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and Labor Supply**

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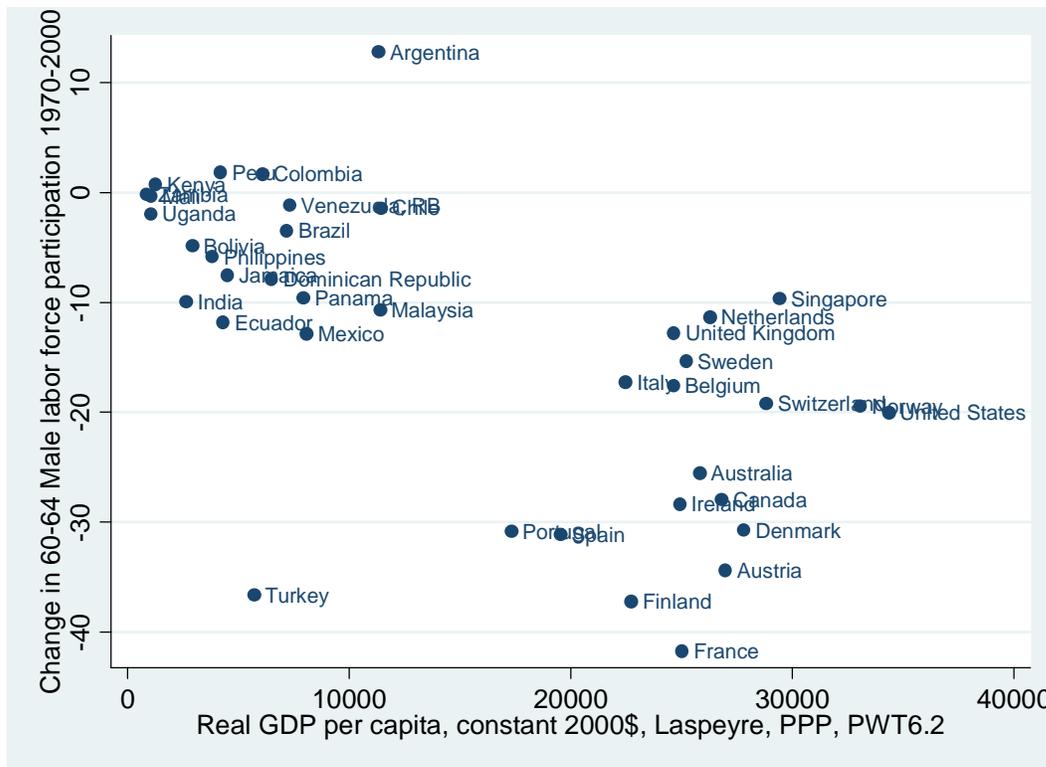
Abstract

We analyze cross-country panel data to examine the effect of key institutional features of social security systems on male labor supply. Our findings indicate that the labor supply of older males covaries negatively with replacement rates and system coverage, with the replacement rate effects being stronger for pay-as-you-go systems than for fully funded systems. The results also reveal a surprisingly small and often negative response of the labor supply of older males to improvements in life expectancy.

1. Introduction

Longer life spans and aging populations are putting pressure on the retirement systems of many countries. The compression of morbidity observed in recent years produces healthier older people. This, in theory implies longer working lives. However, male old-age labor force participation has fallen rapidly over the last decades. As shown in Figure 1 below, the decline in old-age male labor force participation between 1970 and 2000 appears to be reasonably consistent across countries and particularly pronounced in the developed world.

Figure 1: Percentage Point Change in Labor Force Participation Rate of Males Aged 60-64 between 1970 and 2000 and Real Income per Capita



In this paper, we use new data on social security systems from 51 countries representing a range of income groups to estimate the degree to which social security systems can explain the declines in male labor force participation. Under standard social security systems, individuals receive an income stream that is apportioned throughout the retirement years. If these systems are actuarially fair, expected benefits over different

retirement periods would perfectly match contributions and thus not have any direct influence on old-age labor market decisions (Stock and Wise, 1990; Cremer, Lozachmeur and Pestieau, 2006). However, actuarial fairness is not a feature of most pension systems, and retirement incentives are often quite pronounced (Gruber and Wise, 2004). When there is little to no financial incentive to continue working beyond the minimum retirement age, only those with strong preferences for working continue to do so (Blondal and Scarpetta, 1999).

To better understand the magnitude of the labor force participation effects of social security systems, we separately estimate male labor supply equations for each five-year cohort in a five-year panel. To control for year- and country-specific factors, we allow for both country and time-fixed effects in our specifications. We find that life expectancy and social security arrangements have little effect on labor supply below age 55. For the 55–59 and 60–64 age groups we find that higher wages lead to earlier retirement, indicating that the income effect dominates. Our results show a surprisingly small and often negative response of old-age male labor force participation to improvements in life expectancy. On the other hand, social security systems strongly affect old-age labor supply; high replacement rates under pay-as-you-go systems significantly lower old age male labor force participation.

Our results are consistent with a set of recent country studies, many of which are summarized in two recent volumes by Gruber and Wise (1999; 2004). Our results imply that the negative effect of social security systems extends to an even broader set of countries than those focused on in the Gruber and Wise volumes. This is an important finding, because social security systems have been growing rapidly both in size and in their diffusion across the developing world and are likely to become a key factor in economic development.

Our analysis follows most of the existing literature in assuming social security systems to be independent from labor supply trends. As pointed out by Gruber and Wise (1998), this assumption may be problematic if governments use social security schemes

to accommodate public demand for social assistance for an aging population struggling in the labor market. For the purpose of our analysis this is only a minor issue. We give two reasons: first, individual country studies (e.g. Börsch-Supan and Schnabel, 1998) have shown that changes in policy generally precede changes in labor supply; second, and more importantly, in contrast to the aggregate ILO measures used in most previous studies, our social security measures describe old-age retirement systems only and thus exclude the early retirement schemes commonly used as broad substitute for old-age unemployment insurance.

The results presented in this paper complement a more general literature on the effects of social security systems on economic growth. Social security systems distort savings incentives (Zhang and Zhang, 2004; Bloom, Canning, Mansfield and Moore, 2007), fertility decisions (Cremer, Gahvari and Pestieau, 2006), labor supply (Burtless and Moffitt, 1985; Krueger and Pischke, 1992; Coile and Gruber, 2000; Coile and Gruber, 2000), and economic growth (Zhang and Zhang, 2004; Ehrlich and Kim, 2005). In this paper we show that the effect of social security arrangements on male labor supply is significant and is therefore an important factor in understanding the long-term relationship between social security and economic development. For the most part, this paper does not address female labor supply, which follows different patterns than male labor supply. As shown in Bloom, Canning, Fink, and Finlay (2007), decreases in fertility rates combined with general social trends have led to significant increases in female workforce participation over the last decades.

The rest of the paper is structured as follows: we discuss the data in section two of the paper and present the empirical results in section three. We conclude with a short summary and discussion of our main results.

2. Data

The dataset we use in our empirical work is an unbalanced five-year panel covering the period from 1970 to 2000 for 51 countries² that range from low to high

² For a full list of countries, please see the Appendix.

income. The dependent variable in our empirical analysis is the male labor force participation rate. Labor market participation data are from the ILO Bureau of Statistics (2007) and are based on national labor market surveys and censuses. The participation rate is the number of economically active individuals divided by the total population in a given age group. Although definitions vary slightly across countries, those persons classified as “economically active” are either employed or actively looking for work (ILO Bureau of Statistics, 2007). Participation rates are provided for each five-year age group from age group 15–19 up to age group 60–64, and as an average for the population over age 64.

Our explanatory variables are life expectancy, the percentage of the population living in urban areas, physical capital per working-age person, lagged economic growth, average years of schooling, and, of most interest for the purposes of this study, four variables describing the institutional settings of domestic social security systems.

Life expectancy and urbanization data are from the World Development Indicators (World Bank, 2006). The physical capital stock is imputed based on the real capital investment rates from the Penn World Tables 6.2 (Heston, Summers and Aten, 2006), which is also the source for the lagged growth in real GDP per capita. To avoid potential simultaneity biases in the estimation, we adjust the capital stock by the working-age population rather than the number of workers. Our human capital measures are the average years of schooling in the male and female population aged 25 and older as calculated by Barro and Lee (2000).

Data on social security systems were compiled based on the Social Security Administration’s “*Social Security Programs Throughout the World*.”³ The data originated from a survey conducted by the Social Security Administration that summarized the key features of national social security systems. We generate four variables based on each individual country report.

³ <http://www.ssa.gov/policy/docs/progdesc/ssptw/>

The first variable is a basic indicator that takes on a value of one if the system provides universal coverage. A system is assessed as “universal” if all *employees* are covered under the system. The variable is also coded to one if workers in a specific sector (e.g., agriculture or the public sector) are not covered by the general social security system, but receive similar coverage through related schemes.

Our second main variable is an indicator variable that takes on a value of one if the system provides retirement incentives. As discussed extensively in Gruber and Wise (1999; 2004), retirement incentives come in many forms that generally translate into very high net effective tax rates on income earned once the worker passes some set retirement age. Typically, pension payments will only start once the contributor retires, or only be (fully) paid if earnings do not exceed some given threshold. The U.S. system prior to 2001 provides an example of this system: an earning test used to reduce pension receipts up until age 70. In 2001 the law was changed and now the test only applies for early retirement, between ages 62 and 65. We code our variable to one if the social security system provides explicit incentives to retire and to zero in all other cases, independent of the actuarial fairness of the system.

In addition to these two broad indicator variables we calculate average replacement rates as a measure of the size or generosity of social security systems. The replacement rate is given by the size of the annual pension an average worker receives upon retirement relative to the typical pre-retirement income.⁴ Distinguishing between the two broad types of pension systems, we calculate separate replacement rates for pay-as-you-go and fully funded systems. In pay-as-you-go systems, the government uses contributions of current workers to pay the pensions of current retirees following some intergenerational contract. In a fully funded system, contributions are invested in the capital market and the earned income is used later to pay pensions. Although funded pensions are common in defined contribution programs and pay-as-you-go systems are often associated with defined benefit programs, these pairings do not always hold.

⁴ In our calculations we assume that workers enter the labor force at age 16 and that the average earnings correspond to two-thirds of GDP per worker.

Defined contributions are sometimes part of pay-as-you-go systems, and some defined-benefit schemes are at least partially based on capital accounts. We assess a system as funded if social security assets are held by either an independent fund or private companies that invest freely in a portfolio of assets. Systems like the Sri Lankan one, where the social security fund holds only debt, essentially mimic basic pay-as-you-go systems and are coded as such.

In many cases — for example, the United States — pension systems are redistributive, so that replacement rates vary considerably across income groups. We normalize our measure to the average worker so as to have some comparable measure across countries. For fully funded systems we assume that the contributions in the fund earn a real rate of return of 3% a year, and are paid out as a constant real annuity upon retirement. This implies that for the average worker a 1% contribution over the working life should generate a pension corresponding to 5.7% of income.

The coding is particularly difficult for countries (such as Colombia and Peru during the 1990s) that introduced new pension schemes over time and left the choice between the two systems to the worker. To promote comparability, we assume that all workers eventually fall under the new system, and calculate our measures accordingly. For countries that have multi-pillar systems with both a funded and a pay-as-you-go component (such as Australia, Denmark, and Switzerland) we calculate both replacement rates.

We report descriptive statistics on the dataset we use in Table 1 below. The countries in the sample are drawn from each of the six major continents and cover a wide development spectrum. Income per capita (PPP) ranges from US\$ 669 (Mali 1970) to US\$ 34,364 (US 2000). Similar differences characterize educational attainment and life expectancy. For example, male life expectancy at birth ranges in 2000 between 38.1 years in Zambia and 77.4 years in Sweden.

Male labor force participation rates in the age group 55–59 are generally around 90% in developing countries and in the 70–80% range in industrialized countries. In 2000, Belgium had the lowest participation rate (53.8%) in this age group, followed closely by Italy (53.9%) and Turkey (58.4%). Participation rates are significantly lower in the 60–64 age group, with a sample mean of 66.1%. A number of countries, such as Austria, Belgium, and France, display participation rates below 20% in 2000.

Roughly three quarters of the social security systems we considered are classified as universal, and 57% are classified as providing retirement incentives. Average replacement rates in our sample are 13% and 52% for fully funded and pay-as-you go systems, respectively. Singapore is the big outlier within the fully funded systems. Due to total (employer plus employee) contribution rates exceeding 50% in the 1970s, pensions up to 285% of wages were paid in the late 1970s and early 1980s. In 2000, replacement rates had dropped to a more moderate, but still quite impressive 135%. All other countries have average replacement rates below 100% over the sample period.⁵

⁵ There are three cases where replacement rates temporarily exceed 100%: India and Malaysia in 2000 and New Zealand in 1975.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Ave. 10-year Annual Economic Growth (%)	314	2.19	1.93	-4.17	8.94
Average Years of Schooling, males age >25	314	6.53	2.53	0.36	12.45
Average Years of Schooling, females age >25	314	5.64	2.81	0.10	12.21
Capital per Worker	314	36.36	32.05	0.36	137.89
GDP per capita	314	10,515	8,063	681	34,365
Male Labor Force Participation Age 25-29	314	93.75	3.77	74.40	99.00
Male Labor Force Participation Age 30-34	314	96.34	2.53	81.00	99.40
Male Labor Force Participation Age 35-39	314	96.69	2.22	84.40	99.20
Male Labor Force Participation Age 40-44	314	96.43	1.95	86.10	99.58
Male Labor Force Participation Age 45-49	314	95.10	2.57	82.60	98.96
Male Labor Force Participation Age 50-54	314	91.51	4.41	69.00	98.75
Male Labor Force Participation Age 55-59	314	83.15	9.50	50.20	98.00
Male Labor Force Participation Age 60-64	314	65.92	18.51	14.10	93.53
Male Labor Force Participation Age 65+	314	36.72	23.19	1.90	81.45
Male Life Expectancy	314	65.41	8.67	38.10	77.38
Retirement Incentive	314	0.57	0.50	0	1
Replacement Rate Fully Funded	314	0.13	0.35	0.00	2.86
Replacement Rate pay-as-you-go	314	0.52	0.33	0.00	1.23
Universal System	314	0.75	0.43	0	1
Urban population (% of total)	314	60.71	21.70	8.80	100.00

3. Empirical Specification and Results

To analyze the effect of social security on male labor force participation we estimate the parameters of the following reduced-form equation

$$LFP_{ijt} = \beta_0 + \beta_1 k_{it} + \beta_2 Educ_{it} + \beta_3 LE_{it} + \beta_4 \dot{y}_{it} + \beta_5 Urban_{it} + \beta_6 SocSec + \delta_j + \delta_t + \varepsilon_{ijt}$$

where LFP_{ijt} is the male Labor Force Participation rate of age group i in country j in period t , k is log capital per working age person, and $Educ$ is a vector describing the educational attainment distribution. LE stands for life expectancy, $Urban$ measures the degree of urbanization, and $SocSec$ are the social security variables discussed in the previous section. δ_j and δ_t are country and year dummies, respectively.

We use capital per working age person (k_{it}) and education as our proxies for domestic wage rates or potential earnings. To limit endogeneity concerns we normalize the capital stock to the population of working age rather than the actual number of workers. For education, we use both the mean and the variance of educational attainment in our empirical specifications to capture the full educational distribution, and allow for different coefficients on male and female education. For a given average years of education, a higher variance of attainment implies a more uneven distribution of educational benefits, and thus a smaller fraction of the population profiting from higher wages. With income and substitution effects working in opposite directions the priors on the wage proxies are ambiguous. A negative coefficient on the average levels implies that the income effect dominates the substitution effect. A similar, yet slightly more subtle, argument applies to life expectancy. Although lifetime utility maximization generally implies a positive effect of life expectancy on retirement age (Bloom, Canning et al., 2007), this may not necessarily be true if longer life spans are associated with lower degrees of uncertainty regarding the actual length of life (Kalemli-Ozcan and Weil, 2005).

To capture recent trends in the economy, we also include the average annual economic growth rate over the ten years preceding each observation. Higher economic growth implies a larger set of labor market opportunities and thus increases old-age labor market participation rates.

Last, we estimate the effect of our three principal retirement variables: the retirement incentive indicator and the replacement rates in fully funded and pay-as-you-go pension systems, respectively. Because fully funded systems essentially replace private savings, and because the link between actual contributions and benefits is often weak in pay-as-you-go systems, the latter system should lead to greater distortions keeping everything else constant.

As shown in our presentation of the results, we have particular interest in the three age groups over 55, i.e., those who are eligible for retirement benefits. In Table 2 we

show the results with time dummies only and time dummies with country fixed effects for the 55–59, 60–64, and 65+ age groups. Even with country fixed effects, higher replacement rates of the pay-as-you-go system result in lower male labor force participation among 55–59 year olds and also among 60–64 year olds. By contrast, for labor force participation decisions of men older than 65, the replacement rate of the pay-as-you-go system is not significant when controlling for fixed effects. The results for the 60–64 age group imply that an increase in the pay-as-you-go replacement rate from zero to full (100%) coverage reduces labor force participation by 4.7 percentage points. The effects are of a similar magnitude for the 55–59 age group, where the change in policy from zero to full coverage decreases participation by 5.7 percentage points. The fully funded system has no significant effect on male labor force participation for the 55–59 and 60–64 year olds, while it has a positive and significant effect for the 65+ age group. If not already retired at 65, under a fully funded system some individuals continue to work to boost the contributions to their own retirement fund. Retirement incentives discourage work for the 55–59 year olds – the age group that is eligible for early retirement in many countries – while it is insignificant for the 60–64 age group. The insignificance of the retirement incentive for the 65+ age group is unsurprising, as the number of people working in this age group is small and the retirement decision at this age is mostly independent of retirement incentives.

Table 2 here

Physical capital per working age person has a negative and significant coefficient under the fixed effects specifications for the 55–59 and 60–64 year olds as an indication of the dominant income effect in the labor supply decision. Taking the coefficient in column 4 we find that a 100% increase in the capital stock will decrease the extent of male labor force participation by 8.5 percentage points. Comparing the life expectancy effect on the three age groups under the fixed effects specifications (columns 2, 4, and 6), the signs and significance vary. For the 55–59 age group, increasing life expectancy by 5 years raises labor force participation by 0.94 percentage points. This either reflects better health of the workers and thus lower demand for early retirement through disability, or

that males in this age group continue to work to maintain a constant consumption stream over an extended number of years. Turning to column 4, life expectancy does not have a significant effect on male labor force participation of the 60–64 year olds once we control for country fixed effects. By contrast, for the 65+ age group, shown in columns 5 and 6, increasing life expectancy by 5 years will lower labor force participation of this age group by 2.83 percentage points once we control for country fixed effects.

The ten-year annual economic growth coefficients show a reversal of sign when country fixed effects are introduced into the specification. For the 55–59 age group, a country with economic growth 1 percentage point higher than another country will have a 0.5 percentage point higher male labor force participation. A similar order of magnitude is seen for the 60–64 year olds, with a 1 percentage point increase in economic growth leading to an increase in male labor force participation of this age group of 0.6 percentage points. By contrast, under the fixed effects specification for the 65+ age group, the economic growth has no significant effect. The coefficient on urbanization also experiences a reversal of the sign when fixed effects are introduced into the specification. While the effect of urbanization appears negative in the specifications without fixed effects, the fixed specification displayed in column 2 of Table 2 implies that a 10% higher urbanization rate is associated with a 1.3% higher male labor force participation in the age group 55–59. The magnitude is even higher for the 60–64 age group, where countries with 10% higher proportion of urban population will have a 5.2% higher male labor force participation rate.

With the prior that more education tends to lead to a higher wage, the negative sign on the average male years of schooling indicates that the income effect dominates in the labor supply decision for the 60–64 year olds. A higher variance of the male years of schooling is associated with a higher male labor force participation rate; a mean preserving spread in the wage distribution decreases the number of workers profiting from high wages and thus increases labor force participation. On the other hand, female education has a positive effect on male labor force participation. Given the positive

correlation between female education and female labor supply, this result may provide evidence of a joint, complementary, household decision about labor force participation.

Table 3 here

In Table 3 we examine the five-year age groups from the 25–29 through to the 60–64 age group regression with fixed effects. Life expectancy has a significant and positive effect for the 50–59 year olds, while it has no significant effect on younger age groups. Retirement incentives have a positive effect on the 45–59 age groups: if men have the incentive to retire at 60 then this promotes participation up to that age. The replacement rate of the fully funded system has no significant effect on male labor force participation, while the pay-as-you-go has a negative effect from the 45–49 age group through to age group 60–64. We did not expect a negative effect the pay-as-you-go replacement rate on the 45–49 and 50–54 age groups, as retirement is extremely limited as an option for these people.

4. Summary

In this paper, we estimate the effect of key institutional features of national social security systems on male labor force participation. We find fully funded systems to be of little relevance in the old-age workforce participation decision, while pay-as-you-go systems significantly lower male participation above age 50. However, these effects are relatively small: our point estimates imply that the introduction of a pay-as-you-go system with full (100%) replacement will reduce old-age labor supply by around 5%. Given average declines in male participation of around 30% in most developed countries over the last decades and relatively modest changes in social security systems, the overall contribution of pension schemes to the recent trend is small. Overall, income effects, as measured by physical and human capital, seem to dominate the substitution effect — a finding consistent with the notch-generation study by Krueger and Pischke (1992). The relatively small effect of retirement incentives is also consistent with recent upward

trends in female old-age labor supply, which exist in contrast to downward trends among men despite women facing the same social security benefits.

Appendix

Country List

Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Denmark, Dominican Republic, Ecuador, Egypt (Arab Rep.), Finland, France, Ghana, India, Indonesia, Ireland, Israel, Italy, Jamaica, Kenya, Korea (Rep. of), Malaysia, Mali, Mexico, Netherlands, Norway, Panama, Peru, Philippines, Portugal, Senegal, Singapore, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Tunisia, Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela, Zambia, Zimbabwe

Table 2: Male Labor Force Participation Age Groups 55–59, 60–64 and 65 plus

Dependent Variable	Male Labor Force Participation Rate					
	Age 55–59		Age 60–64		Age 65 and older	
	(1)	(2)	(3)	(4)	(5)	(6)
Log Capital per Worker	-2.700*** (0.844)	-5.452*** (0.923)	-3.695** (1.428)	-8.491*** (1.675)	-3.902*** (1.440)	0.277 (2.003)
Male Life Expectancy	-0.303*** (0.096)	0.188** (0.090)	-0.777*** (0.161)	0.069 (0.145)	-0.924*** (0.245)	-0.566*** (0.182)
10-Year Annual Econ. Growth	-0.418 (0.265)	0.511*** (0.166)	-0.356 (0.472)	0.615** (0.243)	-0.483 (0.504)	0.138 (0.299)
Urbanization	-0.093** (0.039)	0.131* (0.072)	-0.198*** (0.066)	0.517*** (0.132)	-0.295*** (0.051)	0.074 (0.119)
Male Years of Education Mean	-1.021 (0.639)	0.809 (0.804)	-3.576*** (1.165)	-2.758* (1.432)	-1.264 (1.136)	-0.378 (1.363)
Male Years of Education Variance	0.445*** (0.165)	0.423** (0.176)	0.063 (0.313)	0.889*** (0.325)	-0.641** (0.317)	0.058 (0.311)
Female Years of Education Mean	1.991*** (0.693)	1.212 (0.870)	3.681*** (1.204)	4.044*** (1.457)	-0.579 (1.181)	-0.251 (1.353)
Female Years of Education Variance	-0.060 (0.142)	-0.431** (0.184)	0.857*** (0.262)	-0.561 (0.355)	1.483*** (0.249)	-0.169 (0.363)
Retirement Incentive	1.384 (1.149)	2.098*** (0.804)	1.121 (1.976)	-1.767 (1.425)	1.587 (1.690)	-1.642 (1.456)
Replacement Rate FF	-0.007 (1.200)	0.890 (1.670)	2.685 (2.052)	0.280 (2.708)	5.020** (2.186)	5.153** (2.505)
Replacement Rate PAYGO	-5.429*** (1.471)	-5.231*** (1.423)	-7.322*** (2.389)	-4.711* (2.445)	-7.936*** (2.412)	-4.204 (2.750)
Share 65–69 of Ages 65+					-3.186 (28.428)	32.825** (15.570)
Share 70–74 of Ages 65+					-59.478 (56.513)	20.328 (23.821)
Constant	105.11*** (4.763)	73.52*** (6.259)	127.19*** (7.887)	55.59*** (9.314)	144.06*** (28.359)	82.69*** (13.987)
Time Fixed Effects	YES	YES	YES	YES	YES	YES
Country Fixed Effects	NO	YES	NO	YES	NO	YES
Observations	314	314	314	314	314	314
R-squared	0.48	0.91	0.55	0.94	0.76	0.96

Notes:

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Male Labor Force Participation All Age Groups: Year and Country Fixed Effects

Dependent Variable:	Male Labor Force Participation Rate Age Group							
Age Group:	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64
Log (Capital per Working Age)	-1.290** (0.548)	-0.381 (0.391)	-0.543 (0.350)	-0.527 (0.339)	-0.739* (0.391)	-1.918*** (0.595)	-5.452*** (0.923)	-8.491*** (1.675)
Male Life Expectancy	-0.049 (0.055)	0.049 (0.047)	0.025 (0.044)	-0.005 (0.037)	0.037 (0.033)	0.114** (0.051)	0.188** (0.090)	0.069 (0.145)
Economic Growth (Avg. last 10Y)	0.229** (0.095)	0.177** (0.071)	0.086 (0.066)	0.080* (0.047)	0.100* (0.051)	0.130 (0.089)	0.511*** (0.166)	0.615** (0.243)
Urbanization	0.099** (0.049)	-0.016 (0.044)	0.010 (0.032)	0.075*** (0.018)	0.034 (0.026)	0.037 (0.046)	0.131* (0.072)	0.517*** (0.132)
Mean Male Years of Education	0.760 (0.509)	0.553 (0.478)	0.415 (0.380)	-0.449** (0.212)	-0.809*** (0.250)	0.270 (0.445)	0.809 (0.804)	-2.758* (1.432)
Variance Male Years of Education	-0.093 (0.110)	-0.144 (0.106)	-0.129* (0.077)	0.011 (0.050)	0.051 (0.060)	0.186** (0.091)	0.423** (0.176)	0.889*** (0.325)
Mean Female Years of Education	-0.224 (0.486)	-0.321 (0.439)	-0.443 (0.355)	0.559** (0.217)	1.066*** (0.272)	0.863* (0.496)	1.212 (0.870)	4.044*** (1.457)
Variance Female Years of Education	0.223 (0.147)	0.322** (0.148)	0.368*** (0.100)	0.140*** (0.053)	0.090 (0.064)	-0.133 (0.096)	-0.431** (0.184)	-0.561 (0.355)
Retirement Incentive	0.235 (0.355)	0.510 (0.309)	0.526* (0.286)	0.206 (0.287)	0.816** (0.363)	1.663*** (0.537)	2.098*** (0.804)	-1.767 (1.425)
Replacement Rate FF	0.680 (0.719)	0.178 (0.411)	0.549 (0.608)	0.304 (0.532)	0.455 (0.565)	1.071 (0.986)	0.890 (1.670)	0.280 (2.708)
Replacement Rate PAYGO	0.046 (0.755)	0.438 (0.498)	0.397 (0.462)	-0.359 (0.437)	-1.384** (0.600)	-4.170*** (0.963)	-5.231*** (1.423)	-4.711* (2.445)
Constant	80.79*** (3.811)	89.64*** (2.987)	90.97*** (2.780)	92.26*** (2.196)	93.03*** (2.322)	85.87*** (3.785)	73.52*** (6.259)	55.59*** (9.314)
Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	314	314	314	314	314	314	314	314
R-squared	0.84	0.76	0.80	0.84	0.85	0.86	0.91	0.94

Notes:

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

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