts born between 1980 and 2005 reach retirement age.

Mexican pension systems are largely tied to employment in the formal sector, that is, economic activities and labor regulated by government (INEGI, 2015). Formal-sector workers are public- and private-sector workers as well as self-employed who choose to contribute to the social-security system. At retirement, such workers receive social-security and health care benefits from the IMSS (Instituto Mexicano del Seguro Social) for private-sector workers, the ISSSTE (Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado) for public-sector workers, PEMEX (Petroleos Mexicanos), military, state, or municipal institutions. Of these IMSS, which serves 45 percent of the Mexican population, and ISSSTE, which serves 10 percent, are the largest (INEGI, 2015).

Resources for IMSS, ISSSTE, and other government social-security programs come from government funds as well as employee and employer contributions. IMSS shifted from a traditional pay-as-you-go (PAYG) program to fully-funded personal retirement accounts (PRA) in July 1997; ISSSTE did so in April 2007, respectively. Both PAYG systems required 500 weeks of contributions to receive benefits, and provided a minimum pension guarantee (MPG) based on the minimum wage of Mexico City. The PRA system requires 25 years of contributions. Under both the PRA and PAYG systems, normal retirement is possible at 65 and early retirement between ages 60 and 64. In the PAYG system, early-retirement pension benefits are reduced with number of years that one retires early. In the PRA system, early retirement is available for those who can obtain a pension equivalent to 130 percent of the minimum wage of Mexico City, which is the system's MPG. Individuals who do not satisfy PRA contribution requirements can withdraw the amount accumulated but cannot claim the MPG (Aguila et al., 2011).

¹These projections were updated in 2012.

Informal-sector workers, that is, those whose economic activities and labor income are outside government regulation (INEGI, 2015), include workers at non-compliant firms and self-employed workers who choose not to contribute to the social-security system (Aguila et al., 2011). Such workers may receive a non-contributory pension and health-care services provided by the government. Also individuals that never worked or were in unpaid work are eligible to claim a non-contributory pension. The non-contributory pension program is a minimum flat rate to alleviate poverty in old age. It is worth noting that the informal sector is larger than the formal sector in Mexico.

The large size of the informal sector in Mexico—which in recent years has comprised approximately 58 percent of the total labor force (INEGI, 2015)—and its lack of access to social-security benefits helps explain why Mexico has the most advanced effective retirement age among OECD countries: 72.3 for men and 68.7 for women in 2013, with half 46.0 percent of males at least 65 years old (OECD, 2013). The large informal sector also explains in part the high incidence of poverty among older persons. CONEVAL² (2014) statistics show that nearly half of Mexicans 65 or older lived in poverty in 2014, and nearly one in ten in extreme poverty.

Many Mexicans 65 or older also lack access to health services (13.1 percent) and 20.0 percent are in poverty or incapable of obtaining a minimum food basket (CONEVAL, 2014). Non-contributory pension programs are the main poverty-alleviation social policy for the older population in Mexico.

Mexico's Non-contributory Pension Program

In 2007, the Mexican government established the non-contributory pension program for adults 70 years or older in rural locations (<2,500 inhabitants). The *Programa de Atención a los Adultos Mayores de 70 años y más en zonas rurales* (PAAM) provided a monthly pension of MXN \$500 or US \$82.2 PPP³ (SEDESOL, 2007). The program expanded in 2008 to all localities with less than 20,000 inhabitants; in 2009, it expanded to all localities with less than 30,000 inhabitants (SEDESOL, 2008, 2009) and was renamed to *Programa 70 y Más* (70 y Más) in 2009. In 2012, it expanded to all urban and rural localities in the country but excluded adults receiving any other social-security benefits (SEDESOL, 2012).

In 2013, the age requirement for the program decreased from 70 to 65 years old (SEDESOL, 2013) and the program was renamed *Programa Pensión para Adultos Mayores* (PPAM). The monthly cash transfer set in 2007 remained unchanged until 2013, when it increased 5 percent to MXN \$525 (US \$67.0 PPP). In 2014, the program started including individuals who receive social-security benefits of less than MXN \$1,092 per month and the amount of the pension increased to MXN \$580 (US \$73.3 PPP) (SEDESOL, 2014).

²CONEVAL (2010) measures poverty with a multidimensional approach, which considers income as one characteristic. Other characteristics include food access, health, education, social security, and housing.

³The PPP is an exchange rate that takes into account the amount of money needed to purchase goods and services in different countries (OECD [undated]). Throughout the paper, we present estimates in Mexican pesos (MXN \$) and US dollars at 2013 purchasing power parity (US \$ PPP).

Table 1 summarizes changes in the program over time. Program changes have led to five-to-six-fold increases in the number of beneficiaries targeted and served beneficiaries.

The transfer from the non-contributory pension represents 39.2 percent of the monthly minimum wage. The government plans to continue expanding the program in the next 15 years and to increase monthly payments to MXN \$1,092 (US \$138.0 PPP) (see Willmore, 2014; SHCP, 2013).

Data and Methods

To estimate the costs of the program under differing eligibility rules, we estimate the number of individuals who would not be entitled to social-security benefits and therefore are eligible to receive a non-contributory pension for every cohort reaching retirement age between 2016 and 2030.⁴ We also estimate the fiscal costs of two alternative policy scenarios: 1. a universal non-contributory pension program and 2. a government proposal that was being discussed in congress (as of 2015).

We estimate the proportion of older persons without social-security benefits as the difference between the total older population and the older population entitled to social-security benefits. Ideally, we would estimate the number of individuals receiving social-security as the number of individuals who exit the labor force each year with such benefits. Unfortunately, this number is unknown, because social-security benefit eligibility depends on contributing to the social security system for a number of years, and there is no longitudinal database tracking individual social-security contributions over time or cross-sectional data with information needed to estimate benefit eligibility.

We therefore forecast the number of individuals with social-security benefits using cross-sectional datasets available. We employ two methods: a. limited dependent variable models (probit models) that predict the probability of receiving social security benefits and b. historic data to predict an average rate of growth of individuals with social security benefits. For the first method, we use all available cross-sectional sources of data in Mexico on employment and social-security contributions: the ENEU-ENE (Encuesta Nacional de Empleo Urbano) from 1994 to 2004, the ENOE (Encuesta Nacional de Ocupación y Empleo) from 2005 to 2015, and the 2013 ENESS (Encuesta Nacional de Empleo y Seguridad Social). ENEU-ENE is a nationally representative survey about labor, access to social security, and socio-demographic characteristics of individuals in urban areas of Mexico. The ENOE is a household survey that replaced the ENEU-ENE in 2005 and includes urban and rural areas. The ENESS is a survey that collects socioeconomic information of individuals affiliated with the social security system. This survey allows us to examine the coverage level of different social-security institutions on the population, as well as the characteristics of persons receiving social-security benefits. For the second method, we estimate, using the ENOE, the geometric average growth rate of the proportion of individuals 65 or older who receive social-security benefits.

⁴Those not entitled to social-security benefits could have been in the informal sector, in unpaid work, without work or otherwise unable to fulfill the requirements to obtain a formal-sector pension.

For the first approach, we conduct Probit regression models using data for the second quarter of each year from the ENEU for 1994 to 2004 and the ENOE for 2005 to 2015 for adults 65 years old or older. Because the ENEU is of urban areas only, we estimated two separate models: one using ENOE data on rural individuals, and the other using both ENEU and ENOE data on urban individuals. The equation of the probit model is:

$$\Pr(Y=1|X)=\Phi(X'\beta)$$

where Y is a dichotomous variable indicating whether an individual receives social-security benefits, and X are the set of covariates and control variables including number of children, gender, quinquennial age cohorts, an indicator of head of household, marital status (couple, and separated or single), education (no education, incomplete primary, complete primary, complete secondary, and high school and more), and an indicator for whether employed. We also included GDP and minimum wage annual growth rates.

To forecast the change in the probability of receiving social-security benefits, we estimated the marginal effects of the model with variables at the 2015 levels and we included projections for the years 2016 to 2030 of education, proportion male and female, and number of individuals per cohort and based on Census 2010 and ENOE 2015. We also conduct projections with the second method (historic data) for urban and rural areas (see appendix for a detailed description).

After computing the projections for urban and rural areas, we estimate the proportion of individuals without social-security benefits as the difference between the total older population from each cohort-year and the projected proportion of individuals with social security benefits. We estimate the fiscal costs of the program with the projected scenarios but only present the estimates of the highest (*high*) and lowest (*low*) projections of the proportion of individuals without social-security benefits (eligible for the non-contributory pension program). The *high* scenario corresponds to the first approach using probit models that estimate the lowest proportion of individuals with social-security benefits—and hence the greatest proportion requiring the non-contributory pension. The *low* scenario corresponds to the second approach using the average historic growth that estimates the highest proportion of individuals with social-security benefits—and hence the lowest proportion requiring the non-contributory pension.

We then compute the annual total cost of the non-contributory pension program under the 2012, 2013, and 2014 reforms using the *low* and *high* scenarios of the proportion of individuals without social-security benefits from 2016 to 2030.⁵ Lastly, we calculate the fiscal cost of the program as a percentage of the GDP and the public-sector GDP.⁶ We conduct the analysis with three scenarios of the GDP and the public-sector GDP growth

⁵Starting 2014, applicants to the non-contributory pension program who received any other contributory pension benefit below \$1,092MXN per month are entitled to receive the benefits of this program. This threshold does not represent further complication to our estimates because the minimum contributory social security benefit is above this threshold.

⁶The public sector GDP is the gross value added by all public administration engaged in production and supply of services; for instance, public education (OECD, undated).

rates: high growth rate (*optimistic*), low growth rate (*pessimistic*), and a scenario based on historic data (*intermediate*). See appendix for a detailed description.

Fiscal Cost of Mexico's Non-contributory pension program

Figure 2 shows the estimates of the two projections (*high* and *low*) of the proportion of individuals not receiving social-security benefits—and therefore eligible for the noncontributory pension program. The population eligible for the program was 2.3 million in 2011 but increased to 4.3 million (81.9 percent of all age-eligible) with reforms in 2012, and again to 6.6 million (82.3 percent of all age-eligible) with the 2013 reduction in the eligibility age from 70 to 65 years of age. After 2013, assuming no changes in age eligibility rule, we estimate the eligible population grew at an average annual rate of 2.7 percent to 2015. From 2016 to 2030, we use the two projections of the proportion of individuals without social security benefits (*high* and *low*) described in the appendix. Under the *high* scenario, the eligible population grows 3.2 percent annually to 2030; under the *low* scenario, it grows 2.7 percent.

Assuming no policy changes to promote formal-sector work and social-security program participation, we project the formal sector will increase slightly in coming years, and the proportion of Mexicans 65 or older eligible for the non-contributory pension program will correspondingly decrease from 82.3 percent in 2020 to 79.5 percent in 2030 in the *high* scenario and from 79.0 percent to 73.7 percent in the *low* scenario. Nevertheless, because the total number of Mexicans at least 65 years old will increase, the number of persons eligible for the non-contributory pension program will increase to 8.1 million by 2020 and 11.2 million in 2030 under the *high* scenario, and from 7.8 million to 10.4 million under the *low* scenario.

Figure 2 also shows the observed costs of the program using the *high* and *low* projections of population eligible for noncontributory pensions. In 2011 the program cost \$1.7 billion US dollars in PPP. Observed costs increased 39.3 percent to \$2.4 billion in 2012 and 64.9 percent to \$3.9 billion in 2013. Figure 2 also shows projected costs using the eligibility rules of the 2012, 2013, and 2014 reforms—and indicates the program cost increased 15.7 percent as a result of the 2014 reform.

Under the 2012 eligibility rules, the non-contributory pension for individuals 70 or older without social-security benefits would have cost US \$3.5 billion PPP in 2014. Under the 2013 eligibility rules, the projected cost of the program for adults at least 65 years of age without social-security benefits would have been US \$5.6 billion PPP in 2014. As a result of increased payments in 2014, the program cost US \$5.9 billion PPP that year. Under the *high* scenario, program costs from 2016 to 2030 would increase 5.8 percent annually using the 2012 rules, 6.2 percent for those of 2013, and 6.5 percent for those of 2014. Under the *low* scenario, program costs increase 5.4 percent annually for the 2012 reform, 5.7 percent for the 2013 reform, and 6.0 percent for the 2014 reform.

In Figure 3 we present two alternative policy scenarios to assess the costs of extending the non-contributory pension program to all persons 65 years old or older. The first would

include those with social-security benefits and pay all MXN \$580 (US \$73.3 PPP) monthly. The second, as debated in congress in 2015, would exclude those with social-security benefits but would increase monthly payments to those eligible from MXN \$580 (US \$73.3 PPP) to MXN \$1,092 (US \$138.0 PPP) over the next 15 years and revise age eligibility every 5 years to life expectancy at birth multiplied by 0.87 (SHCP, 2013). Both scenarios would index payments to inflation as well. We assume that the new government proposal is approved in 2015 and the amount of the non-contributory pension is increased to MXN \$1,092. We also include the *high* and *low* projections of individuals eligible for the noncontributory pension. Finally, Figure 3 shows program costs under the 2014 reform for *high* and *low* projections of recipients.

The average annual rate of growth of the cost for a universal non-contributory pension would be 6.9 percent. Using *high* projections, we find costs would increase 6.5 percent annually under the 2014 reform and 5.3 percent under the reforms debated in 2015. Using *low* projections, we find costs would increase 6.0 percent under the 2014 reform and 4.7 percent under the 2015 proposal, which also includes changes in age-eligibility increments every 5 years.

Table 2 shows estimated program costs in US \$ PPP, as a percentage of the total GDP, and as a percentage of the public-sector GDP for the 2014 reform (Panel A), for an alternative policy scenario of universal coverage (Panel B), and for the 2015 proposal (Panel C). It also shows these projections under three different growth-rate scenarios for GDP and public-sector GDP. Panels A and C also consider *high* and *low* projections of the eligible population.

Estimating costs as a percentage of the public-sector GDP provides another way of assessing the impact of program costs on the government budget. We estimate costs of the program in 2014 were 0.27 percent of GDP and 1.27 percent of public-sector GDP. For the intermediate scenario of GDP growth, we the estimate costs of the program will be 0.30 percent of total GDP or 1.40 percent of public-sector GDP in 2020 and 0.36 percent of total GDP or 1.69 percent of public-sector in 2030 for the *high* population scenario, and 0.29 percent of total GDP or 1.35 percent of public sector GDP in 2020 and 0.33 percent of total GDP or 1.57 percent of public-sector in 2030 under the *low* population scenario.

The pessimistic and optimistic scenarios provide more insights about changes resulting from GDP growth. By 2030, we observe important differences in the percentage of GDP and public-sector GDP for the program represents under both projection scenarios (*high* and *low*). In the *optimistic* scenario, the cost of the program will represent 0.31 percent of GDP or 1.43 percent of the public sector GDP for the *high* scenario, and 0.28 percent of GDP or 1.33 percent of the public sector GDP for the *low* scenario. For the *pessimistic* scenario, the cost of the program will represent 0.39 percent of the GDP or 1.82 percent of the public sector GDP under the *high* scenario, and 0.36 percent of the GDP or 1.69 percent of the public sector GDP for the *low* scenario.

Assuming no pension-testing rules or a universal program, costs increase to 0.45 percent of GDP or 2.12 percent of public-sector GDP in 2030 assuming an intermediate growth rate

scenario (panel B in Table 2).⁷ Finally, Panel C estimates costs in GDP for the 2015 proposal (assuming it started that year). Assuming *optimistic* GDP growth, in 2030 the cost of the program will represent 0.49 percent of the GDP or 2.29 percent of the public sector GDP under the *high* scenario, and 0.45 percent of the GDP or 2.12 percent of the public sector GDP under the *low* scenario. Similarly, with *pessimistic* GDP growth, the cost will represent 0.62 percent of the GDP or 2.91 percent of the public sector GDP assuming a *high* scenario, and 0.57 percent of the GDP or 2.70 percent of the public sector GDP under the *low* scenario.

As a percentage of GDP, the costs of the Mexican program are lower than those for many other nations. According to the Pension Watch Database (HAI, 2013), the pension-tested non-contributory pension in Chile (US \$195.60 PPP monthly to individuals 65 and above), accounts for 0.90 percent of the GDP. In Brazil, the conditionally-tested non-contributory pension of US \$330.85 PPP delivered to women 55 and above and men 65 and above represents 1.50 percent of GDP. In Colombia, the regional and means-tested non-contributory pension of US \$44 PPP paid to women above 54 and men above 59 years accounts for 0.13 percent of the GDP. In Argentina, a means-tested non-contributory pension of US \$130.77 is paid to individuals 70 or older with a total cost of 0.23 percent of the GDP. In South Africa a non-contributory pension of US \$225.06 PPP is disbursed to individuals 60 or older (means-tested) with a total cost of 1.14 percent of GDP. The relatively low cost of the Mexican program may be explained in part by its low payments (US \$73.3 PPP) and age eligibility.

Nevertheless, costs of the Mexican program have grown, from 0.35 percent of public-sector expenditure in 2008 to 0.45 in 2012 and 0.93 in 2014. In 2014, 1.61 percent of the public-sector budget was allocated to *Oportunidades*, the largest poverty-alleviation program in Mexico, and 1.60 percent was allocated to *Seguro Popular*, the largest health-care program that provides health care services. In other words, the non-contributory pension program for older population is among the largest budgets for social programs in Mexico.

Government spending on the non-contributory pension program remains less than that for the formal-sector social-security programs (current PAYG pensions, government matching contributions to current workers, and minimum pension guaranteed). The Mexican government spends 2.9% of GDP for formal-sector pensions, with total fiscal costs for contributory and non-contributory pensions at 3.2% of GDP (PEF, 2015).

Conclusion

Expanding the non-contributory pension program to a larger number of localities and beneficiaries over time poses a financial challenge given the size of the population needing coverage and its expected growth over the coming decades. We find that the cost of providing benefits to all adults 65 and older without social security benefits in 2014 represents 0.27 percent of GDP. Such costs would increase to 0.29–0.30 percent of GDP by 2020 and to 0.33–0.36 percent of GDP by 2030 under an intermediate GDP growth scenario.

⁷All calculations and estimates exclude the program's operational costs.

Non-contributory pension programs are safety-net policies in old age whose expenditures show the lack of mechanisms or possibilities for individuals to plan and save for retirement. Our results shed light on the importance of promoting public policies to increase the coverage of the formal-sector and contributory social-security systems. The non-contributory pension program is financed through general taxes (mainly through VAT, income taxes, and taxes to oil revenues) (SHCP, 2015). The proportion of government spending allocated to the non-contributory pension program will continue to increase with population aging. As a result, the government may need to raise distortionary taxes or increase public debt to continue financing the program. Levy (2008) argues that social programs similar to the non-contributory pension impose taxes in the labor formal sector and shift fiscal resources that may promote informal employment. Having more persons covered by the formal sector will increase well-being during retirement and make it more financially feasible to fund non-contributory pension programs and other policies to alleviate poverty in old age.

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Appendix

In this appendix, we describe in more detail the assumptions and estimation methods used to predict the number of individuals with social-security benefits in our models. To test the sensitivity of our estimations methods, we included different sets of baseline scenarios of the proportion of individuals receiving social-security benefits and demographic projections for education, gender, and number of individuals in each cohort and year.

We derived two baseline scenarios from ENOE 2015 and ENESS 2013. These are the most recent sources on the proportion of individuals with social-security benefits. ENOE 2015 indicates that 1.7 million (18.1 percent) of 9.4 million adults aged 65 and older receive social-security benefits, of whom 1.5 million live in urban areas. In contrast, the ENESS shows that in 2013, 1.9 million (20.8 percent) of 8.9 million adults 65 and older received social-security benefit, of whom 1.5 million live in urban areas (see Table A.1).

Table A.1

Baseline scenarios of the proportion of individuals 65+ that receive social security benefits

Survey		Total	Individuals with social security benefits		Individuals without social security benefits	
			Total	%	Total	%
ENOE 2015	Urban	5,690,712	1,460,615	25.7	4,230,097	74.3
	Rural	3,660,194	233,151	6.4	3,427,043	93.6
	Total	9,350,906	1,693,766	18.1	7,657,140	81.9
ENESS 2013	Urban	5,407,738	1,528,025	28.3	3,879,713	71.7
	Rural	3,544,845	334,312	9.4	3,210,533	90.6
	Total	8,952,583	1,862,337	20.8	7,090,246	79.2

Source: Calculations based on ENESS 2013 and ENOE 2015.

For population projections by age and sex, we use CONAPO (2012), based on Census data. We also did our own projections for age and gender using ENOE 2015. Our method may overestimate the proportion of individuals with social-security benefits because we do not include mortality in our analysis but CONAPO (2012) does incorporate mortality by cohort and year. Using ENOE, however, allows us to project education levels for our analysis. Therefore, we construct two sets of demographic projections: a. age and gender from CONAPO (2012) based on Census data and education level from ENOE, and b. age, gender and education level using ENOE.

Using the first approach with probit models, we obtained four forecasts of the proportion of individuals receiving social security benefits for the period 2016–2030 (see Table A.2.): 1. an ENOE baseline scenario of the proportion of individuals with social-security benefits and

demographic projections based on ENOE, 2. an ENESS baseline scenario and demographic projections based on ENOE, 3. an ENOE baseline scenario and demographic projections based on Census and ENOE, and 4. an ENESS baseline scenario and demographic projections from Census and ENOE.

Table A.2

Approaches used to forecast the proportion of individuals with social security benefits

Demographic projections		Baseline proportions	
Approach 1: Probit models	a.	ENOE	- ENOE/ENESS
	b.	ENOE and Census	- ENOE/ENESS
Approach 2: historic data	-	-ENOE/ENESS	

We estimated probit models for rural and urban areas separately to account for 2012 program changes in rural areas. We estimated four projections for those that live in rural or urban areas, who were 65 years old and older in 2014, and whose eligibility depends on whether they have social security benefits. The second approach uses historic data to calculate the geometric average rate of growth of the proportion of individuals with social-security benefits in urban and rural areas. For this approach, we also use two baseline scenarios (ENOE and ENESS) as described for the first approach (see Table A.2). We estimated that the geometric annual average rate of growth for urban and rural areas is 1.98% percent.

Figure A.1 presents our projections from 2015 to 2030 for the proportion of individuals with social-security benefits in urban areas and Figure A.2 does so for rural areas. The highest projection of the proportion of individuals with social-security benefits corresponds to the second approach using the historic average rate of growth and the ENESS baseline. The lowest corresponds to the first approach using a probit model with demographic projections from ENOE and CONAPO (2012) as based on the Census and ENOE baseline. The solid line is the observed proportion for urban areas from ENOE and ENEU between 1994 and 2015 and for rural areas between 2005 and 2015 from ENOE. We do not include ENEU for rural because it only provides information for urban areas. The predicted are the values estimated by the model.

Figure A.1. Proportion of individuals that receive social security benefits in urban areas

Source: Calculations based on *ENESS* 2013; *ENEU* 1994–2004; *ENOE* 2005–2015, and CONAPO 2012.

We consider the highest projection of the proportion of individuals with social-security benefits as the *low* scenario because it shows the lowest proportion of individuals eligible for the noncontributory pension program. We consider the lowest projection of the proportion of individuals with social-security benefits as the *high* scenario because it shows the highest proportion of individuals eligible for the noncontributory pension program.

Figure A.2. Proportion of individuals that receive social security benefits in rural areas

Source: Calculations based on *ENESS* 2013; *ENOE* 2005–2015, and CONAPO 2012.

To estimate the fiscal costs of the non-contributory pension program, we used the rules of the program between 2012 and 2014 for rural and urban areas separately. We also conducted projections for two alternative policy scenarios (universal coverage and the 2015 government proposal discussed in congress). We added to all the different estimates the fiscal costs of the program, individuals with social-security benefits in rural areas (<30,000 habitants) that received the program before 2011, when the program was not pension-tested, and who therefore are entitled to the non-contributory pension lifelong regardless of subsequent modifications to program rules. We used the CONAPO (2012) population projections of individuals that were 70 years old or older in 2011 for localities with less 30,000 inhabitants.

To estimate the fiscal costs of the non-contributory pension program, we assume the non-contributory pension is indexed to the CPI (Consumers Price Index), that is, its purchasing power will not diminish over time.⁸ We used information from the CPI estimated by INEGI (2014). We assumed a constant annual inflation rate of 4.45 percent from 2015 to 2030, matching the average annual inflation rate between 2001 and 2014.⁹

We present the estimates of the fiscal costs of the non-contributory pension program as a proportion of GDP and of public-sector GDP. We employ three scenarios (optimistic, intermediate, and pessimistic) of GDP growth. For the *optimistic* scenario, we used the IMF (2015) forecast assuming GDP growth of 2.1 percent in 2014, 2.9 percent in 2015, and 3.7 percent thereafter. The *pessimistic* scenario assumes 2.1 percent growth from 2014 to 2030 (CIDE, 2015). For the *intermediate* scenario, we use assume average annualized GDP growth rate of 2.6 percent in the last 20 years will continue in coming years (INEGI, 2013). Table A.3 summarizes the GDP and inflation assumptions.

Table A.3

GDP and Inflation Scenarios 2014, 2015, 2020 and 2030

Forecast	2014	2015	2020	2030
GDP (real)				
Optimistic	2.1	2.9	3.7	3.7
Intermediate	2.1	2.6	2.6	2.6
Pessimistic	2.1	2.1	2.1	2.1
Inflation (annual)	4.45	4.45	4.45	4.45

Source: Calculations based on IMF (2015), INEGI (2013), and CIDE (2015).

To obtain the public-sector GDP, we use National Accounts data from INEGI to calculate the average proportion of GDP that the public sector represented from 2003 to 2013. We assumed this proportion would remain unchanged until 2030 and applied this proportion to the GDP projections (*optimistic*, *pessimistic*, and *intermediate*) to obtain three corresponding scenarios of public-sector GDP from 2014 to 2030.

⁸We adjusted the pension to the CPI because the minimum pension guaranteed for contributory social security benefits is adjusted to the CPI and the current government proposal also states that the pension should be adjusted to the CPI.

⁹An assumption of a constant inflation rate has been used in previous studies. For example, an IMF study to estimate the fiscal costs of pensions for Bangladesh (Medina, 2015).

Figure 1.
Mexican population pyramids by sex and age
Source: CONAPO (2012).

(a) High (Probit model) **(b) Low (Historic data)** **Figure 2.**

Estimated costs of the non-contributory pension program reform 2012, 2013, and 2014 and eligible population (2011–2030)

Notes: In 2011, the eligible population (measured in the right axis) were older adults 70 years old and older living in rural localities with less than 30,000 inhabitants. In 2012, the program served older adults 70 years old and older in rural and urban localities without social security benefits (pension-tested). In 2013, the eligibility age changed from 70 years to 65 years old. In 2014, the program was pension-tested for 65 years old or older and the amount of the pension increased to MXN \$580. Our estimates of the cost of the 2012 Reform assumes that eligible population is 70 years old and above without social security

benefits. Estimates for the 2013 and 2014 Reform costs assume that eligible population is 65 years old or older without social security benefits.

Sources: Calculations based on *ENESS* 2013; *ENEU* 1994–2004; *ENOE* 2005–2015, and CONAPO 2012.

Figure 3.

Cost projections of policy scenarios to extend coverage 2014, 2020 and 2030 (2014–2030)

Notes: Estimates for the 2014 Reform and Universal costs assume a monthly pension of MXN \$580 (\$73.3 USD PPP) and the 2015 Proposal costs assumes a monthly pension of \$1,092 MXN (\$138.0 USD PPP).

Sources: Calculations based on *ENESS* 2013; *ENEU* 1994–2004; *ENOE* 2005–2015, and CONAPO 2012.

Table 1

Federal non-contributory pension program description of beneficiaries, localities covered, and budgets 2007–2014

	2007	2008	2009	2010	2011	2012	2013	2014
Official names of the program	Programa de atención a los adultos mayores de 70 años y más en zonas rurales	Programa de atención a los adultos mayores de 70 años y más en zonas rurales	Programa 70 y más	Programa 70 y más	Programa 70 y más	Programa 70 y más	Programa Pensión para adultos mayores	Programa Pensión para adultos mayores
Beneficiaries age/type	70+	70+	70+	70+	70+	70+ without social security benefits	65+ without social security benefits	65+ without social security benefits above \$1,092 MXN
Locality type	Rural	Rural	Rural	Rural	Rural	Rural and Urban	Rural and Urban	Rural and Urban
Monthly benefit (MXN \$)	<2,500 500	<20,000 500	<30,000 500	<30,000 500	<30,000 500	500	525	580
Beneficiaries target	968,750	1,520,374	2,042,000	2,105,305	2,009,019	3,504,142	4,426,982	5,727,077
Beneficiaries serviced	1,031,005	1,863,945	2,050,626	2,105,306	2,149,024	3,056,816	4,851,025	5,487,664
Original budget (US \$ billions PPP)	1.1	1.5	2.0	1.9	1.8	2.5	3.3	5.3
Final budget (US \$ billions PPP)	1.0	1.5	1.8	1.8	1.8	2.3	3.1	4.6
Operational expenditures as percent of original budget (%) *	7.0	7.0	7.0	7.0	6.73	4.0	5.0	4.0

Notes: Beneficiaries' serviced figures are obtained from the beneficiaries' list at the end of November-December 2007, 2008 2009, 2010, 2011, 2012, 2013 and 2014.

* Limit defined in the Program Operating Rules.

Source: Program Operating Rules (*Reglas de Operación del Programa*), 2007, 2008, 2009, 2010, 2011, 2012, 2013 and 2014; Budgetary Report (Cuenta de la Hacienda Pública Federal, CHPF), 2007, 2008, 2009, 2010, 2011, 2012, 2013 and 2014; Budget Program (Presupuesto de Egresos de la Federación PEF) 2014.

Table 2

Cost projections of policy scenarios to extend the coverage 2014, 2020 and 2030

		2014		2015		2020		2030	
Panel A. 2014 Reform		High (probit model)	Low (historic data)	High (probit model)	Low (historic data)	High (probit model)	Low (historic data)	High (probit model)	Low (historic data)
Cost of the Program (US \$ billions PPP)		5.9	5.9	6.4	6.4	8.6	8.2	16.3	15.1
GDP (%)									
Optimistic		0.27	0.27	0.28	0.28	0.28	0.27	0.31	0.28
Intermediate		0.27	0.27	0.28	0.28	0.30	0.29	0.36	0.33
Pessimistic		0.27	0.27	0.28	0.28	0.31	0.29	0.39	0.36
Public Sector GDP (%)									
Optimistic		1.27	1.27	1.31	1.31	1.33	1.28	1.43	1.33
Intermediate		1.27	1.27	1.32	1.32	1.40	1.35	1.69	1.57
Pessimistic		1.27	1.27	1.32	1.32	1.44	1.38	1.82	1.69
Panel B. Universal Coverage (CONAPO population projections, 2012)		2014		2015		2020		2030	
Cost of the Program (US \$ billions PPP)		7.0		7.6		10.4		20.5	
GDP (%)									
Optimistic		0.32		0.33		0.34		0.38	
Intermediate		0.32		0.33		0.36		0.45	
Pessimistic		0.32		0.33		0.37		0.49	
Public Sector GDP (%)									
Optimistic		1.49		1.56		1.61		1.80	
Intermediate		1.49		1.56		1.70		2.13	
Pessimistic		1.49		1.57		1.75		2.29	
Panel C. 2015 Proposal		High (probit model)	Low (historic data)	High (probit model)	Low (historic data)	High (probit model)	Low (historic data)	High (probit model)	Low (historic data)
Cost of the Program (US \$ billions PPP)		-	-	12.1	12.1	14.8	14.3	26.1	24.2
GDP (%)									
Optimistic		-	-	0.53	0.53	0.49	0.47	0.49	0.45

Panel A. 2014 Reform	2014		2015		2020		2030	
	High (probit model)	Low (historic data)	High (probit model)	Low (historic data)	High (probit model)	Low (historic data)	High (probit model)	Low (historic data)
Intermediate	-	-	0.53	0.53	0.52	0.50	0.58	0.53
Pessimistic	-	-	0.53	0.53	0.53	0.51	0.62	0.57
Public Sector GDP (%)								
Optimistic	-	-	2.47	2.47	2.30	2.21	2.29	2.12
Intermediate	-	-	2.48	2.48	2.43	2.33	2.71	2.51
Pessimistic	-	-	2.49	2.49	2.50	2.40	2.91	2.70

Notes: Panel A and Panel B are estimated assuming a monthly pension of \$580 MXN (\$73.3 UDS PPP), Panel C estimates assume a monthly pension of \$1,092 MXN (\$138.0 USD PPP).

Source: Calculations based on *ENESS* 2013; *ENEZU* 1994–2004; *ENOE* 2005–2015, CONAPO 2012, and INEGI 2012. Forecast information based on IMF WEO April 2015 (optimistic) and CIDE April 2015 (pessimistic) estimates.