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SOCIAL SECURITY REFORM AND MALE LABOR FORCE PARTICIPATION AROUND THE WORLD

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Abstract

In this paper we analyze the effect of Social Security regime changes on labor force participation of 50-80-year-old men across and within 13 countries: Argentina, Austria, Brazil, Chile, France, Greece, Malaysia, Mexico, Panama, Portugal, South Africa, Spain, and the United States. Labor force participation of men ages 50-80 has declined dramatically since 1960, despite increases in life expectancy and the compression of morbidity. We use three variables to capture information regarding the Social Security regime: the Social Security tax rate as a fraction of the wage; the replacement rates as a fraction of the wage; and the delay incentive as a fraction of the wage. We find that the tax rate has an inconsistent effect on labor force participation rates across countries, but the replacement rate has a strong negative effect on labor force participation incentives. That is, a higher replacement rate will encourage men to retire. The delay incentive has a small positive effect on labor force participation. Stratifications by regions within France and the United States show that within country variation in the labor market response to national Social Security regimes exists. We also stratify by education attainment and find that those with higher levels of education have a weaker labor market response to changes in the Social Security regime.

1. Introduction

Longer lifespans and aging populations are putting pressure on the retirement systems of many countries. The compression of morbidity and delay in the onset of disability mean that old people today are healthier than previous generations, which, in theory, allows them longer working lives. However, male old-age labor force participation has fallen rapidly over the past several decades, triggering a policy debate about how to sustain Social Security systems in the long run. An important issue in debating potential solutions is the magnitude of the labor supply response to Social Security reforms.

In conducting this project we analyze variation in male labor force participation response to Social Security reform at the global, country, and individual levels. We focus on cross-country comparisons across different Social Security regimes, and within-country variation in response to the national reform along differences in education attainment. We also consider within country differences across provinces in France and regional divisions within the United States. We also consider differences in marital status, age, cohort, education attainment, dwelling type, number of children alive, as well as information on the spouse (age, education attainment, and labor force participation) and how these covariates affect the male labor force participation in the face of different Social Security regimes and reforms.

The work by Gruber and Wise (1998; 1999; 2004; 2007) (and their extensive network of researchers around the globe) has set a gold standard in cross national comparisons of the labor force participation response to Social Security reform. Gruber and Wise (1998; 1999; 2004; 2007) document the effect of Social Security systems on male retirement in a select group of countries, and show that in each country retirement peaks at exactly the ages at which the retirement incentives are strongest. However, their approach is static in the sense that it analyzes labor force behavior in each country at only one point in time. Using the census data from IPUMS International we are able to draw on time variation within a country to identify the effects of regime changes on male labor force participation behavior. From a policy perspective, it is important to understand how changes in the Social Security systems affect behavior to inform us of how changes instituted in the future may impact on the labor force across different countries. In a previous country level study Bloom, Canning, Fink, and Finlay (Bloom, Canning et al. 2009) examine the role of Social Security reform in shaping male labor supply trends around the world. The results from that empirical analysis suggest that raising the Social

Security eligibility or normal retirement age, or reducing the number of early retirement years allowed, significantly increases the labor market participation of older men.

Using the country level data is useful to gain insight over general trends, but it does not lend itself to identifying within-country-variation in the response to Social Security reform. Factors such as an individual's age and cohort, as well as household composition and household type, will have bearing on an individual's decision to retire in conjunction with the country's Social Security regime. Marital status and, where relevant, characteristics of the spouse, such as age, employment status, and education attainment are factors that will also influence retirement decisions.

As populations age, the pressure for further reform of Social Security systems toward a more sustainable model increases, and for effective policy making countries need to understand how different sub-groups within the population respond to various reform options. In this paper we highlight how Social Security regime change has different effects across countries and within countries by region and by education attainment. By controlling for a number of individual, spouse, and household characteristics we come closer to understanding how individuals from different backgrounds vary in their response to the same Social Security reform.

We find that the Social Security tax rate has little consistent effect on labor force participation across countries. The effect of the replacement rate as a fraction of the wage has a strong negative effect -- a higher pension encourages men to leave the workforce. The delay incentive has a small negative effect on labor force participation. We find that there is some variation in the response across regions within France and within the U.S. We also find that there is a very striking variation in the response when we stratify by education attainment -- those with higher education respond far less to Social Security incentives than those with lower levels of education attainment.

The paper is structured as follows. In the next section we discuss the data that we use for this study, providing details of the Social Security regime data base we constructed, as well as the use of census data through IPUMS International. The empirical strategy is then discussed. Results are presented and discussed. A discussion concludes the paper.

2. Data

2.1 Social Security Variables

Our main interest lies in identifying the effect of the Social Security systems on labor supply. We define three age-year specific indicators that describe the features of Social Security systems in a given country and point of time[1]. Our first indicator is the total (combining worker and employer contributions) Social Security tax rate on labor income. The second is the age-specific replacement rate (the portion of his wage replaced by his Social Security pension) for a worker if he retires at that age. This is zero below the minimum retirement age and usually rises between the minimum and normal retirement ages. After the normal retirement age some countries increase the replacement rate for delaying retirement while others do not. This is captured in the third variable that is the age-specific increase in the net present value of future expected benefits if retirement is delayed by a year relative to retiring immediately.

Data on Social Security systems are coded from the Social Security Administration's (SSA) "Social Security Programs Throughout the World."[2] This database originates from a survey conducted by SSA to summarize the key features of national Social Security systems. The survey covers more than 150 countries from 1958 to 2010. We restrict our analysis to 13 countries that have a universal Social Security system, i.e., a system covering employees of all sectors in the country and also have IPUMS International census data.[3]

To explain the Social Security variable in more detail, our first Social Security variable is the tax rate. Since we are interested in the taxation of labor income *relative* to the taxation of Social Security payments, we ignore general income taxes, and focus on taxes specifically raised for Social Security.

[1] Social Security laws at a point in time often treat cohorts differently; for example a law may only apply to men born after a certain year.
[2] http://www.ssa.gov/policy/docs/progdesc/ssptw/
[3] We count as "universal" systems that have separate rules for public sector and agricultural workers, though we use in our analysis only the system for the rest of the workforce.

The second Social Security variable we compute is the replacement rate faced by workers of a given age in a given country in a given year. The replacement rate is the annual pension received upon retirement as a percentage of the representative worker's pre-retirement income. Given that countries generally have minimum ages for retirement, workers cannot receive any Social Security payments prior to reaching the minimum eligibility age, so that replacement rates up to this age are zero. Most countries offer small pensions for workers retiring early, and larger pensions once a certain "normal retirement" age is achieved.[4] Accordingly, replacement rates faced are generally small or zero for mean ages 50-59 in our sample, and increase as workers reach "standard" or "normal" retirement age. It is important to note here that some countries have mixed systems with both a defined benefit, and a defined contribution scheme. In defined benefit systems, the pension levels are fixed by law; the pension level can be a fixed amount, or it can be dependent on the worker's income, contributions, or years of work, or on a mix of these. We calculate the percentage of income the benefits would replace for an average worker given the assumed wage rates and number of working years. In defined contribution systems, workers contribute to investment or savings accounts, and receive the accumulated savings upon reaching a certain age. Since defined contribution systems are conceptually identical to private savings and should thus in theory not distort retirement decisions, we do not take these systems into consideration in our analysis.

Our third variable measures the incentive to postpone retirement. 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 a certain retirement age. Many pension systems do not adjust annual or monthly benefits at all if the worker decides to work and contribute beyond the Social Security eligibility rate, while other pension systems increase benefits in a more or less actuarially fair way.[5] The deferred retirement bonus variable we use in our empirical analysis captures the increase in Social Security pension,

[4] Some countries link Social Security eligibility ages to years of contributions rather than to age; for the purpose of this paper, we convert contribution years into ages based on our labor market entry and participation assumptions.
[5] Postponing retirement at age 65 by one year should lead to an increase in pensions by about 6-10 percent, depending on the conditional life expectancy at age 65.

measured as a percentage point increase in the replacement rate, for each additional year of work.

For countries that introduce new pension systems, we assume that individuals greater than age 65 are grandfathered by the regime that existed when they were 65. The change is only effective for those 65 or younger. In our coding, we align each cohort and age with the appropriate system, i.e., the new rules do not apply to individuals older than 65 and we apply the laws that existed when they were 65. This coding is not clear-cut for countries (such as Chile or Argentina) that introduced new pension schemes and allowed some workers to choose between switching to the new scheme and remaining on the old scheme. In these cases we assume that all workers who get the choice between an old and a new system fall under the old system and calculate our measures accordingly. Further work on the Social Security data base is required to accurately assign laws by cohort and age to ensure that this grandfathering rule is precise rather than the estimate of age 65.

2.1a Country Specific Changes in Social Security Law

Argentina

Prior to 1994 Argentina operated a defined-benefits system. In 1960 social insurance coverage was fragmented in its coverage through multiple systems. The basic pension was 82 percent of average earnings. 30 years of employment were required to draw the pension, but only five years of contributions were required. Retirement before 60 led to a 5 percent reduction in benefits per year. By 1965 the retirement age was lowered from 60 to 55.

The 1968 reform raised the retirement age back to 60, and increased the contribution requirement to 10 years. A significant penalty for continued employment post-retirement was introduced. Pension payment changed to become 70 percent of earnings plus 1 percent per year of employment beyond 30 years. By 1975 the contribution requirement rose to 15 years. In 1980 the additional benefits for more than 30 years of employment were dropped. The benefit of deferral was 8 percent after three years deferral, 10 percent after four, and 12 percent after five.

The 1994 reform resulted in a system with three parts to it. The first two are compulsory, the third offers a choice to existing employees to either take a defined contribution or a defined benefit option. The system is built around the AMPO (aporte medio previsional obligitorio; average mandatory provisional contribution), a measure of average employee contributions to the system. The three pillars are:

1. The basic pension: calculated as 2.5 AMPO plus 1 percent for every year of contributions beyond 30.
2. The compensatory pension: 1.5 percent for every year of contribution prior to 1994 up to a maximum of 35 years.
3. Second tier: either a defined benefit option of 0.85 percent per year of contributions since 1994, or a defined contribution option with a 7 percent earnings contribution by the employee.

In the document we assumed that employees preferred the defined contribution option to the defined benefit, since the great majority of those eligible to switch did so (see CBO document). The value of an AMPO was 63 Pesos in 1995, raised to 80 Pesos by 2000[6].

Austria

Austria has had a defined-benefits system since 1960. In 1960 the basic benefit was 30 percent of average earnings, plus 0.6 percent per year for 0-10 yrs; 0.9 percent for 11-20 yrs; 1.2 percent for 21-30 yrs; 1.5 percent thereafter. A minimum of 15 years of contributions was requirement for any pension and early retirement was possible at 60 after 35 years of contributions. Theoretically, early retirement would reduce the pension benefit paid, however, in practice the benefit ceiling was reached before age 60, so early retirement had no impact on final benefit. Pensions were reduced for other earnings or income.

[6] http://www.cbo.gov/doc.cfm?index=1065&type=0&sequence=6
http://econ.worldbank.org/external/default/main?pagePK=64165259&theSitePK=469382&piPK=64165421&menuPK=64166093&entityID=000009265_3971110141402

In 1980 a deferral benefit was introduced, but this was no longer present by 1985. In 1985 the benefit structure was simplified to 1.9 percent per year of contributions for first 30 years, then 1.5 percent for each additional year up to 45. The ceiling remained at 79.5 percent.

In 2000 those taking early pensions saw their payments reduced by 3 percent of the assessment base per year and the benefit for each year of contributions coverage became a flat rate of 2 percent per year. The 2004 change to pensions law did not affect retirees in 2005 (the cut off was "age 50 on Jan. 1, 2005"), however it did raise the age for early retirement to 62, and make the penalty for early retirement 4.2 percent p.a. up to 15 percent total[7].

Brazil

Brazil has had a defined-benefit system since 1960. In 1960 the system paid out 100 percent of the past year's income, with a 75 percent reduction for those who were still working. By 1965 this had changed to 70 percent of past earnings, plus 1 percent for every year of contributions beyond 15, to a maximum of 100 percent. There was also a 'long-service' pension of 80 percent of earnings available after 30 years contributions, rising to 100 percent after 35 years of contributions. This meant that early retirement was possible at 50, based on contributions alone, with a full pension; or retirement at 45 was possible with an 80 percent pension.

In 1970, the benefit was based on the past 36 months of "benefit salary", which was 50 percent of average covered earnings, and thus the maximum benefit was 75 percent of annual earnings. By 1975, the system had reverted to the earlier form.

By 1985 the basic pension paid up to 95 percent of an individual's average earnings if they were less than 10 times the minimum wage, but only up to 80 percent if higher. The annual raise in the long-service pension was adjusted to reach a maximum of 95 percent. By 1995 the ceiling benefit had returned to 100 percent.

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7 http://books.google.com/books?id=M0IOAAAAQAAJ&pg=PA140&lpg=PA140&dq=austria+average+retirement+age&source=bl&ots=6MvNB3G4vm&sig=ezvo3FH4rPD1iuJXpQw4tNk-6JY&hl=en&ei=_KlUSryII5DElAeW4bnsCA&sa=X&oi=book_result&ct=result&resnum=9

In 1990, the service period required for the full/partial "long-service" pension rose briefly to 40/35 years. By 1995 this had returned to the earlier 35/30 years, but with a reduced pension (70 percent of average earnings) at 30 years.

Following the 1999 pension reform, a minimum retirement age of 53 was instituted and 35 years of contributions were required to by paid the contributory pension. The payment under this system is based on the highest 80 percent of wages earned and the *fator previdenciário* (FP, Social Security factor), which is determined using residual life expectancy at retirement and contribution rates and period. Early retirement therefore leads to reduced benefits, but the amount is hard to specify.

Chile

Chile ran a dual system in 1960: one for salaried workers (EMPART); the other for wage earners (SSS). Since the latter was far larger (see SAFP reference), we used this for coding purposes, up to the 1981 reform. Both provided pensions from age 65, although EMPART required 35 years of contributions and retirement, while SSS required 16 years of contributions but not retirement. The maximum replacement rate under SSS was 70 percent; under EMPART 100 percent.

From 1981 a defined-contribution system was put in place, with existing employees having the choice of the old or new systems. The large majority of individuals chose the DC system (see Tübingen reference), so we assume everyone had changed by 1985, with an average take-up date of 1983. Contributions prior to an individual's switch were converted into a recognition bond which earned 4 percent p.a. in real terms until retirement. The bond is intended to achieve a replacement rate of 80 percent based on the old system and 35 contributory years. We therefore reduce the DB system in proportion to the number of years of DC income, as a proportion of 80 percent. For example, in 1990, after seven years of DC contributions, the DB benefit would be (80 percent*(35-7)/35) = 64 percent.

Deferral benefits were 10 percent for three years, so we annualized this to 3.33 percent p.a. After 1980 this applied only to DB scheme, and is therefore only an estimate of the true benefit

of deferral: the relative values and benefits of the DB and DC system are not calculable in this dataset[8].

France

France has had a contributions-based defined-benefits pension system since 1960. The retirement age was 60 throughout the period. The number of years contributions required for a full pension rose from 30 to 40. From 1985 onward, retirement from the pre-retirement firm was required and any other earnings were subject to a special tax.

From 1995, the DB payment varied depending on the year of birth, however, no one in the relevant cohorts was affected, with the replacement rate remaining at 50 percent for these individuals, so long as they have made 37.5 years of contributions, which we assume for our representative individual.

Greece

Greece has had a defined-benefit system since 1960. The headline retirement age was 62 from 1965 until 1980. The length of contributions required for a full pension prior to 1961 was 2,500 days. From 1961 until 1981 it was 6,000 days prior to 1961, plus the full number of years since 1961. From 1985, retirement with a full pension could be taken at 62 with 10,000 days of contributions, or at 65 with 4,500 days.

In 1960, the base replacement rate was 80 percent of mid-point of the lowest wage-class, plus 10 percent of difference between this and the individual's average wage-class. Bonuses were then paid for extra years of service: 2 percent per 250 days for 1,000-3,000 days, 1.5 percent per 250 days for 3,000-6,000 days, and 1 percent per 250 days thereafter. No information was provided

[8] http://www.safp.cl/573/articles-3523_chapter2.pdf
http://tiss.zdv.uni-tuebingen.de/webroot/sp/spsba01_W98_1/chile6.htm
http://www.cbo.gov/doc.cfm?index=1065&type=0&sequence=2

in SSTTW on values for wage-classes; we therefore left the replacement rate as missing information.

In 1965, the replacement rate ranged from 28 to 98 percent replacement of average earnings, plus 1-2.5 percent for each 300 days beyond 3,000 of contributions; with a maximum benefit of 100 percent. We assumed our representative individual received the midpoint of the range of replacement rates and bonuses (63 percent and 1.75 percent per 3,000 days). In 1970 the maximum benefit was GDr 4,537/month, which was more than 150 percent of average earnings, and thus non-binding.

By 1975, the base replacement rate range changed to 32 percent to 70 percent and the annual contributory bonus to 1 to 2.3 percent per 300 days; we continued to use the midpoints. The maximum benefit was 25 times the daily wage of the relevant class – we assume this to be equivalent to a 120 percent replacement rate (25*12 / 250). By 1980 the base replacement rate range changed to 30 percent to 70 percent and the annual contributory bonus to 1 to 2.5 percent per 300 days; we continued to use the midpoints.

By 1990, the contributory bonus was 1 percent per 300 days between 3,300 and 7,800 days, and then between 1.5 percent and 2.5 percent per 300 days for subsequent days (again, we assumed the midpoint, 2 percent per 300 days). The maximum pension had reverted to a 100 percent replacement rate.

Early retirement was penalized from 1965 onward, although the penalty rate of 6 percent p.a. was first mentioned in SSTTW in 1981. We assume this was the penalty rate throughout. In addition, the annual contribution bonus was included in the penalty term (i.e., 1.65 or 1.75 percent).

By 2000, early retirement at 58 was extended to men with 10,500 days of contributions. This can be achieved by 57, so was equivalent to a full retirement at 58. To reach the 100 percent replacement rate, individuals had to remain in employment until 58.5.

By 2005, early retirement could be taken with 10,500 days at 58, or at any age with 11,100 days. In practice, the 10,500 days method was reached earlier with 250 days/year of contributions, and is therefore the one we included.

Malaysia

Malaysia has had a defined-contribution system since 1951. Contribution rates rose from 10 percent in 1960 to a total of 23 percent by 1997. The final payout includes an assured interest payment which rose from 2.5 percent in 1960 to 5.75 percent by 1970 and 6.6 percent by 1980. The DC percentages we used were calculated as weighted averages of the contributions made in each year up to the past 40 (the maximum number of contribution years prior to retirement at 55).

From 1975, early withdrawal of some capital could be made at 50. The accounts also were available for home loans and from 1995 onward, 10 percent of contributions were put toward healthcare, and therefore excluded from the pension system. We assumed that no voluntary withdrawals were made by our representative individuals.

Mexico

Mexico has had a defined-benefit pension since 1942. In 1960 the base replacement rate was 34 percent of earnings after 500 weeks of contributions, plus 1 percent p.a. for each year of contributions beyond 10 years. The maximum replacement rate was 85 percent. For those born before 1912, years of employment above the age of 30 prior to 1942 were credited as contributions. Thus someone retiring at 65 in 1960 would have been credited with contributions from 1925 to 1942, as well as their actual contributions from 1942 to 1960, for a total of 35 years of contributions, and thus a pension replacement rate of 34+25=59 percent.

In 1975, the base replacement rate had become 35-45 percent and contribution-year benefit 1.25-1.5 percent p.a.; we used the mean for each. The maximum replacement rate was raised to 100 percent after 40 years of contributions.

From 1980, those with no dependents were paid a 15 percent additional benefit and those with dependents a minimum of 10 percent more. We add in the lowest of these figures. From 1985 onward the base replacement rate was 35 percent and contribution-year benefit 1.25 percent p.a..

Following reforms in 1992, a defined-contribution system was begun. Initially it was voluntary, but from July 1997 the DB system was closed to new contributions. Those with at least 24 years of contributions under the old system could choose at retirement which system they wished to be paid by.

Our last cohort (and thus all previous ones), those retiring in 2005, would have contributed since 1955, and thus would have made sufficient contributions to be covered by the DB system. Since the DC system in 2005 had compulsory contributions of only 1.125 percent for employees, 5.15 percent for employers and 0.225 percent by government, over a maximum of 13 years, we assume that individuals in our cohorts will choose the DB system.

Between 1960 and 1975, deferral of the pension by one year raised the value of pension payments by 2 percent of earnings. In 1960 retirement from employment was required; from 1965 retirement from the current employer and a six-month cooling-off period was required. From 2000 onward, early retirement was possible with 500 weeks contributions and with a penalty of 25 percent of the pension value[9].

Panama

Panama has had a defined-benefit pension since 1941. In 1960 the scheme required 20 years of contributions and retirement from employment; we assume that the 20-year requirement was just met by this cohort. The base replacement rate was 50 percent, plus 2 percent for each year of contributions beyond 20.

[9] http://www.aegonglobalpensions.com/Documents/AGP/Newsletters/Q4%202008/Pension_reform_in_Mexico.pdf

By 1965, only 15 years of contributions were required, the annual bonus began after 10 years of contributions at the rate of 1 percent per additional year. Contribution years after age 60 were paid an additional 5 percent of earnings.

By 1970, a maximum replacement rate had been set at 80 percent. In 1975 the deferral benefit was not specified; because no other changes in the law had occurred since 1970, we assumed that the benefit remained 5 percent of earnings per year.

By 1980, the DB was changed to a base replacement rate of 60 percent, plus 1.25 percent per years of contributions between 10 and 20 years, and 1.5 percent for years over 20. A ceiling of a 100 percent replacement rate was also set. Retirement was not required, but pensions were reduced by the amount of earnings, creating an effective taxation rate of 100 percent on work; we therefore code this as requiring retirement.

From 1980 until 1990, early retirement at 55 was possible with a penalty of 3.5 percent of the pension value p.a.. No additional penalty for reduced contribution-years applied, since the ceiling of 100 percent replacement rate was reached at age 53.33 based on continuous employment since age 15.

By 1995, the retirement age had been raised to 62, early retirement abolished and the annual contribution bonus changed to 1.25 percent for all years over 15[10].

Portugal

Portugal has had a defined-benefit system since 1935. In 1960 the scheme required 10 years of contributions and paid out a base replacement rate of 20 percent plus 2 percent per year of contributions beyond 10, up to a maximum pension of 80 percent. Retirement from insured employment was required until age 70; we code this as a partial loss of income.

[10] http://www.imf.org/external/pubs/ft/scr/2006/cr0626.pdf

By 1975 the DB benefit was 2 percent p.a. for all years of contributions, up to a maximum of 35 years of contributions. By 1985 the benefit was 2.2 percent p.a. up to a maximum of 80 percent replacement; this was reduced to 2 percent p.a. again by 1995.

By 2000 an early retirement at 55 was possible, and since the maximum pension was payable after 40 years of contributions, this early retirement incurred no loss of pension payments. Deferral of retirement was also possible in 2000, although no benefit was mentioned in SSTTW.

By 2005, the accrual rate per year of contributions depended on the ratio of an individual's earnings to the minimum wage, which was around 40 percent of average wages (various sources). Based on the table below, taken from *Pensions Panorama*, we therefore used the accrual rate of 2.2 percent for 2005.

Earnings/minimum wage	<1.1	1.1	2.0	4.0	8.0
Accrual rate (%)	2.3	2.25	2.2	2.1	2.0

In 2005 the maximum replacement rate had been raised to 92 percent and deferral provided a benefit of 10 percent p.a. of deferral. Pensions were only calculated on the first 40 years of contributions and thus early retirement still incurred no loss of pension.

South Africa

South Africa has had a flat-rate pension scheme since 1928. Payments were dependent on racial classification until 1995. We used the African classification for coding purposes, noting that the replacement rates calculated are almost certainly underestimates, since average incomes from the nation as a whole were used in their calculations. The absolute figures for each population (in SA Rands) are shown below:

	African	Asian	Coloured	European
1960	1.7	4.4	3.9	10.5

1965	3.7	12.8	12.8	30.0
1970	5.8	18.0	18.0	38.0
1975	11.3	29.5	29.5	57.0
1980	33.0	62.0	62.0	109.0
1985	65.0	103.0	103.0	166.0
1990	225.0	263.0	263.0	304.0
1995	390.0	390.0	390.0	390.0
2000	640.0	640.0	640.0	640.0
2005	740.0	740.0	740.0	740.0

All payments were means-tested throughout the period, so we coded work as reducing pension payout.

Spain

In 1960, Spain had a flat-rate scheme which required 1,800 days of contributions (we assumed 250 day per year).

By 1965, the flat-rate scheme paid a minimum amount (Pts 500) to those who were also eligible for one of various industry-specific mutual pensions. These mutual pensions paid defined-benefits pensions varying from 40 percent to 90 percent of earnings. We assume that our representative individual was in a scheme earning a little more than the minimum (45 percent).

From 1970, the flat-rate payment was dropped, and the DB benefit consisted of a 25 percent base rate plus 1 percent p.a. for each year of contributions between 10 and 35. By 1980, the base rate was 50 percent and the accrual rate 2 percent p.a., with a maximum overall replacement rate of 100 percent.

By 1990, the base rate was 60 percent and the accrual rate 2 percent p.a. over 15 years of contributions, up to a maximum of 100 percent of the benefit base. The benefit base was 96/112 times the average earnings in the past 96 months.

In 2005, the base rate was 50 percent times 180/210 = 42.9 percent and the accrual rate was 3 percent for contribution-years between 16 and 25, and 2 percent for years over 25, up to a maximum of 100 percent.

In 1995 and 2000, early retirement at 60 was possible with an 8 percent penalty for each year of early retirement. In 1960 retirement from insured employment was required. From 1965 to 2000 retirement from all employment was required. From 2005, retirement from full-time employment was required. Additionally, a 2 percent bonus was paid for each year of pension deferral.

United States

In 1960, the USA had a defined-benefit scheme which paid 58.85 percent of the first $110/month of earnings (first bendpoint), plus 21.4 percent of the next $290 (second bendpoint), up to a ceiling replacement rate of 80 percent of earnings.

By 1965, the replacement rates had been raised to 62.97 percent of income up to $110 and 22.9 percent of income above that. By 1970, the replacement rates had been raised to 81.83 percent of income up to $110 and 29.76 percent of income above that.

Following a reform in the calculation process in 1978, a three-tier system was instituted, with replacement rates of 90 percent of income below the first bendpoint, 32 percent of income between the first and second bendpoints, and 15 percent of income above the second bendpoint, up to an annual maximum. Data on annual bendpoints was found in the first reference below, using the figure set in the previous year, and thus in force on January of the year in question. At no time did our representative individual earn more than the second bendpoint.

Since no information is available on bendpoints for 1975, either from the Social Security website or SSTTW, we assumed that the overall replacement rate in that year was the mean of the figures in 1970 and 1980.

In 1960, the pension was reduced for earnings during retirement, prior to age 72, over $1,200/year. Although the threshold and age was changed in later years, this policy remained throughout the period.

In 1960, early retirement was possible at 62 with a reduction of 5/9^{ths} of 1 percent of pension for each month retirement was early. This has continued to be the policy up to the present (see second reference below). From 1975 onward, a deferral benefit was available, rising from 1 percent of pension in 1975 to 8 percent by 2005[11].

2.2 Economic and Social Variables

IPUMS (Integrated Public Use Microdata Series) International is a free online data base of harmonized census data from around the world. Country samples range between 1 percent and 10 percent and census data from the 1960s through to the 2000s are incorporated in the dataset. There are 13 countries for which we have access to IPUMS International data and have Social Security policy data: Argentina, Austria, Brazil, Chile, France, Greece, Malaysia, Mexico, Panama, Portugal, South Africa, Spain, and the United States. Table 1 summarizes the samples by country and by year, as well as showing the average labor force participation and standard deviation of labor force participation by country and census year.

One of the key advantages of applying the IPUMS International data to the questions in this project is that the data date back into the 1960s prior to the periods of Social Security reform in the 1970s and 1980s that many countries underwent. IPUMS International is not a longitudinal dataset, however, and thus we draw on cohort analysis rather than tracking an individual across time. Another key advantage of using the IPUMS International data is that the set of countries covered is more comprehensive than the longitudinal retirement surveys. Our selection of countries overlaps with a few HRS, SHARE, and ELSA countries, but our sample

[11] https://s044a90.ssa.gov/apps10/poms.nsf/lnx/0300605900
http://www.socialsecurity.gov/retire2/agereduction.htm

includes a broader geographical representation with representative countries from South American, Africa, and Asia along with Europe and North America in our sample. Thus, to study cross country comparisons to different Social Security regimes and consider how people respond differentially to different reforms within a country, IPUMS International offers us a more comprehensive set of case studies than we would have by using existing longitudinal data.

The main outcome variable of interest in this analysis is labor force participation. For this study, we take labor force participation as the classic definition and thus include those who are employed and those who are unemployed but looking for work. Those who are not in the labor force are classified as inactive. We discuss this choice of the outcome variable over the use of employed/unemployed in the limitations section (Section 4).

The three explanatory variables of interest are discussed above in Section 2.1. Each is a continuous variable and captures information on the Social Security tax rate, the replacement rate as a fraction of the wage, and the delay incentive as a fraction of the wage. These Social Security variables are country, year, and age specific. Changes in a regime can affect an individual of a given cohort, but it is unlikely that changes in the Social Security regime will affect cohorts who are older than 65 at the time of the change. While our Social Security data base is not cohort specific, we estimate that individuals will be grandfathered by existing regimes and exempt from any changes once they are older than age 65. This is an estimation, and further work on the Social Security data base is necessary to make it more precise in its reflection of cohort and age specific regime.

Using IPUMS International data we control for a number of covariates that may affect an individual's incentive to work in the face of changes in the Social Security regime. We control for age, cohort, (and thus implicitly the census year) each as continuous variables. As continuous variables, the assumption is that age and cohort affect labor supply linearly. For the age covariate, we thus interpret it as if an individual ages one year he or she is more or less likely to be in the workforce. If we were not to control for the Social Security variables, age would affect labor force participation non-linearly. As the Social Security variables are age specific, their presence in the equation picks up the age-related variation in labor supply attributable to the Social Security regime. Entering age dummies would cause a collinearly with the Social Security variables. The same applies for cohorts.

We control for education attainment in the main equation. This variable is categorical and indicates the highest level of education achieved by the respondent. There are four categories: no education or incomplete primary; completed primary; completed secondary; and completed university. Through the efforts of the administrators of IPUMS International these categories have been standardized across the different countries. Austria stood out as an exception with no man reporting no education or incomplete primary. This may be a reflection of the compulsory schooling laws that were introduced in 1775.

We control for whether the household is a family household or not. A man is classified as living in a family household if he is living with one's spouse, children, relative, or extended family. Those who do not live in a family household include those who live alone, live with non-family member, or live in group quarters. We also control for whether the male respondent has children alive or not. This is an indicator variable that takes the value of one if the male respondent has any children alive (one or more) and a value of zero if the male respondent has no children alive. Both the family household and children alive indicator variables proxy for support within the family unit, whether coming from those he lives with or from his children if they are alive.

An important contribution of this paper is the inclusion of information regarding the spouse. Information regarding the spouse also is taken into consideration. Whether the spouse is in the labor market, their education attainment, and their age. Each of these variables specific to the spouse is coded as for the male respondent. For those men who do not have a spouse a zero is assigned to the spouse characteristic. For the continuous variable of age, the mean age is assigned.

2.3 Merging the Social Security Variables with Economic and Social Variables

The two datasets used in this paper are merged. The Social Security data set has unique observations by country, year, and age, thus also capturing cohort differences. The IPUMS International is unique by country, year, and individual (individual characteristics include the age of the man). Thus we merge the Social Security data base onto the IPUMS International data by country, year, and age. Thus each individual within a country and year who is of the same age in that year will be subject to the same Social Security regime.

Two elements add to the complexity of the merge. The first is the grandfathering rule that we apply. Individuals ages 50-65 are subject to the Social Security regime of the given year. Individuals ages 65-80 are subject to the Social Security regime that existed when they were 65. Thus, we take account not only the laws that existed at the time of the census, but also all past laws so that we can merge on the Social Security data for the year in which an individual was 65.

The second element that adds complexity to the merge is that the census does not occur every year and also the Social Security laws are not cataloged by SSA every year. Thus, we take the two years that are closest to each other from the census year and the SSA's file year and we merge on these years for those individuals who are subject to the current law. (For those older than 65, we go back to the SSA's file year that is closest to the year in which the individual was 65).

3. Empirical Strategy

In this paper we analyze the effects of Social Security regime changes on male labor force participation of those ages 50-80 years old. In addition to the Social Security variables of interest, we control for individual demographic variables, household characteristics, and spouse characteristics as detailed in Section 2.

In establishing the equation for estimation, we based it on the theoretical work of Bloom, Canning, Fink, and Finlay (2011). In this paper, the authors show that labor force participation is a function of the Social Security tax rate, the replacement rate as a function of the wage, the delay incentive as a function of the wage as well as other country specific variables. In that paper the authors use macroeconomic data, and not individual level data as we do in this project. Given the breadth of the data available for this project, we take the three key variables of interest but we also control for age, cohort, and education attainment of the individual, as well as household characteristics such as family household and number of children alive, and spouse characteristics such as their labor force participation, education attainment, and age.

The individual is either in the labor force or not, and thus is a dichotomous variable. We use a probit model to estimate the effect of the Social Security change on the probability of the individual being in the labor force. To assist with interpreting the results, we present the marginal effects (dprobit) of a unit change in the continuous variable (or the switch from 0 to 1 on a dichotomous variable) around the mean.

In our analysis we assume that changes to Social Security system are exogenous and are set independently of labor supply. As pointed out by Gruber and Wise (1998), this assumption may be problematic if governments change Social Security schemes in response to labor market conditions. However, individual country studies (e.g., Börsch-Supan and Schnabel 1998) have shown that changes in policy generally precede changes in labor supply. While Social Security reforms do respond to retirement behavior, in most cases reforms are implemented very slowly. Reforms generally do not apply to those who are about to retire, but are phased in gradually to apply to those that will retire in the future. Thus the system under which the current elderly are operating is likely not affected by their own retirement decisions. However, the decisions of the current elderly can depend on the retirement decisions of previous generations. To the extent that there is an endogenous policy response (e.g., raising the Social Security eligibility age to counteract increasing early retirement) we will underestimate the true effect of Social Security reforms, so that our estimates could be interpreted as a lower bound for the true policy impact.

With this, we estimate the following probit model for individual *i* in country *k* at time *t*, given age *a*:

$$\begin{aligned}\Pr\left(LFP_{ikt}=1\right) = \Phi[&\beta_1 Tax_{akt} + \beta_2 RR_{akt} + \beta_3 DI_{akt} \\ &+ \sum_m \gamma_{1m} marital_{mikt} + \gamma_2 age_{ikt} + \gamma_3 cohort_{ikt} + \sum_e \gamma_{e4} educ_{eikt} \\ &+ \gamma_5 family\_hh_{ikt} + \gamma_6 child_{ikt} \\ &+ \gamma_7 sp\_age_{ikt} + \gamma_3 sp\_LFP_{ikt} + \sum_p \gamma_{p4} sp\_educ_{pikt} + \alpha_k + \varepsilon_{ikt}]\end{aligned}$$

The probability of an individual *i* being in the labor force (*LFP*) in country *k* at time *t* is a function of the Social Security tax that individual *i* of age *a* in country *k* at time *t* will face (*Tax*). The probability of an individual being in the labor force is also a function of the replacement rate as a fraction of the wage (*RR*) and the delay incentive as a fraction of the wage (*DI*). The categorical variable of marital status over *m* categories of individual *i* in country *k* at time *t* is also accounted for. As is the continuous variable of age (*age*) of the individual *i* and the cohort (birth year) of the individual *i* (*cohort*). Education attainment enters the equation as a categorical variable (categories *e*) of individual *i*. A dummy variable for whether the household is a family household (*family_hh*) or not and a dummy variable for whether the individual has a child alive (*child*) or not. Characteristics of the spouse are also considered, the spouse of individual *i*'s age

(*sp_age*), a dummy variable of individual *i*'s spouse's labor force participation (*sp_LFP*). The education over *p* categories of the spouse (*sp_educ*) is also controlled for. In the pooled regression country fixed effects are applied, (α_k). An independently and identically distributed random error term ε_{ikt} is distributed according to the standard normal distribution.

We expect that the tax rate will have a negative influence on the probability of an individual working with a higher tax rate providing a disincentive to stay in the labor market. Increases in the replacement rate will likely encourage men to exit the labor market, and the delay incentive is expected to have a positive effect on labor force participation.

5. Results

In this section we present summary plots and details of each country's Social Security system. All tables of results and figures are presented in the appendix. We consider the labor force participation behavior of men ages 50 to 80-years-old at the time of the census. In Table 1 we present the sample sizes for each country and year, which yields a total of 12,462,569 observations in the pooled analysis. Census years range between 1960 (Brazil, Panama, and the USA), and 2005 (USA). Eleven of the 13 countries have three or more census years. Spain only has two, and South Africa has one. In Table 1 we show the average labor force participation for 50-80-year-olds in each census year for each country. For nine of the 13 countries male labor force participation has declined monotonically over the census years. This decline has been most rapid for the European countries, such as France, which has experienced average annual decline in labor force participation of -1.28 percent among the 50-80-year-olds between 1962 and 1999. The average annual decline in labor force participation for other European countries is not far behind France: Greece (-1.34 percent), Portugal (-1.06 percent) and Spain (-1.03 percent). The Duggan and Singleton explore the dramatic decline in labor force participation (Duggan, Singleton et al. 2007) as does Gustman and Steinmeier (2005). Male labor force participation in the United States declined between 1960 and 1990 census, but has risen successively in 2000 and 2005. Mastrobuoni (2009) examines this recent cut in Social Security benefits and the effect on labor force participation in the United States. To show the earlier downward trend in labor force participation, work by Costa exemplified the effects of Social Security regime changes within the United States on male labor force participation (Costa 1995).

In Table 2 we show the average Social Security Tax Rate, Replacement Rate as a Fraction of the Wage, and the Delay Inceptive as a Fraction of the Wage, and how these variables have changed over time within each country. We report rates at the time of the census year, and the Social Security regime that the 50-80-year-olds faced at that time.

In Table 3 we show the distribution of covariates within each country. Sample sizes for each country are given, and of the 12,462,569 individuals in the study, 39.79 percent are from the United States. Thus, pooled regressions will be weighted heavily by the U.S. experience, and individual country regressions will be representative of a given country's experience through changes in their Social Security regimes. The distribution of marital status is very similar across countries, with most people declaring to be married or in union. For the samples here, most of the spouses are not in the labor force, the South American countries have the most extreme cases in Chile (88.5 percent), Mexico (88.1 percent), and Panama (87.8 percent). The average age in the sample is around 62 for each country. But spouses are significantly younger on average at around 45. Education attainment is lowest in Brazil and Portugal where in these countries 84.6 percent and 81.5 percent, respectively, report to have incomplete primary or no education. Similar cross country patterns exist for the education of the spouse. Most men live in family households. There is much variation across countries in those who report to have at least one child alive.

Figures 1 through to 13 show a dramatic and systematic picture of the systematic decline in labor force participation at each age. In the case of France, Figure 5, the top left figure shows labor force participation by age for each of the census year. It shows an alarming story of the delay of young individuals in entering the labor force, and the dramatic decrease in labor force participation of men ages 50 to 80. The top right figure, magnifies the top left figure to highlight the age range that is the focus of this paper -- the 50 to 80-year-olds. We see that in the 1962 census, 75 percent of 60-year-olds were in the labor force. By the 1999 census, 17 percent of 60-year-olds reported to be in the labor force. This decline in labor force participation is in the face of Social Security reform reflected in the bottom left figure. We also see in the bottom right figure that labor force participation systematically varies by average characteristics of an

individual. Men who are married, have a spouse who also works, have a university education (and as does his spouse), lives in a family household, and has children alive is more likely to be in the labor force than those men without these characteristics.

The systematic decline in labor force participation for the 50-80-year-olds and the variation in labor supply across the covariates is glaring. Only the United States stands out as an exception, and from 2001 to 2005 we see a slight increase in male labor force participation by age for those 50-80-year-olds.

Results from Table 4, graphically presented in Figure 14, show that the effect of the Social Security tax rate has a small positive effect on labor force participation in the pooled analysis, but this small positive effect is an average of the wide variation that exists across countries in the labor supply response to the Social Security tax rate. The labor force participation response to the replacement rate as a fraction of the wage is systematic across the countries: higher replacement rates are associated with lower probability of being in the workforce. Replacement rates are very generous in most countries, and are often above 1.0 (the U.S. has one of the lowest replacement rates with 50-80-year-olds facing an average rate of 0.78 of their wage in 1999 or when they were 65). With such generous replacement rates, the strong response of exiting the labor force is no surprise. The delay incentive has a small positive effect on labor market retention. This is especially true in the case of France. However, in all countries the response is very small. The small response may be due to the subtly of the incentive, and only those who investigate the Social Security rules in detail will understand the effect of delaying retirement a further year.

In Table 5.2 and Table 6.2 we show regional analysis for the France and the United States respectively. The average response in France to the replacement rate as a fraction of the wage is -0.155 (or a decline in the probability of being in the labor force by 15.5 percent for each percentage point increase in the replacement rate) this ranges from a 12.1 percent decline in Lorraine to an 18.4 percent decline in Limousin. For the delay incentive, the average response is 1.61 percent increase in labor force participation for a percentage point increase in the delay incentive. Lorraine has the lowest regional response rate for the delay incentive with a 1.17 percent increase, and Haute-Normandie has the highest with a 1.98 percent increase in labor

force participation as the delay incentive increases. In the case of the United States, the average labor force response to the replacement rate is 11.6 percent decrease in the probability of being in the labor force. This ranges from a 9.34 percent decline in the Mountain Division to a 13.2 percent in New England and a 13.9 percent decline in Middle Atlantic. The delay incentive has a very weak effect in the United States as a whole, and across the regions.

Referring back to Tables 5.1 and 6.1, we can see the cross regional variation within both France and the United States. In France, Lorraine had a very weak response to the Social Security variables. In this region of France, all covariates seemed to be consistent with the national average except the labor force participation of the spouse. In this region, the spouses labor force participation was particularly low with 85.1 percent reporting not to be in the labor market compared to the national average of 78.6 percent reporting not to be in the labor market. For the United States, New England had a particularly strong response to the Social Security regime changes. In this region we see that spouses had high labor force participation relative to the national average and education attainment of the man was high, relative to the national average. From comparing the two country's regional analyses, it would appear that a spouse in the labor force dampened the influence of the Social Security regime changes.

In Table 7 through to Table 10 the effect of the Social Security regime changes on labor force participation is analyzed for each education attainment level. Education attainment may influence the type of work an individual had throughout their working life, or potentially influence their engagement and attachment to their profession. Thus we may expect to observe differential responses to changes in the Social Security regimes across education differences. To easily visualize the marginal effects of the three Social Security regime measures, Figures 15, 16, and 17 illustrate the marginal effects by country and education level. The response to the tax rate is not systematic (Figure 15), consistent with the pooled analysis in Table 4 and Figure 14. In Figure 16, we show the effects of the replacement rate as a fraction of the wage on labor force participation by country and by education attainment. We see that France and Spain are the most responsive on average (consistent with Table 4 and Figure 14). As highlighted in Figure 16, it seems that in many countries those men with a completed primary education are most responsive to the replacement rate changes. These men respond more strongly than those with no education

or incomplete primary and also those with greater levels of education attainment. In the case of Brazil and Panama, those who completed secondary education are the most responsive to increases in the replacement rate.

Figure 17 highlights the effect of the delay incentive by country and by education attainment. The strong effects in France are evident, and particularly for those with who have completed primary education. But the effects are generally small for the delay incentive.

6. Discussion

6.1 Summary

In this paper we found that male labor force participation responds to changes in the Social Security regime. We found that increases in replacement rate as a fraction of the wage, that is increase in the pension a man will receive on retirement, encourages men to exit the labor force. This finding of the negative effect of the pension on labor force participation was consistent across countries, within countries (France and the United States), and across education attainment levels. The Social Security tax rate had varying effects on labor force participation, and did not tell a consistent story across the countries within this study. The delay incentive had a small positive effect on labor force participation -- encouraging men to stay in the labor market by rewarding them with a higher future pension has a very small effect on labor force participation. The fact that the response to the delay incentive is small may be a reflection of the value of leisure relative to income around the years of retirement.

We found that within France and the United States, variation within the respective countries existed in terms of the labor market response to national socials security regime changes. This variation within countries may be a reflection of the variation across regions in the average characteristics of men ages 50-80. For these two countries, it seemed that regions with higher labor force participation of the spouse strengthened the labor market response to Social Security reform.

We also stratified our results by education attainment, and found that men with higher levels of education attainment have a weaker response to Social Security regime changes. This may be due to a tendency for those

who have higher education attainment to have higher job satisfaction and thus the gap between the utility from work and the utility from leisure is less than that gap for someone with lower education attainment who may hold a job that is repetitive (factory work) or physically demanding.

6.2 Limitations

As discussed above, the grandfathering of the laws has been done as an estimate at the age of 65 for each country and cohort. That is, if there is a legal change when the individual is older than 65, then this individual is not subject to the legal change and they are grandfathered by the law that existed when they were 65. Estimating this to be at age 65 for all countries and cohorts is purely an estimation. Further work on the Social Security data base would be needed to construct a legal data base by country, year, and cohort (and thus age) to ensure that the grandfathering rules apply precisely in the way the law specified.

A further limitation of the current coding of the Social Security laws is that they are not sector specific. People across different sectors within a country may be subject to different Social Security laws and as yet this has not been accounted for in the Social Security data base. Once coded, the sector specific laws can be associated with individuals in the IPUMS International where sectors of work are declared. This would require a cohort analysis to identify the average behavior of people within a sector by cohort across the census years as individuals are not identifiable over time in the census.

In this paper, we have treated labor force participation as a dichotomous variable, in the labor force (which includes those employed and those unemployed but looking for work) and out of the labor force. Further investigation into the links between employed, unemployed, and inactive would be an interesting extension. We chose not to do this in the current paper, as the interest in this differentiation may lie in the longitudinal nature of the shift around retirement years from employed to unemployed and then to inactive. This pattern, that is a period of unemployment before retirement, may be indicative of involuntary retirement and may reflect other workplace policies, attitudes or cultural practices that discriminate against older workers and make it

difficult for them to re-enter the workforce once redundant. Exploring the intensity of work, as in Burtless and Moffitt (1985) would also be a valuable extension.

Despite three censuses for South Africa made available through IPUMS International, more recent years classified age up to 65 and did not differentiate age between 66 and 80. A separate study of South Africa, working with the limitation on age, is a worthy investigation especially given the publicity surrounding the cash transfers and the effect on household size and behavior. But this case study is beyond the scope of this paper, and we limit the analysis to a uniform treatment across all countries. In this case, we drop the census years 2001 and 2007 for which we lack information on the full age range considered in this paper.

6.3 Further Work

To further this analysis we plan to draw out the cohort differences in greater detail -- including cohort and age fixed effects rather than including these factors as continuous variables in the model. Moreover, we plan to expand the analysis of analyzing the labor supply outcomes by various stratifications. In this paper we have stratified by regions within France and divisions within the United States. We have also stratified by education attainment. These results proved illuminating in the differential responses within a country geographically, and by characteristic. We will further explore these stratifications to examine how the labor supply response to Social Security laws varies by marital status, spouse labor force participation, and other variables of interest.

7. References

Bloom, D. E., D. Canning, et al. (2009). "The Effect of Social Security Reform on Male Retirement in High and Middle Income Countries." PGDA Working Paper **48**.

Bloom, D. E., D. Canning, et al. (2011). "The Effect of Social Security Reform on Male Retirement." Mimeo.

Börsch-Supan, A. and R. Schnabel (1998). "Social Security and Declining Labor-Force Participation in Germany." American Economic Review **88**(2): 173-178.

Burtless, G. and R. A. Moffitt (1985). "The Joint Choice of Retirement Age and Postretirement Hours of Work " Journal of Labor Economics **3**(2): 209-236.

Costa, D. (1995). "Pensions and Retirement: Evidence from Union Army Veterans." Quarterly Journal of Economics **110**(2): 297-320.

Duggan, M., P. Singleton, et al. (2007). "Aching to retire? The rise in the full retirement age and its impact on the Social Security disability rolls " Journal of Public Economics **91**(7-8): 1327-1350.

Gruber, J. and D. Wise (1998). "Social Security and Retirement: An International Comparison." The American Economic Review **88**(2): 158-163.

Gruber, J. and D. A. Wise (1999). Social Security and Retirement around the World. Chicago, The University of Chicago Press.

Gruber, J. and D. A. Wise (2004). Social Security Programs and Retirement around the World: Micro-Estimation. Chicago, The University of Chicago Press.

Gustman, A. L. and T. L. Steinmeier (2005). "The Social Security early entitlement age in a structural model of retirement and wealth." Journal of Public Economics **89**(2-3): 441-463.

Mastrobuoni, G. (2009). "Labor supply effects of the recent Social Security benefit cuts: Empirical estimates using cohort discontinuities." Journal of Public Economics **93**(11-12): 1224-1233.

Appendix: Tables of Results and Figures

Table 1: Sample Size of the 13 Countries

			Male Labor Force Participation					Male Labor Force Participation	
	Year	N	Mean	SD		Year	N	Mean	SD
Argentina	1970	39,033	0.642	0.479	**Malaysia**	1970	8,379	0.690	0.462
	1980	216,506	0.594	0.491		1980	8,949	0.719	0.449
	1991	364,910	0.609	0.488		1991	17,464	0.651	0.477
	2001	331,663	0.615	0.487		2000	25,009	0.625	0.484
	Total	952,112	0.609	0.488		Total	59,801	0.656	0.475
Austria	1971	86,668	0.457	0.498	**Mexico**	1970	15,129	0.866	0.341
	1981	88,652	0.430	0.495		1990	344,944	0.703	0.457
	1991	94,227	0.381	0.486		1995	12,255	0.771	0.420
	2001	109,947	0.373	0.484		2000	552,854	0.696	0.460
	Total	379,494	0.407	0.491		Total	925,182	0.702	0.457
Brazil	1960	147,106	0.818	0.385	**Panama**	1960	2,366	0.825	0.380
	1970	223,053	0.776	0.417		1970	7,710	0.820	0.384
	1980	342,682	0.650	0.477		1980	10,834	0.646	0.478
	1991	522,470	0.637	0.481		1990	14,020	0.610	0.488
	2000	709,568	0.600	0.490		2000	19,276	0.675	0.468
	Total	1,944,879	0.656	0.475		Total	54,206	0.680	0.467
Chile	1970	49,443	0.702	0.457	**Portugal**	1981	55,890	0.540	0.498
	1982	70,764	0.606	0.489		1991	62,820	0.448	0.497
	1992	91,926	0.556	0.497		2001	71,242	0.425	0.494
	2002	124,404	0.568	0.495		Total	189,952	0.466	0.499
	Total	336,537	0.592	0.491					
					South Africa	1996	141,451	0.514	0.500
France	1962	275,143	0.651	0.477		Total	141,451	0.514	0.500
	1968	277,063	0.554	0.497					
	1975	293,672	0.480	0.500	**Spain**	1991	241,589	0.457	0.498
	1982	306,861	0.450	0.498		2001	272,764	0.410	0.492
	1990	276,691	0.363	0.481		Total	514,353	0.432	0.495
	1999	81,283	0.342	0.474					
	Total	1,510,713	0.490	0.500	**United States**	1960	184,251	0.687	0.464
						1970	208,570	0.652	0.476
Greece	1971	87,152	0.662	0.473		1980	1,213,354	0.576	0.494
	1981	118,209	0.618	0.486		1990	1,342,484	0.519	0.500
	1991	137,542	0.478	0.500		2000	1,605,281	0.540	0.498
	2001	151,589	0.397	0.489		2005	405,457	0.561	0.496
	Total	494,492	0.519	0.500		Total	4,959,397	0.555	0.497

Source: IPUMS International

Male Labor Force Participation of 50 to 80 year olds

Sample restricted to that applied in the main regression analysis

Table 2: Changes in Social Security Policy over time.

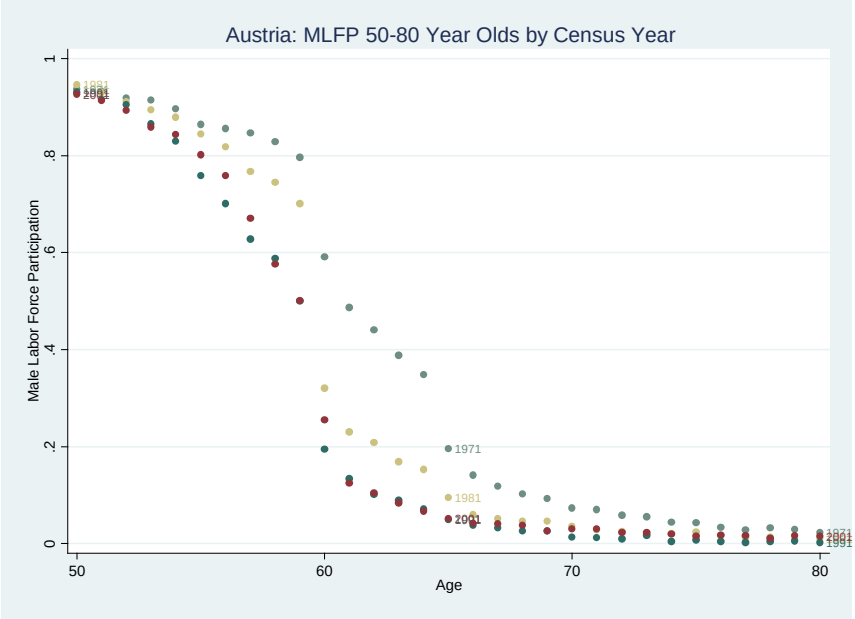
	Year	Social Security Tax Rate	Replacement Rate as a Fraction of Wage	Delay Incentive as a Fraction of Wage
Argentina	1970	0.200	0.820	0.570
	1980	0.260	0.700	0.233
	1991	0.260	0.700	0.233
	2001	0.270	0.179	0.051
Austria	1971	0.170	0.765	0.000
	1981	0.178	0.765	0.319
	1991	0.228	0.795	0.000
	2001	0.228	0.680	0.417
Brazil	1960	0.160	0.750	0.000
	1970	0.160	0.750	0.000
	1980	0.160	0.950	0.000
	1991	0.193	0.950	0.000
	2000	0.290	1.000	0.000
Chile	1970	0.185	0.000	0.000
	1982	0.232	0.000	0.000
	1992	0.100	0.000	0.000
	2002	0.100	0.000	0.000
France	1962	0.085	0.200	0.111
	1968	0.085	0.200	0.111
	1975	0.085	0.200	0.111
	1982	0.129	0.250	0.174
	1990	0.158	0.500	0.000
	1999	0.148	0.500	0.000
Greece	1971	0.100	1.070	0.431
	1981	0.143	0.931	0.425
	1991	0.143	0.855	0.445
	2001	0.200	0.855	0.000
Malaysia	1970	0.00	0.00	0.00
	1980	0.00	0.00	0.00
	1991	0.00	0.00	0.00
	2000	0.00	0.00	0.00
Mexico	1970	0.05	0.00	0.00
	1990	0.05	0.00	0.00
	1995	0.06	0.00	0.00
	2000	0.08	0.70	0.70
Panama	1960	0.12	0.69	0.70
	1970	0.12	0.69	0.70
	1980	0.16	1.00	0.28
	1990	0.09	1.00	0.28
	2000	0.09	0.60	0.17
Portugal	1981	0.26	1.13	11.38
	1991	0.34	1.18	11.82
	2001	0.35	1.57	49.59
South Africa	1996	0.00	0.00	0.00
Spain	1991	0.29	0.00	0.00
	2001	0.28	0.51	1.11
United States	1960	0.08	0.24	0.56
	1970	0.08	0.24	0.56
	1980	0.10	0.22	0.56
	1990	0.12	0.23	0.56
	2000	0.12	0.22	0.56
	2005	0.12	0.22	0.56

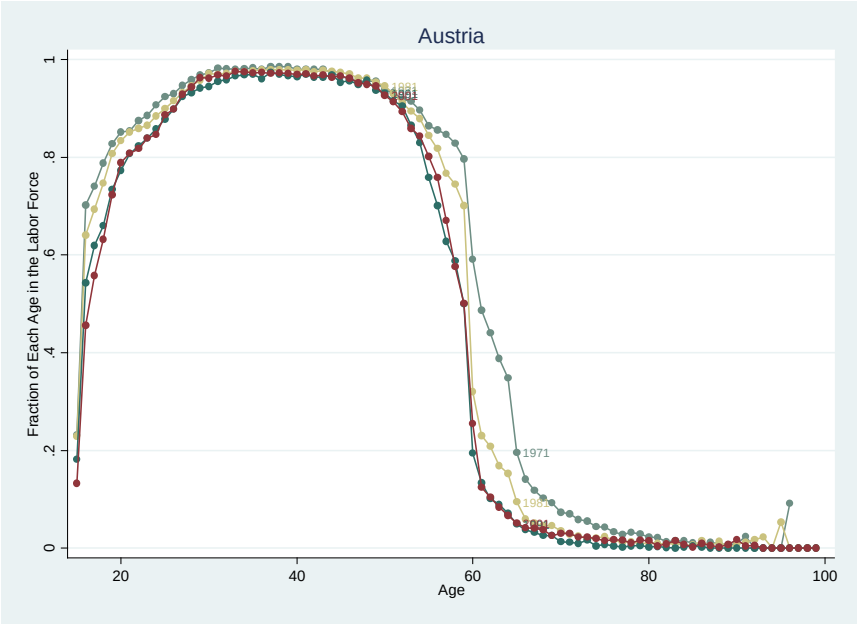
Table 3: Distribution of Control Variables

Figure 1: Argentina

		Argentina	Austria	Brazil	Chile	France	Greece	Malaysia	Mexico	Panama	Portugal	South Africa	Spain	United States	Total
Sample Population		952,112	379,494	1,944,879	336,537	1,510,713	494,492	59,801	925,182	54,206	189,952	141,451	514,353	4,959,397	12,462,569
Fraction of Total Population		7.64	3.05	15.61	2.7	12.12	3.97	0.48	7.42	0.43	1.52	1.14	4.13	39.79	
Marital Status (categorical variable)															
Single	%	12.4	6.6	6.0	11.2	10.8	4.1	2.8	5.4	12.6	5.0	10.8	8.4	5.6	7.1
Married or in Union	%	74.8	77.6	83.5	75.2	75.8	89.5	88.0	83.7	69.9	86.6	77.3	83.7	78.9	79.9
Separated or Divorced	%	5.4	8.9	4.2	5.3	4.5	1.5	1.4	3.4	11.1	2.0	4.4	2.2	9.7	6.4
Widowed	%	7.4	6.8	6.3	8.3	8.9	4.9	7.7	7.5	6.4	6.4	7.6	5.8	5.8	6.6
Labor Force Participation of Spouse (categorical variable)															
Omitted Category: No	%	74.6	71.8	79.0	84.7	71.8	79.7	73.8	85.8	82.5	73.2	61.6	82.1	58.3	70.0
Yes	%	25.4	28.2	21.0	15.3	28.2	20.3	26.2	14.2	17.5	26.8	38.4	17.9	41.7	30.0
Age (continuous variable)															
Age	Mean	61.4	62.3	60.5	61.0	62.0	62.3	59.8	60.9	60.9	62.4	60.7	62.7	62.0	61.7
	SD	8.2	8.3	8.0	8.1	8.2	8.3	7.8	8.3	8.2	8.3	8.0	8.3	8.4	8.3
Age of Spouse (continuous variable)															
Age of Spouse	Mean	56.1	58.5	53.0	55.0	58.8	56.4	51.7	54.0	52.5	58.5	53.7	59.3	58.2	56.7
	SD	9.8	9.3	10.4	10.4	9.1	9.6	9.0	10.1	11.1	9.5	10.1	9.0	9.6	10.0
Education Attainment (categorical variable)															
Less than completed primary	%	40.6	0.0	84.6	44.2	48.5	25.1	70.0	66.4	54.6	81.5	46.0	35.0	4.6	34.9
Completed Primary	%	46.2	40.5	6.7	36.0	40.4	53.1	26.6	24.4	31.4	9.5	34.2	49.0	31.6	31.0
Completed Secondary	%	8.7	53.5	4.9	16.1	5.7	13.8	0.8	4.4	9.6	5.3	12.9	11.0	26.8	16.4
Completed Univeristy	%	4.4	6.0	3.8	3.7	5.3	8.0	2.6	4.9	4.3	3.8	6.8	5.0	37.0	17.7
Education Attainment of Spouse (categorical variable)															
Spouse less than completed primary	%	37.9	0.0	84.7	43.1	50.3	35.2	78.5	67.6	51.1	85.8	39.9	37.4	2.5	35.3
Spouse Completed Primary	%	49.8	64.3	7.3	39.7	43.4	48.4	19.9	25.8	33.2	7.6	41.2	53.4	27.4	30.7
Spouse Completed Secondary	%	10.1	33.6	5.8	15.2	4.3	12.7	0.5	4.8	11.7	4.3	13.2	7.1	36.4	19.4
Spouse Completed Univeristy	%	2.1	2.2	2.2	2.0	2.0	3.7	1.2	1.8	4.0	2.3	5.7	2.1	33.8	14.6
Family Household (categorical variable)															
Omotted Category: Not a family household	%	9.6	13.2	6.4	8.1	14.2	4.7	3.9	5.1	13.4	6.9	7.4	6.8	13.7	10.7
Family Household	%	90.4	86.8	93.6	91.9	85.8	95.3	96.1	94.9	86.6	93.1	92.6	93.2	86.3	89.3
Children Alive (categorical variable)															
No children alive at time of census	%	44.4	60.7	30.8	38.5	65.5	45.3	23.1	28.1	39.0	53.7	42.0	42.6	71.3	54.6
At Least One Child Alive	%	55.6	39.3	69.2	61.5	34.5	54.7	76.9	71.9	61.0	46.3	58.0	57.4	28.7	45.4
Year of Birth (continuous variable)															
Year of Birth	Mean	1929.7	1924.7	1927.1	1929.3	1914.8	1925.9	1930.3	1934.8	1926.5	1929.5	1935.3	1933.6	1928.0	1927.1
	SD	11.9	14.3	14.6	13.7	13.4	13.2	13.3	10.0	14.3	11.3	8.0	9.5	13.9	14.3

Figure 2: Austria





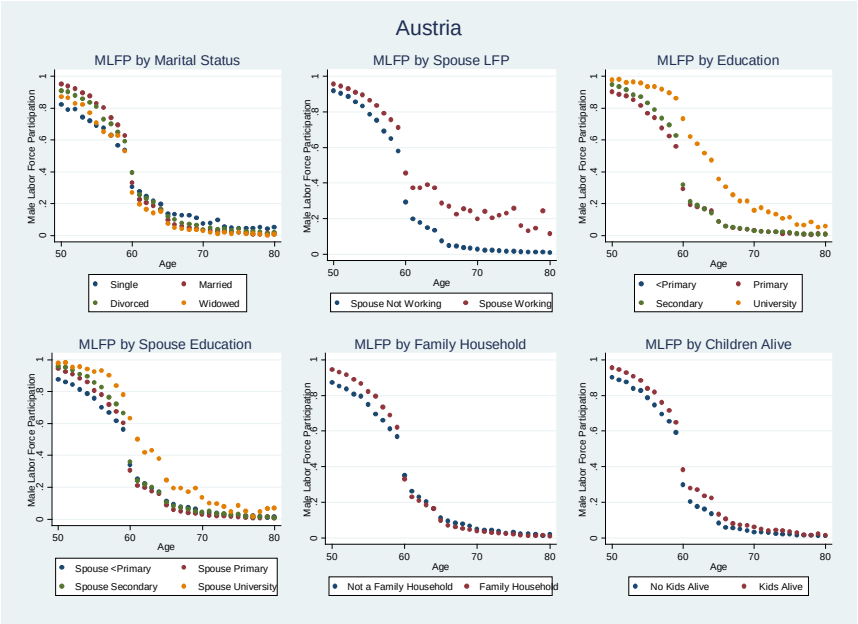
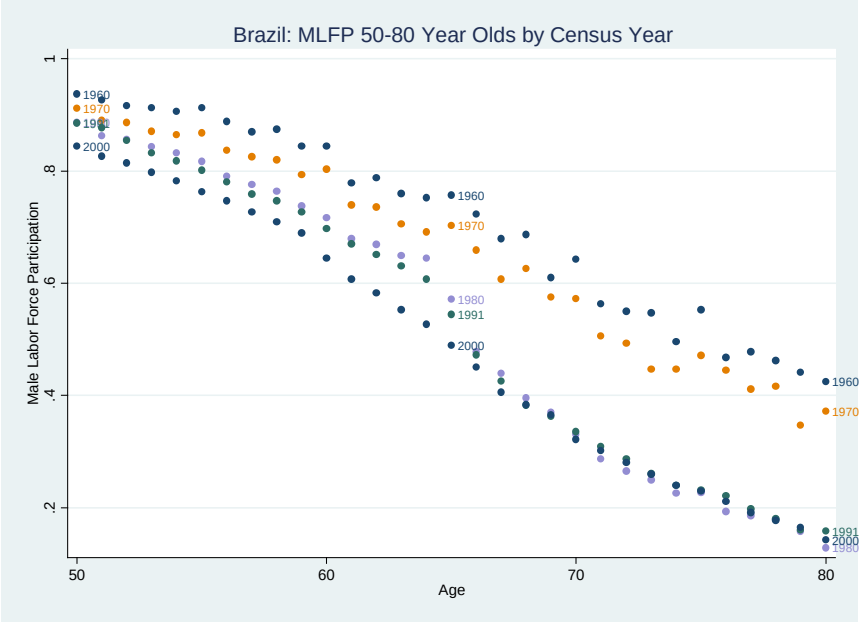
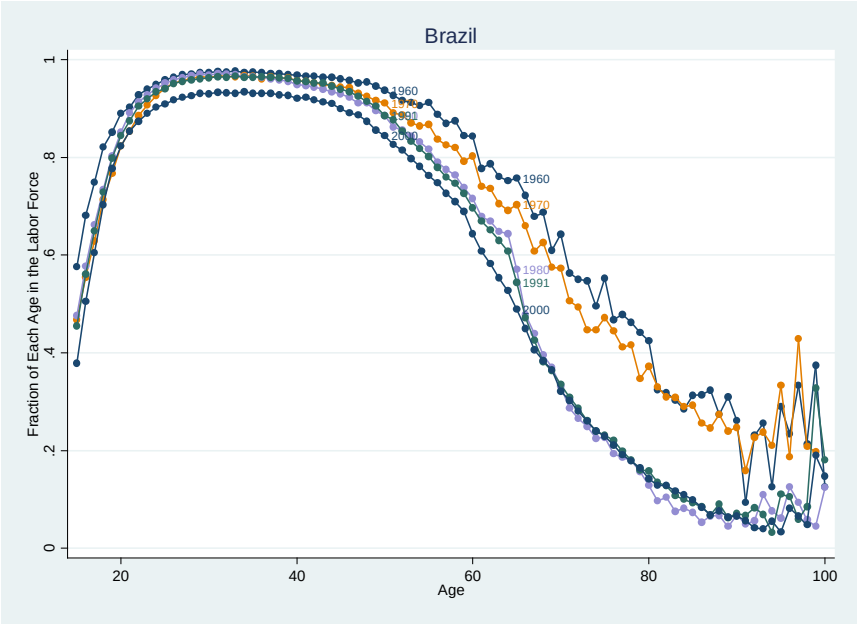

Austria
MLFP by Marital Status
MLFP by Spouse LFP
MLFP by Education
MLFP by Spouse Education
MLFP by Family Household
MLFP by Children Alive
Male Labor Force Participation
Age
Single
Married
Divorced
Widowed
Spouse Not Working
Spouse Working
<Primary
Primary
Secondary
University
Spouse <Primary
Spouse Primary
Spouse Secondary
Spouse University
Not a Family Household
Family Household
No Kids Alive
Kids Alive

Figure 3: Brazil




Brazil
Fraction of Each Age in the Labor Force
Age
1960
1970
1980
1991
2000

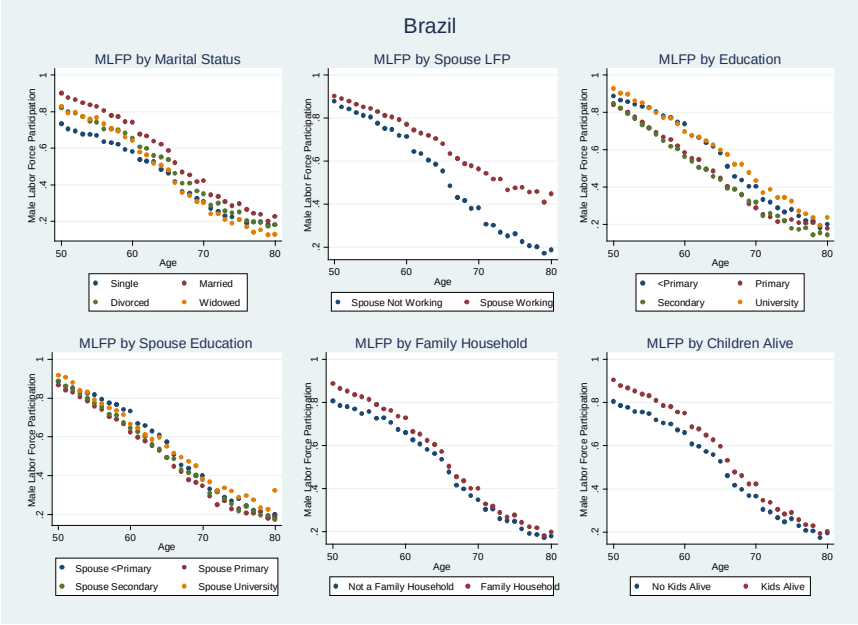
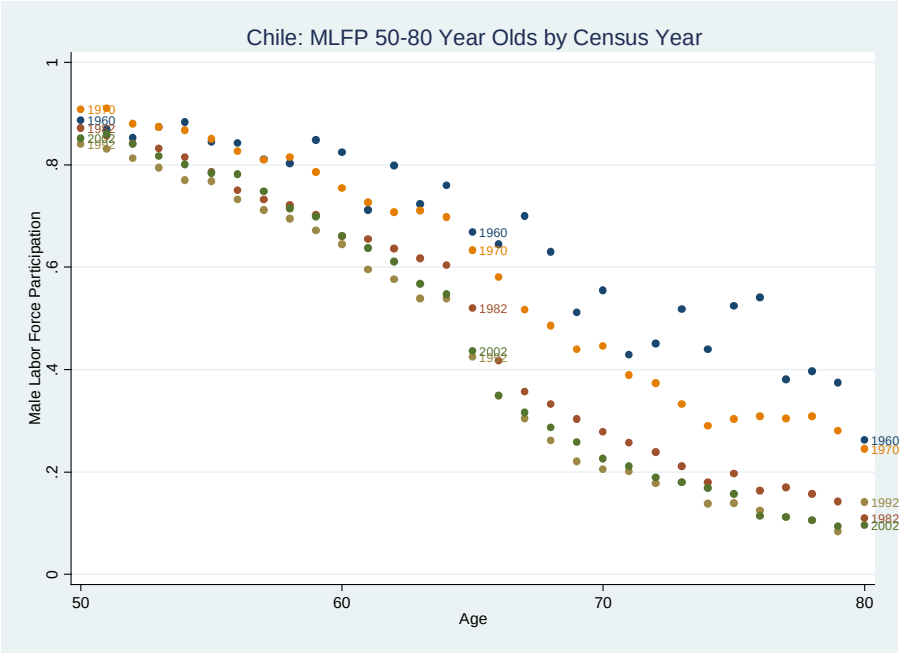

Brazil
MLFP by Marital Status
Single
Married
Divorced
Widowed
MLFP by Spouse LFP
Spouse Not Working
Spouse Working
MLFP by Education
<Primary
Primary
Secondary
University
MLFP by Spouse Education
Spouse <Primary
Spouse Primary
Spouse Secondary
Spouse University
MLFP by Family Household
Not a Family Household
Family Household
MLFP by Children Alive
No Kids Alive
Kids Alive
Male Labor Force Participation
Age

Figure 4: Chile



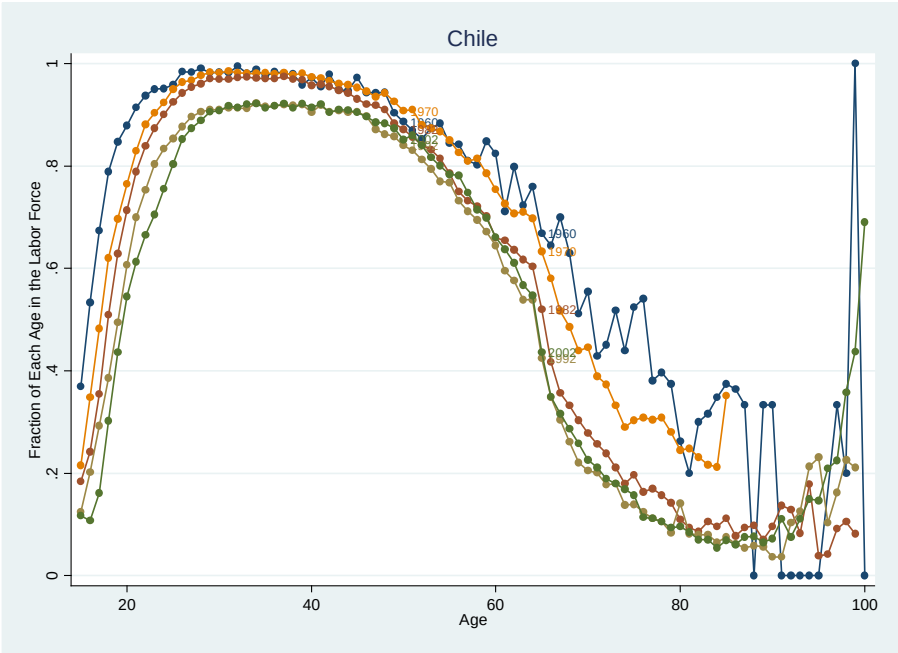
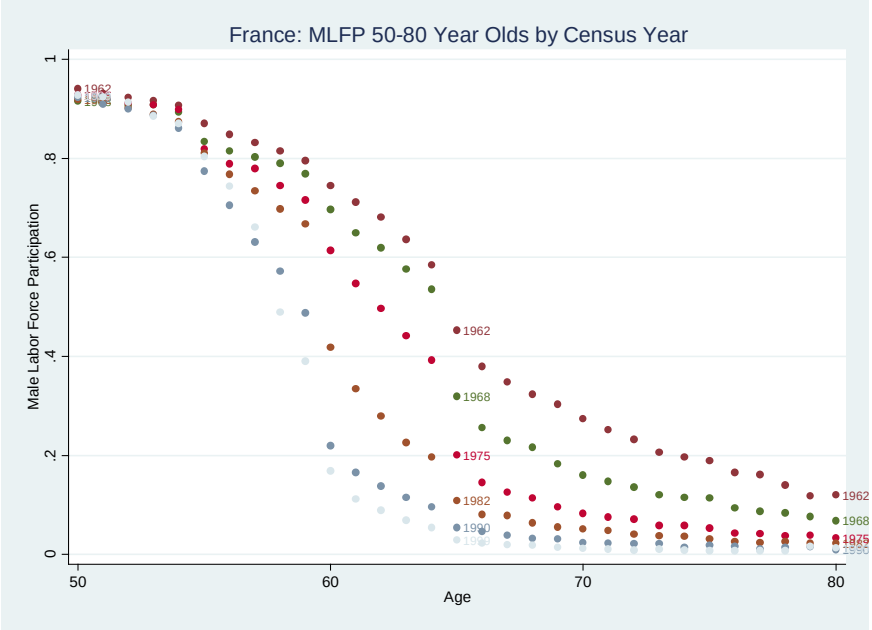
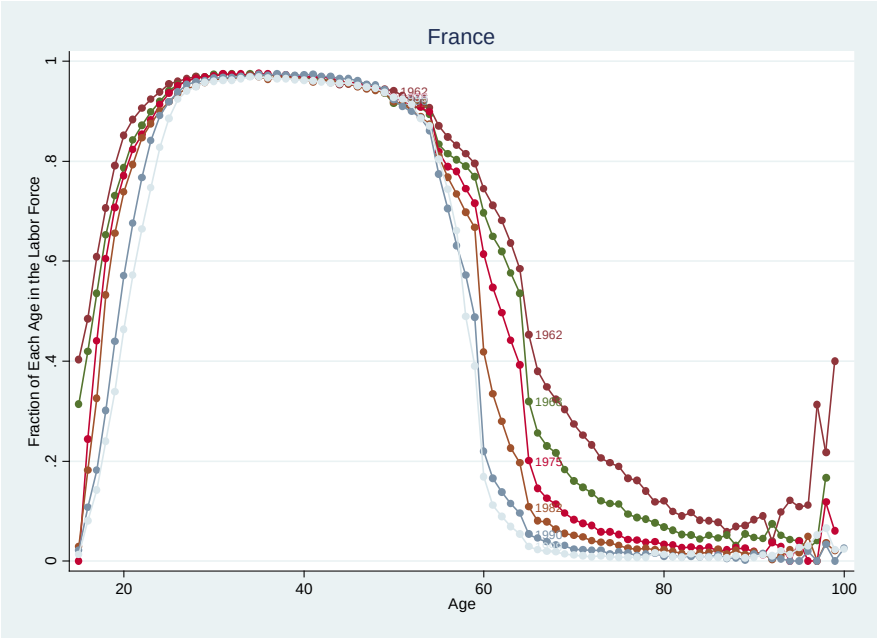


Figure 5: France





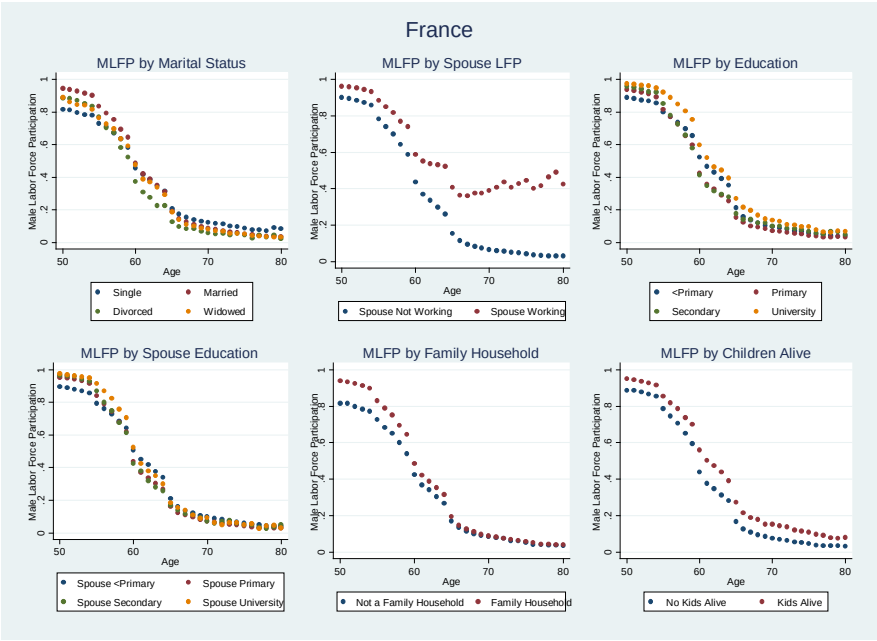
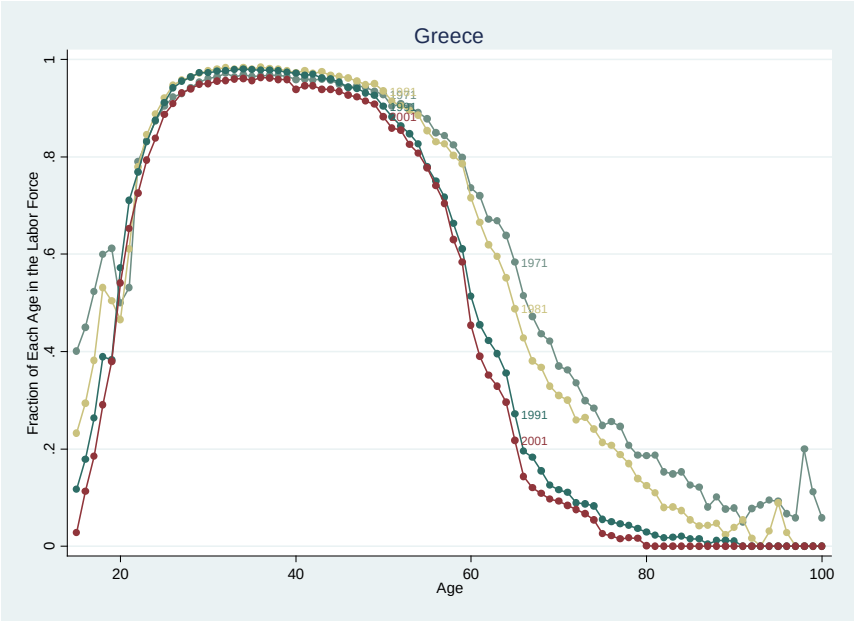
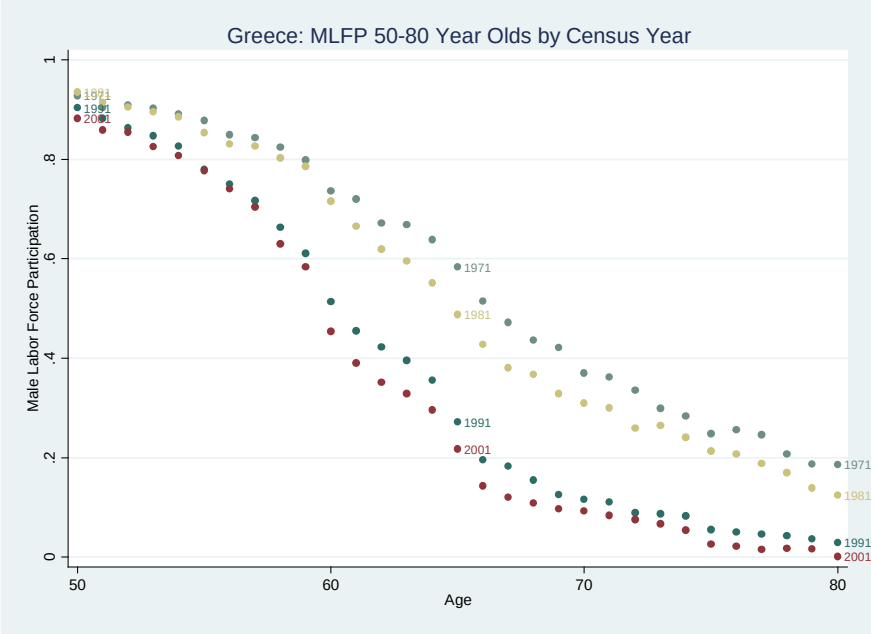


Figure 6: Greece


Greece
Fraction of Each Age in the Labor Force
0
.2
.4
.6
.8
1
20
40
60
80
100
Age
1971
1981
1991
2001


Greece: MLFP 50-80 Year Olds by Census Year
Male Labor Force Participation
0
.2
.4
.6
.8
1
50
60
70
80
Age
1971
1981
1991
2001

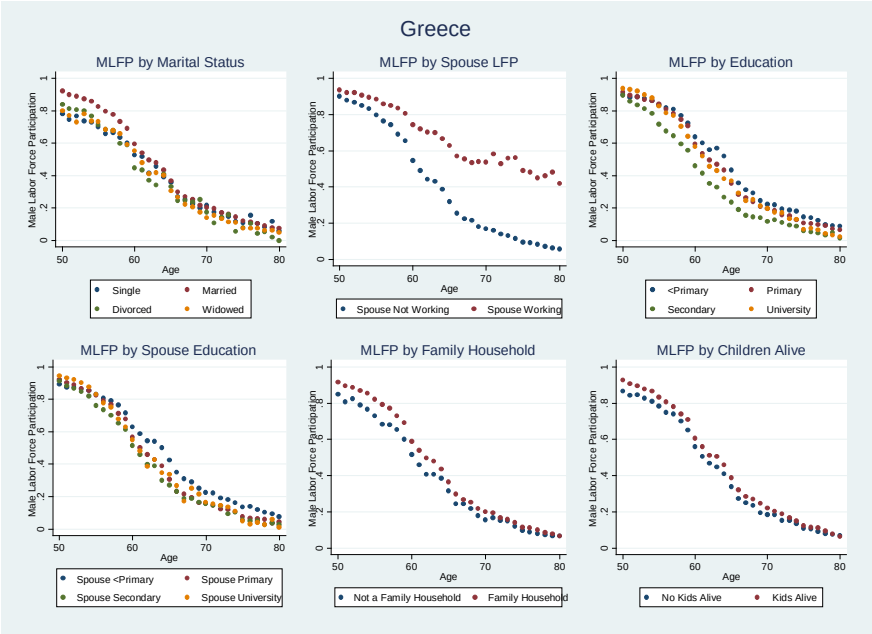
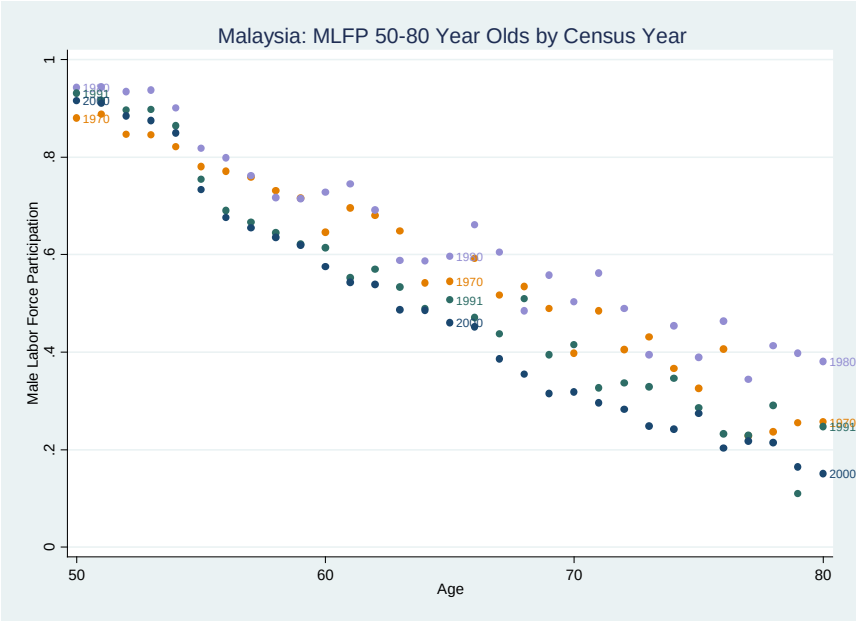
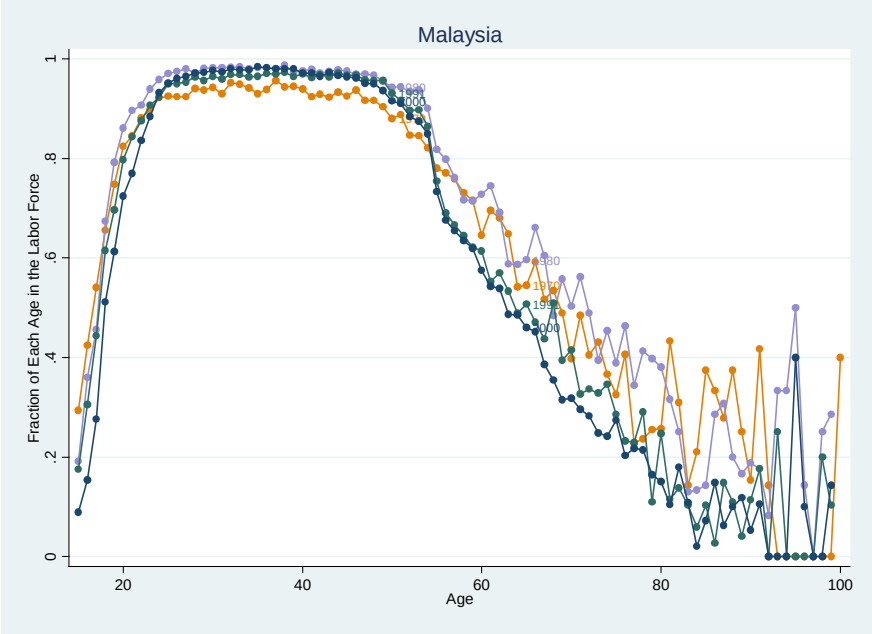


Figure 7: Malaysia


Malaysia: MLFP 50-80 Year Olds by Census Year
Male Labor Force Participation
0
.2
.4
.6
.8
1
50
60
70
80
Age
1970
1980
1991
2000


Malaysia
Fraction of Each Age in the Labor Force
0
.2
.4
.6
.8
1
20
40
60
80
100
Age

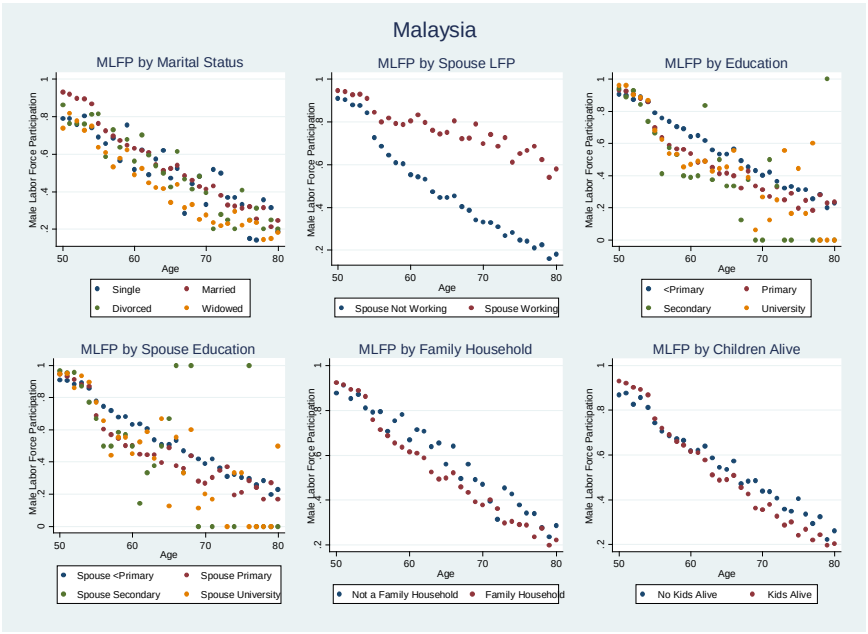
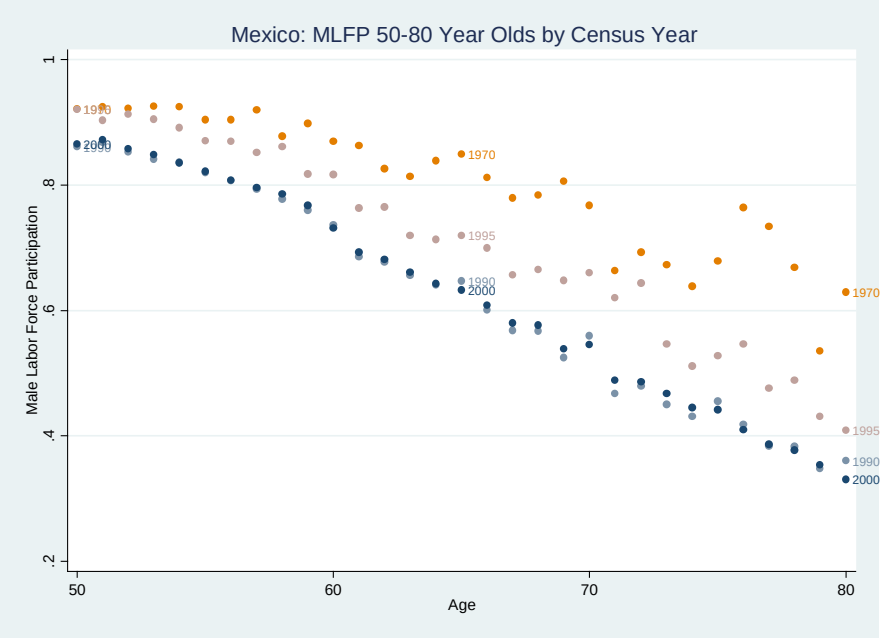
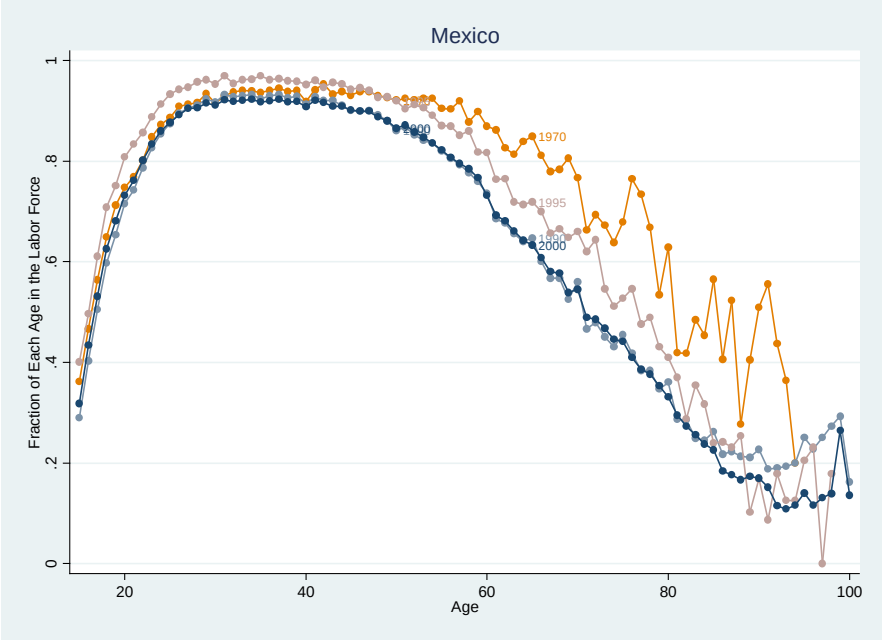

Malaysia
MLFP by Marital Status
Male Labor Force Participation
Age
Single
Married
Divorced
Widowed
MLFP by Spouse LFP
Spouse Not Working
Spouse Working
MLFP by Education
<Primary
Primary
Secondary
University
MLFP by Spouse Education
Spouse <Primary
Spouse Primary
Spouse Secondary
Spouse University
MLFP by Family Household
Not a Family Household
Family Household
MLFP by Children Alive
No Kids Alive
Kids Alive

Figure 8: Mexico




Mexico
Fraction of Each Age in the Labor Force
0
.2
.4
.6
.8
1
20
40
60
80
100
Age
1970
1995
2000

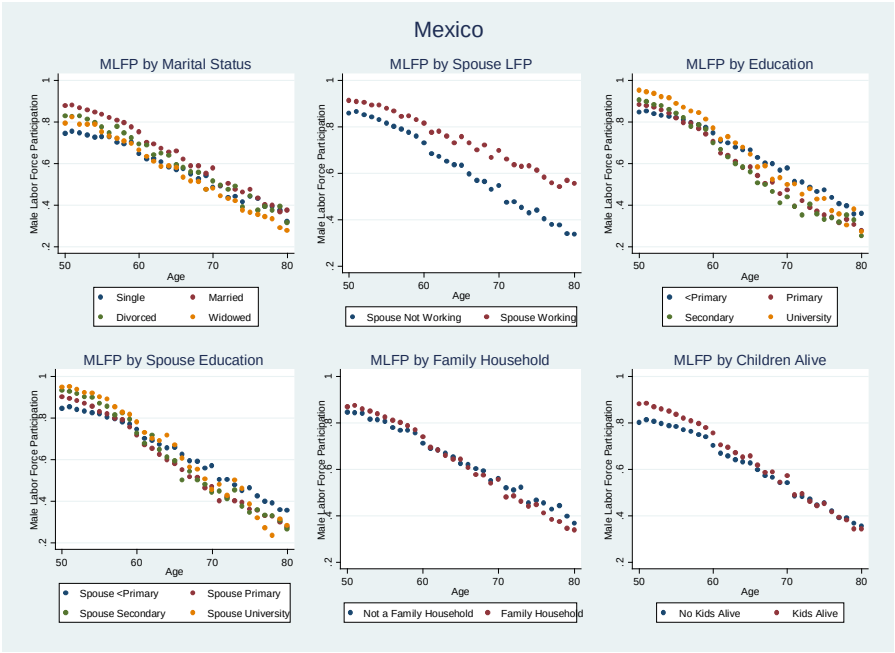
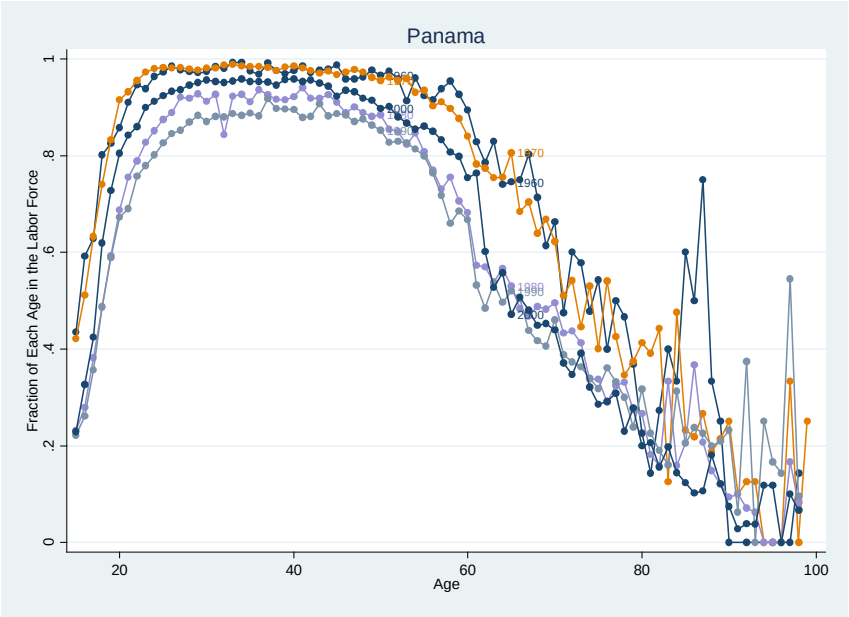

Mexico
MLFP by Marital Status
MLFP by Spouse LFP
MLFP by Education
MLFP by Spouse Education
MLFP by Family Household
MLFP by Children Alive
Male Labor Force Participation
Age
Single
Married
Divorced
Widowed
Spouse Not Working
Spouse Working
<Primary
Primary
Secondary
University
Spouse <Primary
Spouse Primary
Spouse Secondary
Spouse University
Not a Family Household
Family Household
No Kids Alive
Kids Alive

Figure 9: Panama


Panama
Fraction of Each Age in the Labor Force
Age
1960
1970
1980
1990
2000
2010

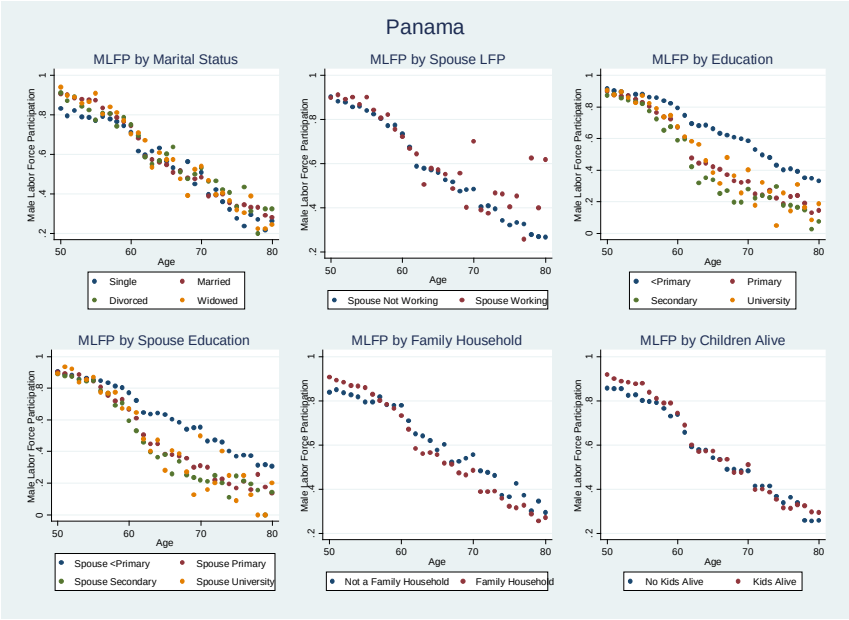
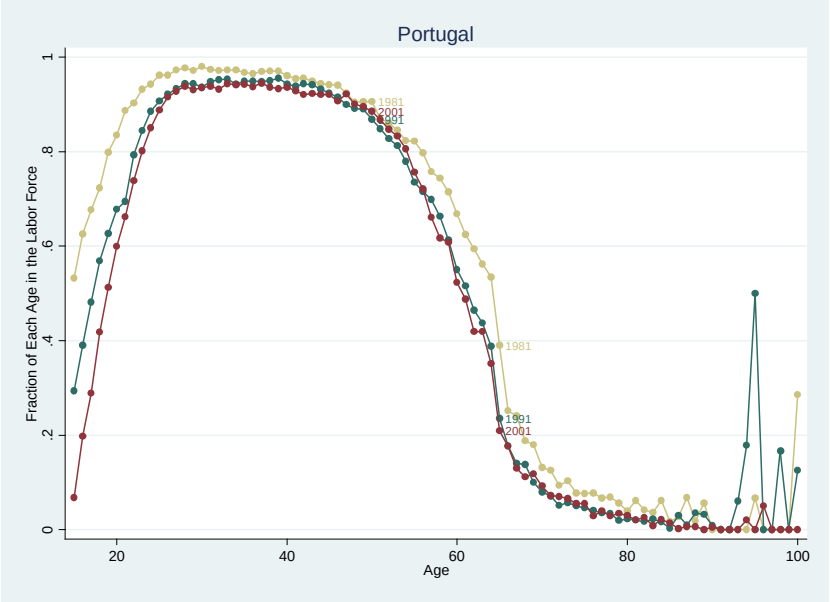
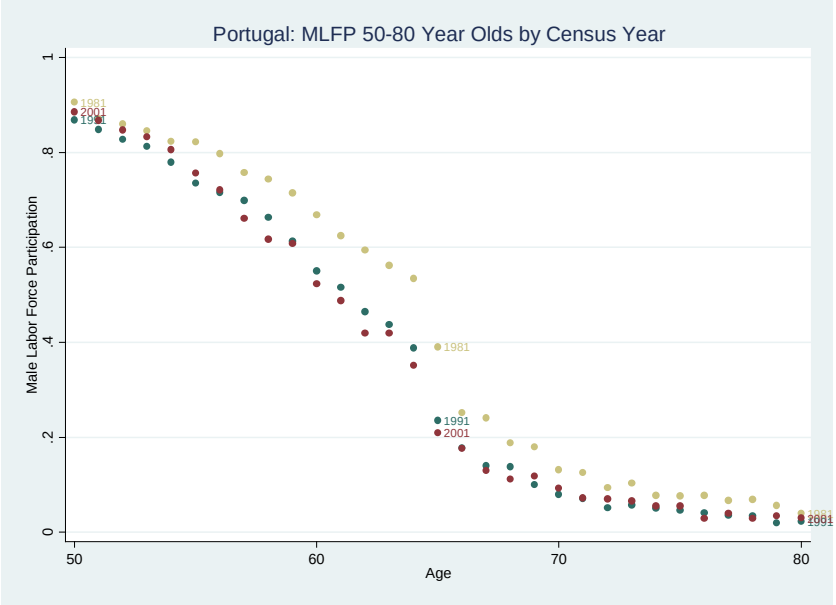

Panama
MLFP by Marital Status
Male Labor Force Participation
Age
Single
Married
Divorced
Widowed
MLFP by Spouse LFP
Spouse Not Working
Spouse Working
MLFP by Education
<Primary
Primary
Secondary
University
MLFP by Spouse Education
Spouse <Primary
Spouse Primary
Spouse Secondary
Spouse University
MLFP by Family Household
Not a Family Household
Family Household
MLFP by Children Alive
No Kids Alive
Kids Alive

Figure 10: Portugal





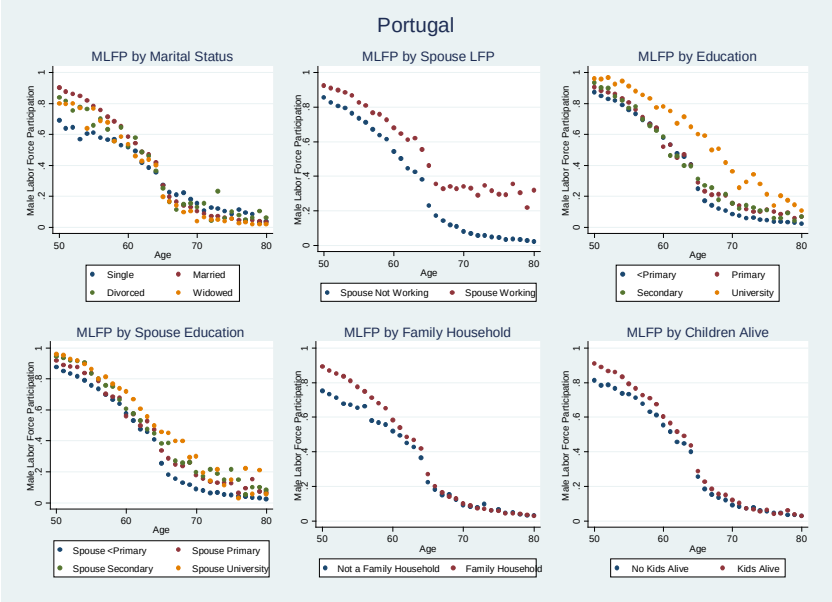
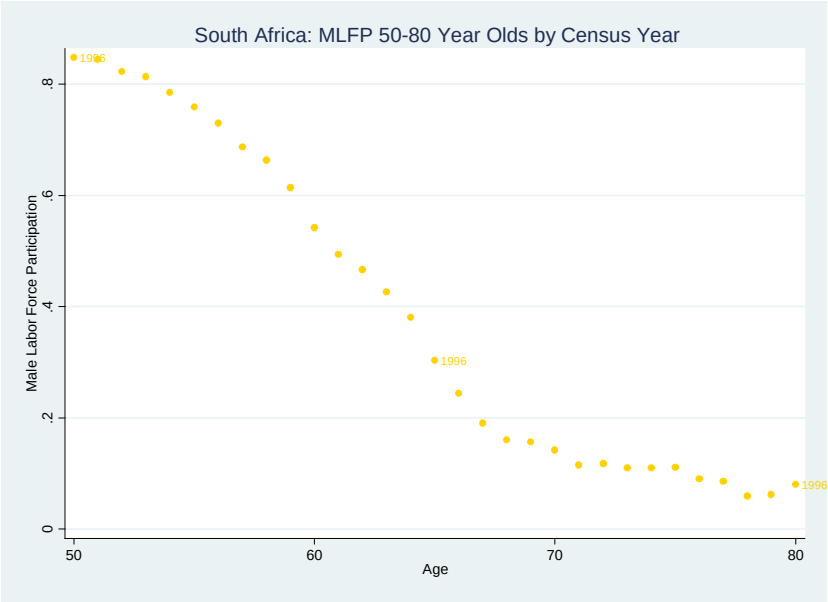
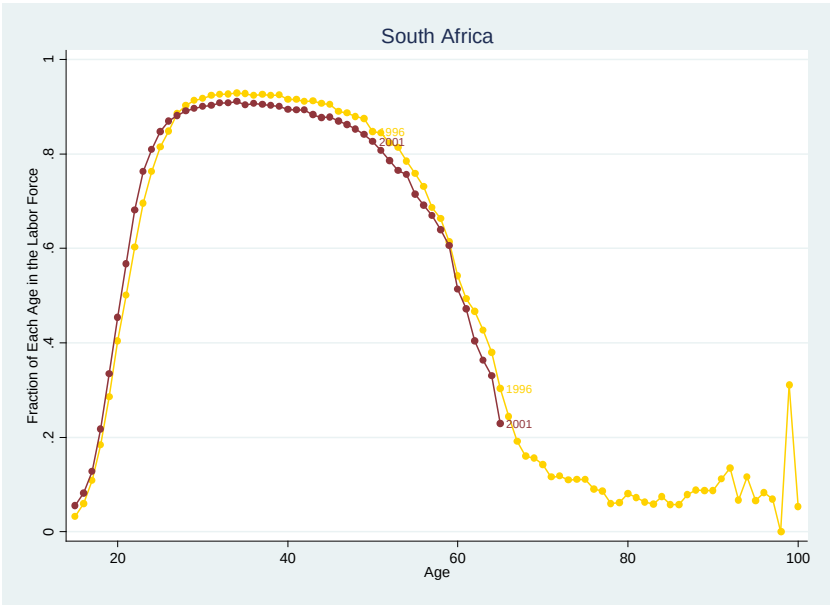


Figure 11: South Africa




South Africa
Fraction of Each Age in the Labor Force
0
.2
.4
.6
.8
1
20
40
60
80
100
Age
1996
2001
1996
2001

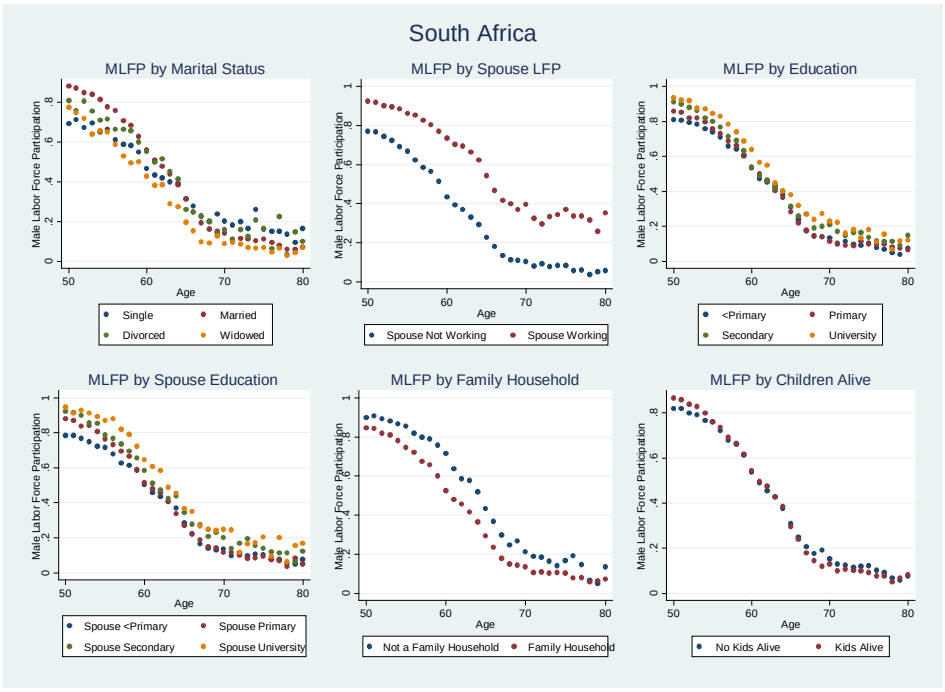
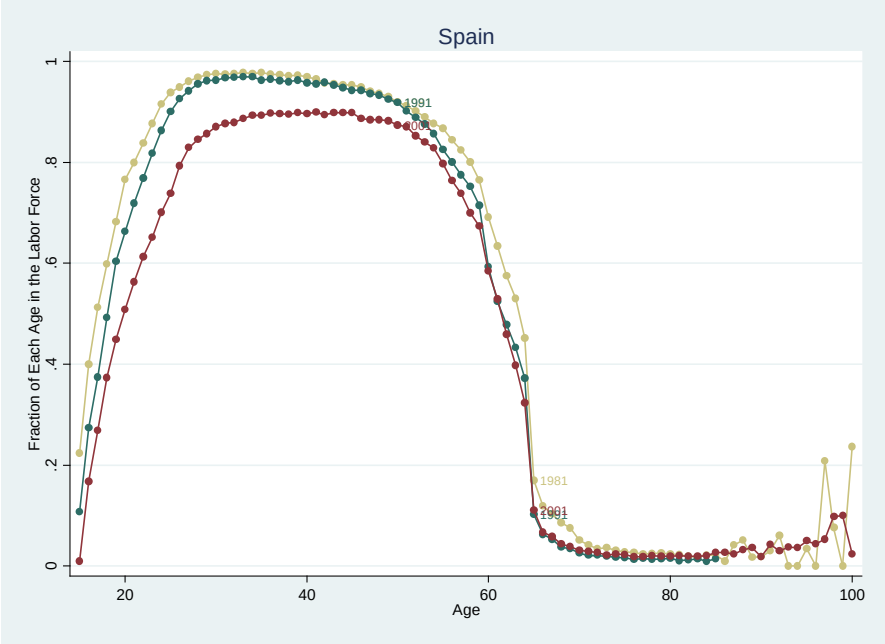
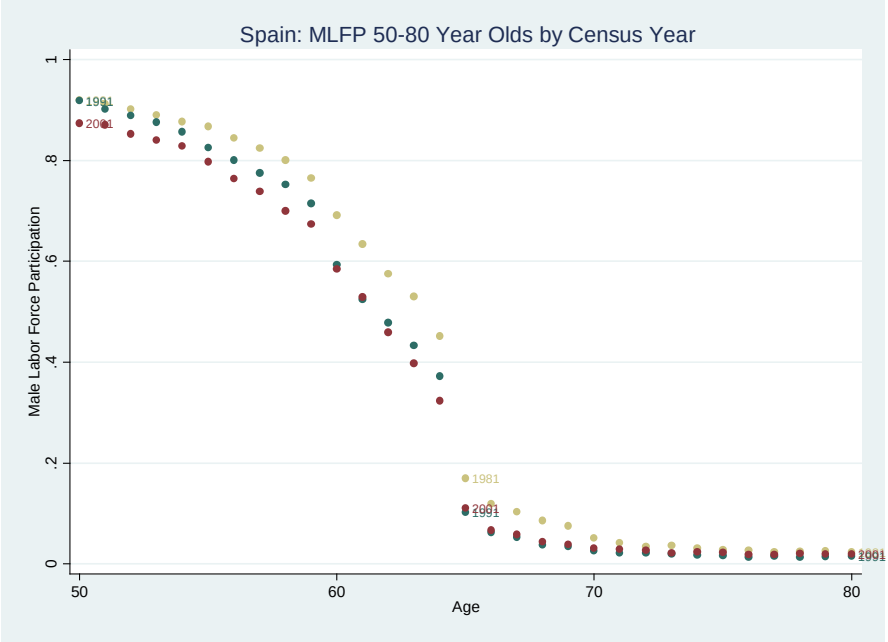

South Africa
MLFP by Marital Status
Male Labor Force Participation
Age
Single
Married
Divorced
Widowed
MLFP by Spouse LFP
Spouse Not Working
Spouse Working
MLFP by Education
<Primary
Primary
Secondary
University
MLFP by Spouse Education
Spouse <Primary
Spouse Primary
Spouse Secondary
Spouse University
MLFP by Family Household
Not a Family Household
Family Household
MLFP by Children Alive
No Kids Alive
Kids Alive

Figure 12: Spain





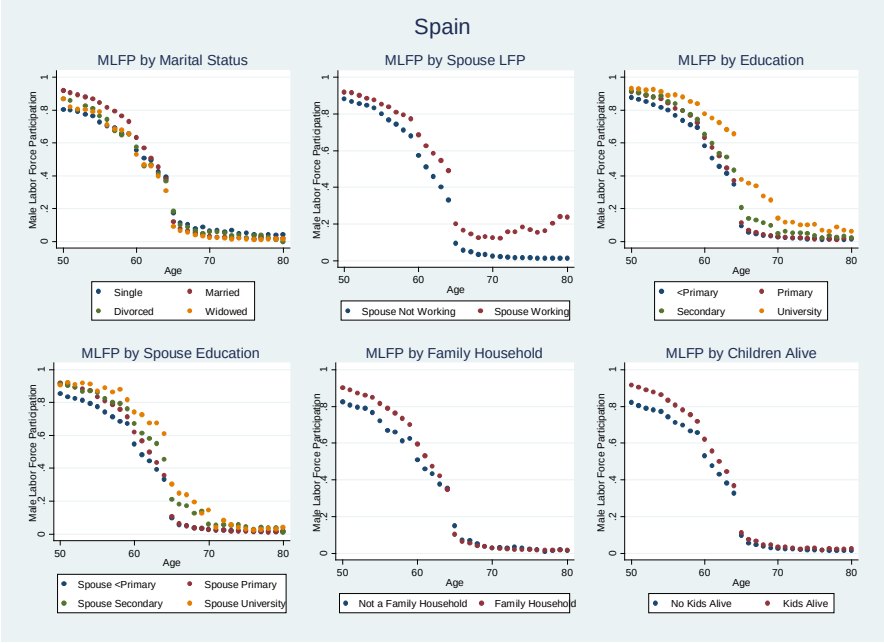
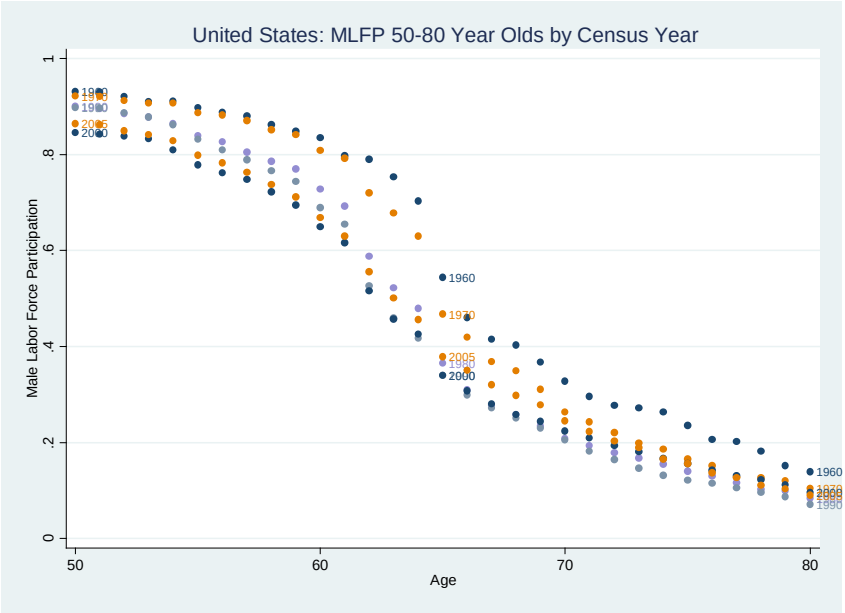
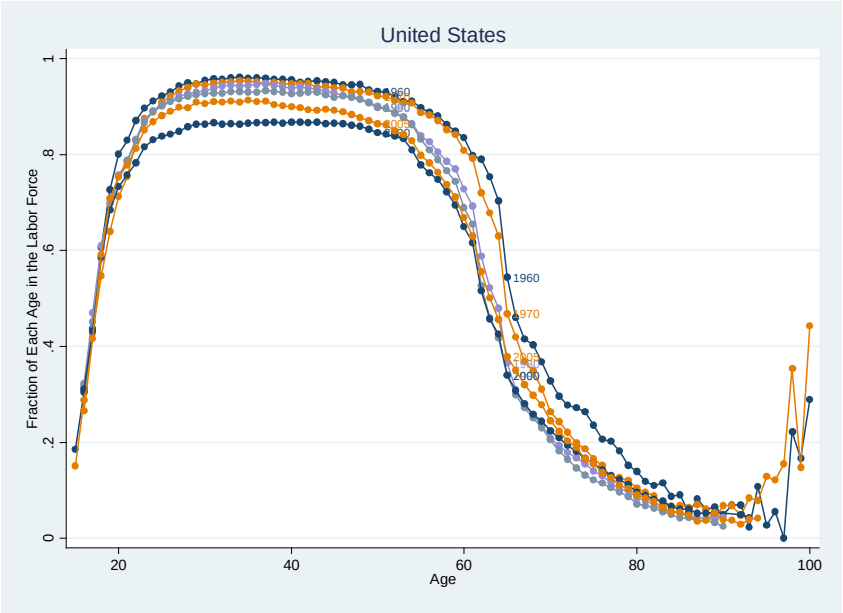


Figure 13: United States of America


United States: MLFP 50-80 Year Olds by Census Year
Male Labor Force Participation
0
.2
.4
.6
.8
1
50
60
70
80
Age
1960
1970
2005
1980
2000
1990


United States
Fraction of Each Age in the Labor Force
0
.2
.4
.6
.8
1
20
40
60
80
100
Age
1960
1970
2005
2000

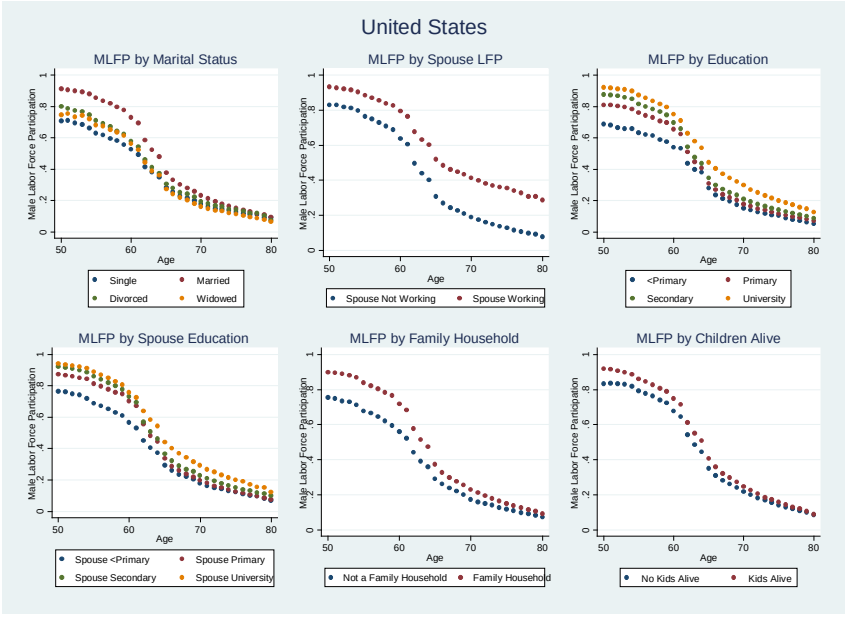
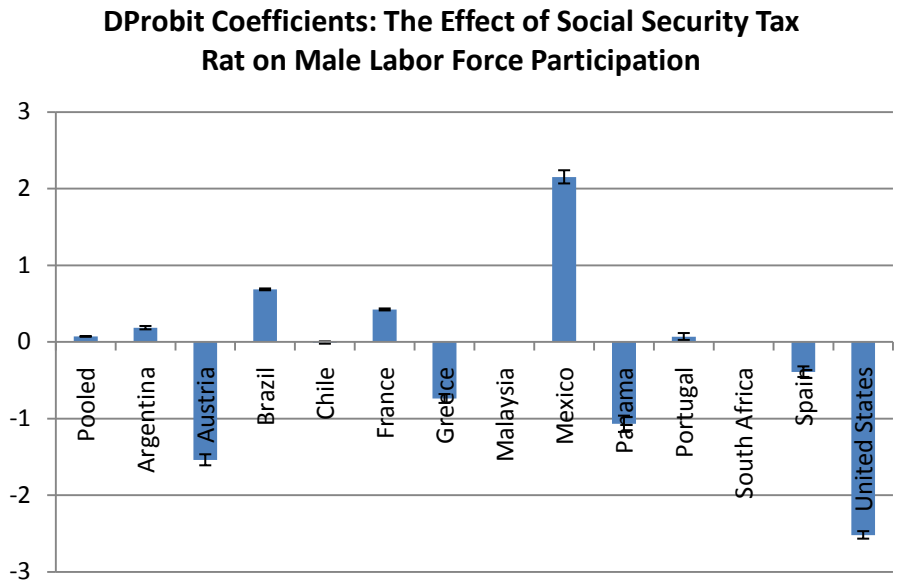

United States
MLFP by Marital Status
Male Labor Force Participation
0
.2
.4
.6
.8
1
50
60
70
80
Age
Single
Married
Divorced
Widowed
MLFP by Spouse LFP
Male Labor Force Participation
Age
Spouse Not Working
Spouse Working
MLFP by Education
Male Labor Force Participation
Age
<Primary
Primary
Secondary
University
MLFP by Spouse Education
Male Labor Force Participation
Age
Spouse <Primary
Spouse Primary
Spouse Secondary
Spouse University
MLFP by Family Household
Male Labor Force Participation
Age
Not a Family Household
Family Household
MLFP by Children Alive
Male Labor Force Participation
Age
No Kids Alive
Kids Alive

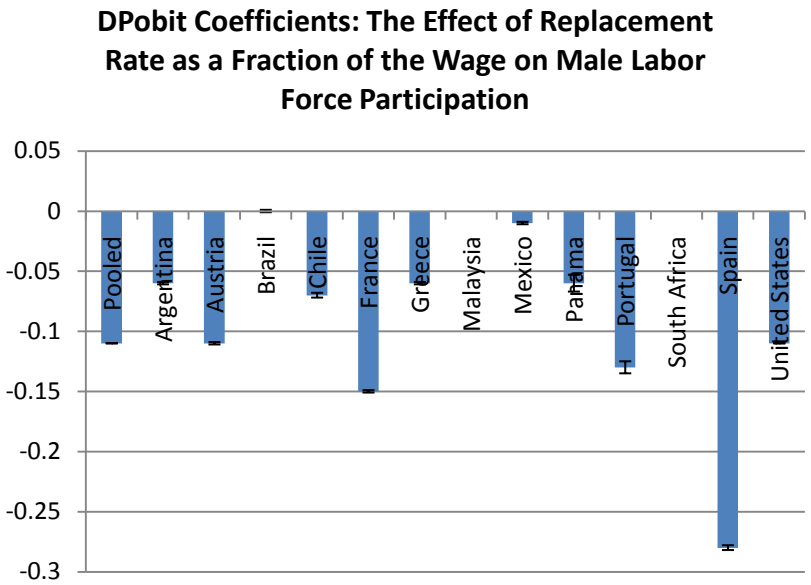
Table 4: The Effect of Social Security Tax, Replacement Rate, and Delay Incentive on Male Labor Force Participation. Pooled and by Country

	Pooled	Argentina	Austria	Brazil	Chile	France	Greece	Malaysia	Mexico	Panama	Portugal	South Africa	Spain	United States
Social Security Variables (continuous variables)														
Social Security Tax Rate	0.0701***	0.184***	-1.544***	0.684***	-0.0125	0.422***	-0.744***		2.152***	-1.070***	0.0695		-0.397***	-2.521***
	(0.00512)	(0.0228)	(0.0725)	(0.0129)	(0.0153)	(0.0134)	(0.0581)		(0.0863)	(0.106)	(0.0457)		(0.0690)	(0.0497)
Replacement Rate as a Fraction of Wage	-0.119***	-0.0635***	-0.113***	0.000460	-0.0760***	-0.155***	-0.0668***	-0.0964***	-0.0159***	-0.0618***	-0.130***	-0.0910***	-0.283***	-0.116***
	(0.000364)	(0.00138)	(0.00185)	(0.00176)	(0.00280)	(0.00110)	(0.00196)	(0.00389)	(0.00135)	(0.00783)	(0.00517)	(0.00582)	(0.00270)	(0.000737)
Delay Incentive as a Fraction of Wage	0.000636***	0.00130***	-0.00240***	1.94e-05	0.00147***	0.0161***	0.000304***	-0.00587	-0.000257***	-0.000311**	0.00193***	0.00627***	0.00148***	0.000149***
	(9.04e-06)	(9.20e-05)	(0.000125)	(2.52e-05)	(7.46e-05)	(0.000150)	(3.30e-05)	(0.0111)	(2.62e-05)	(0.000158)	(6.42e-05)	(0.000436)	(2.08e-05)	(2.50e-05)
Marital Status														
Omitted Category: Single														
Married or in Union	0.250***	0.273***	0.194***	0.367***	0.241***	0.0978***	0.196***	0.464***	0.339***	0.314***	0.288***	0.250***	0.301***	0.237***
	(0.00170)	(0.00589)	(0.0118)	(0.00326)	(0.00848)	(0.00649)	(0.00977)	(0.0208)	(0.00519)	(0.0193)	(0.0122)	(0.0128)	(0.00721)	(0.00359)
Separated or Divorced	0.0379***	0.0374***	0.0606***	0.0625***	0.0414***	0.0179***	0.0376***	0.0264	0.0304***	0.0447***	0.0746***	-0.000944	0.00351	0.0666***
	(0.000842)	(0.00276)	(0.00517)	(0.00201)	(0.00472)	(0.00278)	(0.00776)	(0.0195)	(0.00307)	(0.00796)	(0.0113)	(0.00840)	(0.00589)	(0.00127)
Widowed	-0.0295***	-0.0520***	-0.0644***	-0.0101***	-0.0284***	-0.103***	-0.0304***	-0.0352**	-0.00519*	0.0311***	-0.00556	-0.106***	-0.0667***	0.0238***
	(0.000899)	(0.00265)	(0.00559)	(0.00207)	(0.00443)	(0.00245)	(0.00597)	(0.0147)	(0.00275)	(0.00955)	(0.00872)	(0.00723)	(0.00489)	(0.00157)
Labor Force Participation of Spouse														
Omitted Category: No														
Yes	0.166***	0.126***	0.165***	0.0986***	0.115***	0.259***	0.245***	0.171***	0.0839***	0.0674***	0.164***	0.278***	0.0972***	0.163***
	(0.000410)	(0.00152)	(0.00292)	(0.000980)	(0.00315)	(0.00134)	(0.00220)	(0.00455)	(0.00148)	(0.00671)	(0.00365)	(0.00354)	(0.00267)	(0.000621)
Age (continuous variable)														
Age	-0.0298***	-0.0255***	-0.0525***	-0.0295***	-0.0298***	-0.0481***	-0.0436***	-0.0194***	-0.0187***	-0.0216***	-0.0385***	-0.0279***	-0.0287***	-0.0258***
	(4.40e-05)	(0.000156)	(0.000344)	(0.000106)	(0.000318)	(0.000177)	(0.000296)	(0.000463)	(0.000169)	(0.000683)	(0.000560)	(0.000591)	(0.000423)	(9.15e-05)
Age of Spouse (continuous variable)														
Age of Spouse	-0.00337***	-0.00442***	-0.00356***	-0.00388***	-0.00350***	-0.00361***	-0.00206***	-0.00595***	-0.00379***	-0.00330***	-0.00443***	-0.00567***	-0.00690***	-0.00251***
	(2.70e-05)	(9.22e-05)	(0.000209)	(4.80e-05)	(0.000131)	(0.000107)	(0.000158)	(0.000316)	(6.90e-05)	(0.000281)	(0.000257)	(0.000234)	(0.000211)	(4.86e-05)
Education Attainment														
Omitted Category: Less than completed primary														
Completed Primary	-0.00614***	-0.0160***	-0.344***	-0.0788***	-0.0353***	0.0546***	0.0194***	-0.0567***	-0.0242***	-0.116***	0.0535***	0.0294***	0.0615***	0.0902***
	(0.000524)	(0.00134)	(0.00408)	(0.00162)	(0.00229)	(0.00123)	(0.00231)	(0.00549)	(0.00132)	(0.00550)	(0.00520)	(0.00390)	(0.00274)	(0.00137)
Completed Secondary	0.0501***	0.0183***	-0.301***	-0.0787***	0.0612***	0.135***	-0.0644***	-0.107***	-0.0173***	-0.158***	0.0563***	0.0872***	0.103***	0.166***
	(0.000655)	(0.00236)	(0.00468)	(0.00196)	(0.00314)	(0.00244)	(0.00339)	(0.0249)	(0.00269)	(0.00923)	(0.00702)	(0.00585)	(0.00392)	(0.00136)
Completed Univeristy	0.150***	0.170***		0.0592***	0.223***	0.270***	0.0581***	-0.0274*	0.0554***	-0.0845***	0.298***	0.127***	0.263***	0.256***
	(0.000654)	(0.00265)		(0.00208)	(0.00442)	(0.00230)	(0.00426)	(0.0156)	(0.00255)	(0.0131)	(0.00787)	(0.00757)	(0.00558)	(0.00134)
Education Attainment of Spouse														
Omitted Category: Spouse less than completed primary														
Spouse Completed Primary	-0.0264***	-0.00303*	-0.0660***	-0.0481***	-0.0466***	0.00409***	-0.0599***	-0.0527***	-0.0308***	-0.104***	0.00765	-0.0121***	0.0118***	0.000183
	(0.000569)	(0.00155)	(0.00910)	(0.00173)	(0.00263)	(0.00137)	(0.00234)	(0.00673)	(0.00148)	(0.00678)	(0.00636)	(0.00445)	(0.00292)	(0.00204)
Spouse Completed Secondary	-0.00490***	0.00133	-0.0262***	-0.0345***	-0.0250***	-0.0256***	-0.0762***	-0.0872**	-0.0229***	-0.111***	0.00472	0.0307***	0.00370	0.0146***
	(0.000715)	(0.00277)	(0.00887)	(0.00205)	(0.00404)	(0.00328)	(0.00379)	(0.0359)	(0.00309)	(0.0105)	(0.00862)	(0.00706)	(0.00478)	(0.00206)
Spouse Completed Univeristy	0.0196***	0.00610		-0.0278***	-0.0347***	-0.00428	-0.0928***	-0.0853***	-0.0146***	-0.0898***	-0.0360***	0.0466***	-0.00480	0.0310***
	(0.000832)	(0.00574)		(0.00326)	(0.00991)	(0.00484)	(0.00592)	(0.0261)	(0.00494)	(0.0163)	(0.0117)	(0.00987)	(0.00799)	(0.00209)
Family Household														
Omotted Category: Not a family household														
Family Household	-0.0145***	-0.0623***	-0.0232***	-0.0743***	-0.0225***	0.0473***	-0.0351***	-0.0852***	-0.0675***	-0.0641***	-0.0196**	-0.137***	-0.000227	-0.00607***
	(0.000718)	(0.00218)	(0.00448)	(0.00161)	(0.00393)	(0.00213)	(0.00535)	(0.0107)	(0.00224)	(0.00715)	(0.00789)	(0.00658)	(0.00437)	(0.00117)
Children Alive														
Omitted Category: No children alive at time of census														
At Least One Child Alive	0.0515***	0.0306***	0.0827***	0.0474***	0.0107***	0.107***	0.0416***	-0.0179***	0.0167***	0.0100*	0.0428***	0.0481***	0.0658***	0.0537***
	(0.000385)	(0.00129)	(0.00226)	(0.000907)	(0.00225)	(0.00122)	(0.00185)	(0.00526)	(0.00126)	(0.00522)	(0.00304)	(0.00357)	(0.00205)	(0.000639)
Year of Birth (continuous variable)														
Year of Birth	-0.00696***	0.000417***	-0.00793***	-0.00804***	-0.00394***	-0.0123***	-0.00820***	-0.00235***	-0.00561***	-0.00360***	-0.00949***		-0.00690***	-0.00330***
	(1.79e-05)	(7.47e-05)	(0.000160)	(5.97e-05)	(0.000106)	(5.92e-05)	(0.000197)	(0.000206)	(0.000165)	(0.000229)	(0.000277)		(0.000176)	(6.42e-05)
Country Fixed Effects	Yes													
Observations	12,466,335	952,112	379,494	1,944,879	336,537	1,510,713	494,492	59,801	925,182	54,206	189,952	141,451	514,353	4,959,397

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Marginal effects around the mean calculated from a probit estimation. dy/dx is for discrete change of dummy variable from 0 to 1

Figure 14: Graphical Display of Marginal Effects Presented in Table X





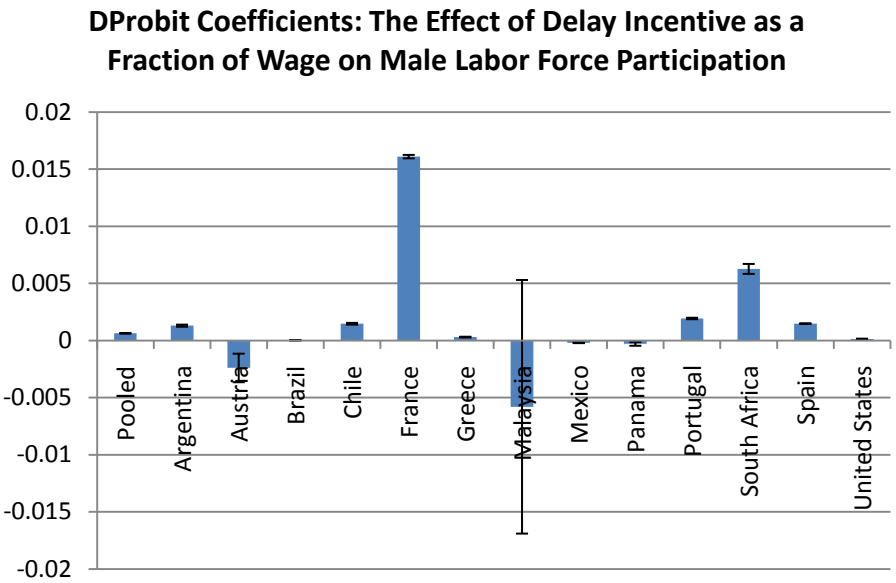


Table 5.1: Regional Variation in Labor Force Participation and its Covariates. France, by Region.

		France	Alsace	Aquitaine	Auvergne	Basse-Normandie	Bourgogne	Bretagne	Centre	Champagne-Ardenne	Corse	Franche-Comté	Haute-Normandie	Lanquedoc-Roussillon	Limousin	Lorraine	Midi-Pyrénées	Nord-Pas-de-Calais	Pays de la Loire	Picardie	Poitou-Charentes	Provence-Côte d'Azur	Region d'Île de France	Rhône-Alpes
Sample Population		1,510,713	40,557	85,502	44,313	36,420	50,570	78,277	67,823	36,529	6,674	28,911	41,606	63,682	28,157	60,424	78,005	100,767	76,694	45,646	50,314	108,323	248,928	132,591
Fraction of Total Population		12.12	2.7	5.7	2.9	2.4	3.3	5.2	4.5	2.4	0.4	1.9	2.8	4.2	1.9	4.0	5.2	6.7	5.1	3.0	3.3	7.2	16.5	8.8
Labor Force Participation (categorical variable)																								
Omitted Category: No	%	51.0	52.7	51.0	51.8	49.1	54.3	53.9	53.0	51.3	62.2	51.7	49.3	56.4	52.5	54.9	51.8	58.0	51.8	52.7	54.0	55.0	41.8	48.1
Yes	%	49.0	47.3	49.0	48.2	50.9	45.7	46.1	47.0	48.7	37.8	48.3	50.7	43.6	47.5	45.1	48.2	42.0	48.2	47.3	46.0	45.0	58.2	51.9
Marital Status (categorical variable)																								
Single	%	10.8	9.5	11.8	14.4	10.3	11.7	12.9	10.5	9.9	18.1	12.0	8.8	11.0	13.1	9.7	13.5	7.6	9.5	9.4	9.9	10.8	9.9	11.9
Married or in Union	%	75.8	77.4	74.9	72.5	76.0	75.7	75.0	76.2	76.5	67.6	75.6	77.3	75.7	75.0	77.5	73.6	78.0	78.1	76.0	76.8	74.4	75.9	74.7
Separated or Divorced	%	4.5	3.5	4.6	3.7	4.4	3.9	2.7	4.3	4.4	4.3	3.8	4.9	4.4	3.1	3.6	4.0	3.6	3.4	4.7	4.1	6.3	6.2	4.6
Widowed	%	8.9	9.5	8.6	9.5	9.3	8.7	9.5	9.0	9.2	10.0	8.6	9.0	8.9	8.8	9.3	8.9	10.7	9.0	9.9	9.2	8.5	7.9	8.7
Labor Force Participation of Spouse (categorical variable)																								
Omitted Category: No	%	71.8	78.2	71.2	71.4	61.9	73.1	67.3	69.4	72.2	90.3	71.9	70.6	82.7	66.7	80.8	73.7	80.5	68.8	74.3	74.0	79.3	63.2	69.9
Yes	%	28.2	21.8	28.8	28.6	38.1	26.9	32.7	30.6	27.8	9.7	28.1	29.4	17.3	33.3	19.2	26.3	19.5	31.2	25.7	26.0	20.7	36.8	30.1
Age (continuous variable)																								
Age	Mean	62.0	61.8	62.5	62.5	61.8	62.7	61.9	62.7	62.2	62.3	62.0	61.8	62.8	62.9	61.5	62.5	61.7	62.0	62.2	62.7	62.5	61.2	61.8
	SD	8.2	8.1	8.3	8.3	8.1	8.3	8.1	8.3	8.3	8.1	8.3	8.2	8.3	8.3	8.1	8.3	8.1	8.2	8.2	8.3	8.3	8.1	8.2
Age of Spouse (continuous variable)																								
Age of Spouse	Mean	58.8	58.6	58.9	59.1	58.5	59.4	58.7	59.4	59.0	57.7	58.8	58.7	59.4	59.4	58.1	58.9	58.9	59.0	59.2	59.5	59.0	58.0	58.5
	SD	9.1	8.9	9.2	9.0	9.1	9.1	8.7	9.1	9.2	9.8	9.1	9.1	9.2	8.9	8.9	9.2	8.9	8.9	9.3	9.0	9.5	9.4	9.1
Education Attainment (categorical variable)																								
Less than completed primary	%	48.5	50.0	50.8	50.6	55.8	48.7	49.6	49.9	47.7	59.4	47.1	53.4	52.7	50.7	50.8	53.0	50.8	52.9	52.3	53.7	46.5	38.6	47.0
Completed Primary	%	40.4	35.4	38.7	41.3	36.7	43.4	42.5	42.0	45.2	31.7	44.4	38.1	36.9	42.6	40.2	37.6	41.6	39.1	40.1	39.1	38.7	41.8	42.1
Completed Secondary	%	5.7	9.4	5.8	4.8	4.1	4.4	4.6	4.7	4.2	5.0	5.0	4.8	5.6	4.0	5.4	5.2	4.5	4.6	4.4	4.2	7.5	8.0	5.9
Completed Univeristy	%	5.3	5.2	4.8	3.3	3.3	3.5	3.3	3.4	2.8	3.9	3.5	3.7	4.8	2.7	3.6	4.2	3.1	3.4	3.2	3.0	7.3	11.5	5.0
Education Attainment of Spouse (categorical variable)																								
Spouse less than completed primary	%	50.3	59.3	52.7	47.5	55.2	47.4	51.9	49.4	49.1	63.6	45.9	55.0	55.6	48.1	55.7	53.9	54.9	54.3	53.6	53.9	50.0	41.7	46.2
Spouse Completed Primary	%	43.4	34.9	41.2	47.3	40.5	47.8	43.9	45.9	46.8	30.2	49.0	40.3	38.2	47.5	40.3	40.3	41.4	41.6	42.2	41.7	41.5	46.5	47.4
Spouse Completed Secondary	%	4.3	4.1	4.4	3.8	3.1	3.5	3.0	3.3	3.1	4.6	3.7	3.3	4.3	3.4	2.8	4.1	2.7	3.0	3.0	3.2	5.7	7.3	4.4
Spouse Completed Univeristy	%	2.0	1.7	1.8	1.5	1.2	1.3	1.3	1.3	1.0	1.6	1.5	1.4	1.9	1.1	1.2	1.7	0.9	1.2	1.2	1.2	2.8	4.5	2.0
Family Household (categorical variable)																								
Omotted Category: Not a family household	%	14.2	12.5	12.7	15.7	15.1	15.0	14.8	14.5	14.2	11.8	14.5	13.6	13.4	13.6	13.1	13.4	12.2	13.8	13.9	13.1	14.9	15.1	15.4
Family Household	%	85.8	87.5	87.3	84.3	84.9	85.0	85.2	85.5	85.8	88.2	85.5	86.4	86.6	86.4	86.9	86.6	87.8	86.2	86.1	86.9	85.1	84.9	84.6
Children Alive (categorical variable)																								
No children alive at time of census	%	65.5	60.0	63.9	65.1	66.1	69.7	63.1	70.2	67.1	59.7	64.3	67.2	66.3	66.6	60.9	60.9	64.3	65.5	66.9	68.4	67.8	66.7	64.3
At Least One Child Alive	%	34.5	40.0	36.1	34.9	33.9	30.3	36.9	29.8	32.9	40.3	35.7	32.8	33.7	33.4	39.1	39.1	35.7	34.5	33.1	31.6	32.2	33.3	35.7
Year of Birth (continuous variable)																								
Year of Birth	Mean	1914.8	1914.7	1914.5	1914.0	1915.6	1913.8	1915.1	1914.3	1914.3	1912.8	1914.9	1915.2	1914.6	1913.2	1915.1	1914.3	1914.5	1915.1	1914.5	1914.1	1914.9	1915.3	1915.4
	SD	13.4	13.6	13.3	13.4	13.0	13.4	13.0	13.4	13.5	14.1	13.4	13.3	13.2	13.1	13.3	13.3	13.3	13.2	13.6	13.3	13.6	13.6	13.5

Table 5.2: The Effect of Social Security Tax Rate, Replacement Rate and Delay Incentive on Male Labor Force Participation in France. By Region.

	France	Region d'Nle de France	Champagn e-Ardenne	Picardie	Haute-Normandie	Centre	Basse-Normandie	Bourgogne	Nord-Pas-de-Calais	Lorraine	Alsace	Franche-Comti	Pays de la Loire	Bretagne	Poitou-Charentes	Aquitaine	Midi-Pyrinies	Limousin	Rhtne-Alpes	Auvergne	Lanquedoc-Roussillon	Provence-Cte d'Azur	Corse
Social Security Variables (continuous variables)																							
Social Security Tax Rate	0.422***	0.307***	0.351***	0.304***	0.145*	0.392***	0.0810	0.267***	0.429***	0.275***	1.007***	0.140	0.394***	0.205***	0.560***	0.576***	0.527***	0.701***	0.515***	0.525***	0.563***	0.405***	0.513***
	(0.0134)	(0.0327)	(0.0865)	(0.0772)	(0.0842)	(0.0663)	(0.0906)	(0.0709)	(0.0459)	(0.0638)	(0.0809)	(0.0998)	(0.0644)	(0.0593)	(0.0753)	(0.0570)	(0.0582)	(0.0961)	(0.0472)	(0.0767)	(0.0626)	(0.0478)	(0.147)
Replacement Rate as a Fraction of Wage	-0.155***	-0.151***	-0.155***	-0.151***	-0.170***	-0.173***	-0.161***	-0.141***	-0.124***	-0.121***	-0.170***	-0.171***	-0.170***	-0.144***	-0.156***	-0.163***	-0.156***	-0.184***	-0.166***	-0.162***	-0.142***	-0.141***	-0.122***
	(0.00110)	(0.00258)	(0.00724)	(0.00651)	(0.00683)	(0.00533)	(0.00702)	(0.00607)	(0.00424)	(0.00569)	(0.00680)	(0.00831)	(0.00518)	(0.00493)	(0.00616)	(0.00454)	(0.00474)	(0.00822)	(0.00366)	(0.00639)	(0.00506)	(0.00400)	(0.0154)
Delay Incentive as a Fraction of Wage	0.0161***	0.0176***	0.0177***	0.0178***	0.0198***	0.0179***	0.0144***	0.0136***	0.0165***	0.0117***	0.0139***	0.0178***	0.0166***	0.0132***	0.0157***	0.0146***	0.0128***	0.0148***	0.0175***	0.0145***	0.0162***	0.0149***	0.0147***
	(0.000150)	(0.000366)	(0.000974)	(0.000875)	(0.000924)	(0.000715)	(0.000970)	(0.000814)	(0.000555)	(0.000734)	(0.000924)	(0.00110)	(0.000675)	(0.000654)	(0.000805)	(0.000624)	(0.000648)	(0.00111)	(0.000508)	(0.000876)	(0.000682)	(0.000523)	(0.00194)
Marital Status																							
Omitted Category: Single																							
Married or in Union	0.0978***	0.271***	0.128***	0.185***	0.206***	0.144***	0.00589	-0.0624*	0.0446*	0.0442	0.278***	-0.0598	0.127***	-0.0183	0.155***	0.113***	0.0719**	-0.0650	0.100***	0.0582	0.155***	0.208***	0.0567
	(0.00649)	(0.0157)	(0.0438)	(0.0353)	(0.0385)	(0.0325)	(0.0425)	(0.0375)	(0.0233)	(0.0313)	(0.0347)	(0.0517)	(0.0321)	(0.0324)	(0.0372)	(0.0268)	(0.0280)	(0.0517)	(0.0227)	(0.0388)	(0.0280)	(0.0195)	(0.0650)
Separated or Divorced	0.0179***	0.0287***	-0.0423**	0.0163	0.0365**	0.0203	-0.00734	-0.0274*	0.0315***	0.00194	0.0245	-0.0268	0.0407***	-0.0230*	0.0176	0.00822	-0.0192	0.00479	0.0174*	-0.0285*	0.0375***	0.0255***	0.0129
	(0.00278)	(0.00612)	(0.0179)	(0.0163)	(0.0176)	(0.0138)	(0.0182)	(0.0148)	(0.0115)	(0.0150)	(0.0189)	(0.0212)	(0.0146)	(0.0138)	(0.0161)	(0.0115)	(0.0121)	(0.0238)	(0.00931)	(0.0165)	(0.0135)	(0.00904)	(0.0338)
Widowed	-0.103***	-0.0717***	-0.139***	-0.0691***	-0.0471***	-0.0478***	-0.0562***	-0.126***	-0.0980***	-0.151***	-0.117***	-0.136***	-0.0747***	-0.150***	-0.0931***	-0.0841***	-0.143***	-0.0555***	-0.104***	-0.129***	-0.0862***	-0.0778***	-0.114***
	(0.00245)	(0.00646)	(0.0157)	(0.0146)	(0.0168)	(0.0123)	(0.0164)	(0.0124)	(0.00876)	(0.0113)	(0.0151)	(0.0177)	(0.0120)	(0.00940)	(0.0135)	(0.0102)	(0.00980)	(0.0180)	(0.00845)	(0.0131)	(0.0112)	(0.00894)	(0.0251)
Labor Force Participation of Spouse																							
Omitted Category: No																							
Yes	0.259***	0.123***	0.250***	0.221***	0.217***	0.282***	0.338***	0.325***	0.284***	0.250***	0.203***	0.290***	0.329***	0.395***	0.301***	0.251***	0.257***	0.342***	0.212***	0.280***	0.199***	0.185***	0.233***
	(0.00134)	(0.00312)	(0.00887)	(0.00840)	(0.00825)	(0.00656)	(0.00742)	(0.00743)	(0.00572)	(0.00773)	(0.00939)	(0.00996)	(0.00590)	(0.00539)	(0.00784)	(0.00563)	(0.00606)	(0.00902)	(0.00451)	(0.00794)	(0.00796)	(0.00572)	(0.0296)
Age (continuous variable)																							
Age	-0.0481***	-0.0494***	-0.0493***	-0.0514***	-0.0518***	-0.0501***	-0.0470***	-0.0488***	-0.0453***	-0.0552***	-0.0455***	-0.0516***	-0.0530***	-0.0447***	-0.0507***	-0.0473***	-0.0445***	-0.0450***	-0.0489***	-0.0461***	-0.0447***	-0.0435***	-0.0252***
	(0.000177)	(0.000436)	(0.00120)	(0.00107)	(0.00115)	(0.000881)	(0.00114)	(0.000963)	(0.000675)	(0.000947)	(0.00110)	(0.00140)	(0.000897)	(0.000797)	(0.00102)	(0.000714)	(0.000723)	(0.00124)	(0.000598)	(0.000988)	(0.000787)	(0.000611)	(0.00197)
Age of Spouse (continuous variable)																							
Age of Spouse	-0.00361***	-0.00518***	-0.00484***	-0.00437***	-0.00447***	-0.00373***	-0.00215***	-0.00212***	-0.00247***	-0.00359***	-0.00672***	-0.00208**	-0.00415***	-0.00345***	-0.00397***	-0.00347***	-0.00350***	-0.00110	-0.00392***	-0.00356***	-0.00402***	-0.00457***	-0.00195*
	(0.000107)	(0.000246)	(0.000736)	(0.000628)	(0.000669)	(0.000559)	(0.000684)	(0.000594)	(0.000396)	(0.000525)	(0.000678)	(0.000828)	(0.000550)	(0.000523)	(0.000658)	(0.000442)	(0.000453)	(0.000830)	(0.000364)	(0.000628)	(0.000501)	(0.000356)	(0.00110)
Education Attainment																							
Omitted Category: Less than completed primary																							
Completed Primary	0.0546***	0.0635***	0.0515***	0.0517***	0.0529***	0.0324***	0.0538***	0.0396***	0.110***	0.0897***	0.0622***	0.0510***	0.0457***	0.0265***	0.0394***	0.0306***	0.0431***	0.0602***	0.0623***	0.0548***	0.0314***	0.0307***	-0.0322**
	(0.00123)	(0.00318)	(0.00764)	(0.00695)	(0.00749)	(0.00582)	(0.00779)	(0.00644)	(0.00428)	(0.00597)	(0.00789)	(0.00887)	(0.00563)	(0.00533)	(0.00661)	(0.00521)	(0.00534)	(0.00880)	(0.00417)	(0.00697)	(0.00578)	(0.00458)	(0.0159)
Completed Secondary	0.135***	0.148***	0.127***	0.138***	0.126***	0.107***	0.143***	0.106***	0.256***	0.196***	0.196***	0.103***	0.127***	0.163***	0.0812***	0.0575***	0.0903***	0.104***	0.120***	0.144***	0.0613***	0.0589***	0.0130
	(0.00244)	(0.00460)	(0.0189)	(0.0160)	(0.0160)	(0.0136)	(0.0177)	(0.0157)	(0.0100)	(0.0128)	(0.0118)	(0.0201)	(0.0132)	(0.0125)	(0.0169)	(0.0107)	(0.0114)	(0.0220)	(0.00781)	(0.0150)	(0.0118)	(0.00813)	(0.0318)
Completed Univeristy	0.270***	0.235***	0.293***	0.316***	0.288***	0.228***	0.246***	0.249***	0.421***	0.374***	0.322***	0.247***	0.273***	0.282***	0.256***	0.213***	0.195***	0.260***	0.248***	0.270***	0.192***	0.146***	0.173***
	(0.00230)	(0.00374)	(0.0190)	(0.0164)	(0.0154)	(0.0150)	(0.0179)	(0.0169)	(0.0102)	(0.0131)	(0.0133)	(0.0209)	(0.0134)	(0.0132)	(0.0177)	(0.0104)	(0.0118)	(0.0232)	(0.00755)	(0.0160)	(0.0128)	(0.00832)	(0.0396)
Education Attainment of Spouse																							
Omitted Category: Spouse less than completed primary																							
Spouse Completed Primary	0.00409***	-0.0109***	0.0167*	0.0157**	0.0218***	-0.0126*	0.0120	0.0116	0.0317***	0.0402***	-0.00876	0.00716	0.000208	-0.00717	-0.00421	-0.0169***	-0.0244***	-0.00308	0.00990**	-0.00183	-2.65e-05	-0.0179***	-0.0466**
	(0.00137)	(0.00356)	(0.00856)	(0.00776)	(0.00832)	(0.00646)	(0.00870)	(0.00721)	(0.00468)	(0.00654)	(0.00854)	(0.00986)	(0.00614)	(0.00598)	(0.00736)	(0.00584)	(0.00603)	(0.00992)	(0.00466)	(0.00792)	(0.00639)	(0.00504)	(0.0189)
Spouse Completed Secondary	-0.0256***	0.00774	-0.0718***	-0.0219	-0.0429**	-0.0652***	-0.0352	-0.0487**	0.0198	-0.0156	0.00399	-0.0384	-0.0908***	-0.101***	-0.0627***	-0.0622***	-0.0717***	-0.0628**	-0.0431***	-0.0251	-0.0480***	-0.0456***	-0.0446
	(0.00328)	(0.00662)	(0.0244)	(0.0223)	(0.0218)	(0.0171)	(0.0246)	(0.0194)	(0.0141)	(0.0185)	(0.0199)	(0.0252)	(0.0169)	(0.0158)	(0.0205)	(0.0137)	(0.0143)	(0.0269)	(0.0109)	(0.0198)	(0.0139)	(0.0101)	(0.0392)
Spouse Completed Univeristy	-0.00428	0.0212**	-0.0556	-0.0566*	0.00741	-0.0707***	-0.0649	0.0208	0.0453*	0.0420	-0.0258	0.0513	-0.0529*	-0.0135	-0.0949***	-0.0603***	-0.0523**	-0.0768	-0.0317**	-0.0344	0.000777	-0.0215	-0.0920
	(0.00484)	(0.00835)	(0.0418)	(0.0340)	(0.0354)	(0.0264)	(0.0396)	(0.0345)	(0.0257)	(0.0298)	(0.0311)	(0.0424)	(0.0288)	(0.0277)	(0.0306)	(0.0210)	(0.0230)	(0.0478)	(0.0159)	(0.0346)	(0.0220)	(0.0138)	(0.0567)
Family Household																							
Omotted Category: Not a family household																							
Family Household	0.0473***	0.0119**	0.0968***	0.0533***	0.0855***	0.0488***	0.0658***	0.0549***	0.0102	0.0313***	0.0593***	0.0882***	0.0708***	0.0979***	0.0420***	0.0505***	0.0695***	0.0964***	0.0646***	0.110***	0.0482***	0.0443***	-0.0236
	(0.00213)	(0.00534)	(0.0138)	(0.0124)	(0.0138)	(0.0104)	(0.0139)	(0.0112)	(0.00834)	(0.0112)	(0.0138)	(0.0156)	(0.0104)	(0.00872)	(0.0120)	(0.00869)	(0.00869)	(0.0148)	(0.00725)	(0.0112)	(0.00969)	(0.00732)	(0.0252)
Children Alive																							
Omitted Category: No children alive at time of census																							
At Least One Child Alive	0.107***	0.0629***	0.0951***	0.103***	0.0788***	0.116***	0.0998***	0.135***	0.0767***	0.0731***	0.103***	0.133***	0.106***	0.147***	0.117***	0.124***	0.134***	0.136***	0.124***	0.129***	0.113***	0.0903***	0.108***
	(0.00122)	(0.00303)	(0.00816)	(0.00717)	(0.00767)	(0.00627)	(0.00810)	(0.00694)	(0.00431)	(0.00586)	(0.00719)	(0.00898)	(0.00568)	(0.00534)	(0.00692)	(0.00498)	(0.00507)	(0.00885)	(0.00414)	(0.00704)	(0.00564)	(0.00444)	(0.0150)
Year of Birth (continuous variable)																							
Year of Birth	-0.0123***	-0.0106***	-0.0121***	-0.0128***	-0.0129***	-0.0121***	-0.0130***	-0.0129***	-0.0106***	-0.0160***	-0.0123***	-0.0133***	-0.0139***	-0.0117***	-0.0129***	-0.0133***	-0.0130***	-0.0151***	-0.0131***	-0.0139***	-0.0120***	-0.00896***	-0.00270***
	(5.92e-05)	(0.000143)	(0.000388)	(0.000345)	(0.000366)	(0.000296)	(0.000386)	(0.000326)	(0.000206)	(0.000289)	(0.000359)	(0.000446)	(0.000287)	(0.000265)	(0.000338)	(0.000254)	(0.000261)	(0.000456)	(0.000204)	(0.000349)	(0.000276)	(0.000204)	(0.000659)
Observations		248,928	36,529	45,646	41,606	67,823	36,420	50,570	100,767	60,424	40,557	28,911	76,694	78,277	50,314	85,502	78,005	28,157	132,591	44,313	63,682	108,323	6,674

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Marginal effects around the mean calculatec 1,510,713

Table 6.1: Regional Variation in Labor Force Participation and its Covariates. United States, by Division.

		United States	East North Central division	East South Central division	Middle Atlantic division	Mountain division	New England division	Pacific division	South Atlantic division	West North Central division	West South Central division
Sample Population		4,959,397	851,752	301,306	803,837	267,163	267,829	690,425	887,653	374,160	497,984
Fraction of Total Population		39.79	17.2	6.1	16.2	5.4	5.4	13.9	17.9	7.5	10.0
Labor Force Participation (categorical variable)											
Omitted Category: No	%	44.5	43.5	48.7	42.9	45.5	40.5	43.9	47.7	42.3	44.7
Yes	%	55.5	56.5	51.3	57.1	54.5	59.5	56.1	52.3	57.7	55.3
Marital Status (categorical variable)											
Single	%	5.6	5.5	4.5	7.3	4.4	7.1	5.9	4.9	5.8	4.1
Married or in Union	%	78.9	79.8	79.7	77.7	79.3	78.0	77.1	78.7	81.3	80.1
Separated or Divorced	%	9.7	8.9	9.8	8.4	11.4	8.9	11.9	10.5	7.7	10.1
Widowed	%	5.8	5.8	6.0	6.5	4.9	6.1	5.1	5.9	5.2	5.7
Labor Force Participation of Spouse (categorical variable)											
Omitted Category: No	%	58.3	58.2	61.1	57.6	59.0	52.5	58.1	59.3	55.7	60.5
Yes	%	41.7	41.8	38.9	42.4	41.0	47.5	41.9	40.7	44.3	39.5
Age (continuous variable)											
Age	Mean	62.0	61.9	62.0	62.0	62.0	62.0	61.8	62.3	62.5	61.9
	SD	8.4	8.3	8.3	8.3	8.4	8.4	8.4	8.4	8.5	8.3
Age of Spouse (continuous variable)											
Age of Spouse	Mean	58.2	58.3	57.9	58.2	58.3	58.4	57.9	58.5	58.8	57.9
	SD	9.6	9.4	9.6	9.4	9.8	9.5	9.9	9.8	9.5	9.7
Education Attainment (categorical variable)											
Less than completed primary	%	4.6	2.8	9.0	3.3	3.0	2.9	4.4	5.9	2.1	8.4
Completed Primary	%	31.6	34.0	38.5	34.1	23.2	30.3	23.4	31.9	34.5	32.0
Completed Secondary	%	26.8	31.2	24.0	29.1	26.4	27.7	23.5	23.7	32.3	23.3
Completed Univeristy	%	37.0	32.1	28.5	33.5	47.4	39.1	48.8	38.5	31.0	36.3
Education Attainment of Spouse (categorical variable)											
Spouse less than completed primary	%	2.5	1.3	3.3	2.2	1.9	2.0	3.6	2.4	0.8	4.8
Spouse Completed Primary	%	27.4	27.9	36.5	28.4	20.0	24.3	21.3	29.2	25.5	30.2
Spouse Completed Secondary	%	36.4	41.5	33.2	40.3	35.2	37.6	31.4	33.5	41.3	32.2
Spouse Completed Univeristy	%	33.8	29.4	27.0	29.1	42.9	36.1	43.7	35.0	32.5	32.9
Family Household (categorical variable)											
Omotted Category: Not a family household	%	13.7	13.4	12.8	13.8	14.4	14.0	15.2	13.6	13.2	13.0
Family Household	%	86.3	86.6	87.2	86.2	85.6	86.0	84.8	86.4	86.8	87.0
Children Alive (categorical variable)											
No children alive at time of census	%	71.3	71.5	72.5	66.3	74.9	67.6	69.8	73.7	76.4	72.8
At Least One Child Alive	%	28.7	28.5	27.5	33.7	25.1	32.4	30.2	26.3	23.6	27.2
Year of Birth (continuous variable)											
Year of Birth	Mean	1928.0	1927.5	1928.3	1926.8	1930.2	1927.4	1928.9	1928.8	1927.1	1928.7
	SD	13.9	14.0	13.9	14.1	13.3	14.1	13.7	13.5	14.3	13.8

Table 6: The Effect of Social Security Tax Rate, Replacement Rate and Delay Incentive on Male Labor Force Participation in the USA. By Division.

		Divisions								
	US Pooled	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
Social Security Variables (continuous variables)										
Social Security Tax Rate	-2.521***	-1.460***	-1.916***	-3.496***	-2.688***	-1.649***	-1.759***	-3.104***	-3.843***	-1.957***
	(0.0497)	(0.211)	(0.123)	(0.121)	(0.178)	(0.119)	(0.204)	(0.155)	(0.220)	(0.135)
Replacement Rate as a Fraction of Wage	-0.116***	-0.132***	-0.139***	-0.126***	-0.114***	-0.0980***	-0.107***	-0.0960***	-0.0934***	-0.116***
	(0.000737)	(0.00310)	(0.00180)	(0.00178)	(0.00263)	(0.00177)	(0.00302)	(0.00232)	(0.00325)	(0.00200)
Delay Incentive as a Fraction of Wage	0.000149***	0.000735***	0.000514***	8.47e-05	0.000178**	-0.000330***	-0.000161	-0.000147*	-0.000314***	0.000293***
	(2.50e-05)	(0.000104)	(6.09e-05)	(5.95e-05)	(8.89e-05)	(6.02e-05)	(0.000103)	(7.95e-05)	(0.000110)	(6.80e-05)
Marital Status										
Omitted Category: Single										
Married or in Union	0.237***	0.248***	0.324***	0.241***	0.145***	0.246***	0.189***	0.297***	0.175***	0.218***
	(0.00359)	(0.0169)	(0.00901)	(0.0100)	(0.0175)	(0.00807)	(0.0135)	(0.00978)	(0.0163)	(0.00904)
Separated or Divorced	0.0666***	0.0756***	0.0907***	0.0624***	0.0223***	0.0775***	0.0854***	0.0747***	0.0701***	0.0630***
	(0.00127)	(0.00490)	(0.00291)	(0.00318)	(0.00487)	(0.00314)	(0.00581)	(0.00437)	(0.00581)	(0.00323)
Widowed	0.0238***	0.0390***	0.0359***	0.0393***	0.00812	0.0251***	0.0774***	0.0438***	0.00212	-0.0121***
	(0.00157)	(0.00596)	(0.00351)	(0.00380)	(0.00572)	(0.00385)	(0.00688)	(0.00526)	(0.00752)	(0.00435)
Labor Force Participation of Spouse										
Omitted Category: No										
Yes	0.163***	0.149***	0.133***	0.152***	0.171***	0.184***	0.136***	0.141***	0.205***	0.174***
	(0.000621)	(0.00265)	(0.00157)	(0.00152)	(0.00219)	(0.00148)	(0.00256)	(0.00194)	(0.00263)	(0.00166)
Age (continuous variable)										
Age	-0.0258***	-0.0261***	-0.0261***	-0.0268***	-0.0246***	-0.0252***	-0.0267***	-0.0247***	-0.0244***	-0.0260***
	(9.15e-05)	(0.000386)	(0.000229)	(0.000227)	(0.000325)	(0.000215)	(0.000378)	(0.000283)	(0.000391)	(0.000243)
Age of Spouse (continuous variable)										
Age of Spouse	-0.00251***	-0.00270***	-0.00372***	-0.00237***	-0.00181***	-0.00254***	-0.00137***	-0.00247***	-0.00237***	-0.00310***
	(4.86e-05)	(0.000212)	(0.000126)	(0.000124)	(0.000185)	(0.000112)	(0.000194)	(0.000147)	(0.000204)	(0.000124)
Education Attainment										
Omitted Category: Less than completed primary										
Completed Primary	0.0902***	0.0991***	0.0862***	0.109***	0.152***	0.0776***	0.110***	0.0729***	0.0730***	0.0372***
	(0.00137)	(0.00715)	(0.00387)	(0.00409)	(0.00670)	(0.00292)	(0.00418)	(0.00331)	(0.00735)	(0.00391)
Completed Secondary	0.166***	0.169***	0.166***	0.198***	0.225***	0.135***	0.206***	0.144***	0.137***	0.107***
	(0.00136)	(0.00688)	(0.00379)	(0.00396)	(0.00644)	(0.00303)	(0.00436)	(0.00344)	(0.00726)	(0.00388)
Completed Univeristy	0.256***	0.266***	0.274***	0.291***	0.281***	0.226***	0.303***	0.238***	0.205***	0.206***
	(0.00134)	(0.00685)	(0.00360)	(0.00374)	(0.00614)	(0.00297)	(0.00423)	(0.00337)	(0.00732)	(0.00387)
Education Attainment of Spouse										
Omitted Category: Spouse less than completed primary										
Spouse Completed Primary	0.000183	-0.0116	0.00697	-0.00115	0.0144	-0.00403	0.0489***	-0.0176***	0.0129	0.0144***
	(0.00204)	(0.00971)	(0.00534)	(0.00653)	(0.0122)	(0.00490)	(0.00712)	(0.00466)	(0.0102)	(0.00487)
Spouse Completed Secondary	0.0146***	-0.000413	0.0215***	0.0243***	0.0452***	-0.0156***	0.0788***	-0.00371	0.0249**	0.0204***
	(0.00206)	(0.00969)	(0.00536)	(0.00654)	(0.0122)	(0.00499)	(0.00733)	(0.00483)	(0.0102)	(0.00491)
Spouse Completed Univeristy	0.0310***	0.0187*	0.0399***	0.0375***	0.0709***	0.00868*	0.1000***	0.0177***	0.0371***	0.0388***
	(0.00209)	(0.00978)	(0.00545)	(0.00659)	(0.0121)	(0.00506)	(0.00751)	(0.00495)	(0.0102)	(0.00493)
Family Household										
Omotted Category: Not a family household										
Family Household	-0.00607***	0.0377***	0.00703**	-0.00884***	0.00165	-0.0242***	-0.0206***	-0.0174***	-0.0123**	0.00625**
	(0.00117)	(0.00484)	(0.00279)	(0.00292)	(0.00466)	(0.00273)	(0.00491)	(0.00379)	(0.00525)	(0.00305)
Children Alive										
Omitted Category: No children alive at time of census										
At Least One Child Alive	0.0537***	0.0478***	0.0420***	0.0527***	0.0515***	0.0661***	0.0395***	0.0443***	0.0636***	0.0502***
	(0.000639)	(0.00263)	(0.00154)	(0.00156)	(0.00249)	(0.00154)	(0.00259)	(0.00204)	(0.00289)	(0.00171)
Year of Birth (continuous variable)										
Year of Birth	-0.00330***	-0.00437***	-0.00517***	-0.00343***	-0.00269***	-0.00230***	-0.00465***	-0.00223***	-0.000637**	-0.00328***
	(6.42e-05)	(0.000276)	(0.000163)	(0.000158)	(0.000233)	(0.000151)	(0.000261)	(0.000197)	(0.000272)	(0.000171)
Observations	4,959,397	267,829	803,837	851,752	374,160	887,653	301,306	497,984	267,163	690,425

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Marginal effects around the mean calculated from a probit estimation. dy/dx is for discrete change of dummy variable from 0 to 1

Table 7: The Effect of Social Security Tax Rate, Replacement Rate and Delay Incentive on Male Labor Force Participation Stratified by Education Attainment -- No Education or Incomplete Primary

	Pooled	Argentina	Brazil	Chile	France	Greece	Malaysia	Mexico	Panama	Portugal	South Africa	Spain	United States
Social Security Variables (continuous variables)													
Social Security Tax Rate	0.305***	0.320***	0.774***	-0.197***	0.428***	0.544***		2.441***	-1.316***	0.0469		-0.320***	-1.769***
	(0.00635)	(0.0357)	(0.0137)	(0.0213)	(0.0173)	(0.112)		(0.103)	(0.126)	(0.0490)		(0.0765)	(0.209)
Replacement Rate as a Fraction of Wage	-0.0942***	-0.0581***	0.0136***	-0.0939***	-0.142***	-0.0590***	-0.0573***	-0.0108***	-0.0180*	-0.138***	-0.0927***	-0.223***	-0.112***
	(0.000596)	(0.00210)	(0.00205)	(0.00422)	(0.00166)	(0.00415)	(0.00494)	(0.00165)	(0.00946)	(0.00560)	(0.00819)	(0.00371)	(0.00292)
Delay Incentive as a Fraction of Wage	0.000831***	0.00131***	0.000199***	0.00212***	0.0156***	0.000248***	-0.000961	-4.10e-05	-0.000416**	0.00231***	0.00837***	0.00111***	0.00163***
	(1.42e-05)	(0.000130)	(2.73e-05)	(0.000109)	(0.000218)	(6.36e-05)	(0.0119)	(3.25e-05)	(0.000198)	(7.05e-05)	(0.000634)	(2.51e-05)	(0.000102)
Marital Status													
Omitted Category: Single													
Married or in Union	0.295***	0.288***	0.386***	0.222***	0.133***	0.249***	0.455***	0.330***	0.309***	0.285***	0.229***	0.233***	0.286***
	(0.00241)	(0.00826)	(0.00349)	(0.0124)	(0.00833)	(0.0171)	(0.0241)	(0.00621)	(0.0241)	(0.0122)	(0.0162)	(0.00628)	(0.00885)
Separated or Divorced	0.0429***	0.0299***	0.0644***	0.0467***	0.0180***	0.0457**	0.0553***	0.0316***	0.0606***	0.0918***	0.00379	0.0139	0.131***
	(0.00153)	(0.00448)	(0.00218)	(0.00744)	(0.00423)	(0.0193)	(0.0207)	(0.00394)	(0.00906)	(0.0136)	(0.0125)	(0.00999)	(0.00522)
Widowed	-0.0348***	-0.0592***	-0.00133	-0.0160***	-0.0779***	0.0365***	-0.0162	0.000106	0.0482***	0.0192**	-0.0839***	-0.0272***	0.103***
	(0.00133)	(0.00369)	(0.00216)	(0.00608)	(0.00314)	(0.0115)	(0.0165)	(0.00330)	(0.0104)	(0.00962)	(0.00928)	(0.00579)	(0.00559)
Labor Force Participation of Spouse													
Omitted Category: No													
Yes	0.162***	0.138***	0.0933***	0.0891***	0.277***	0.286***	0.189***	0.0850***	0.0308***	0.163***	0.305***	0.0680***	0.142***
	(0.000759)	(0.00274)	(0.00110)	(0.00637)	(0.00199)	(0.00485)	(0.00546)	(0.00200)	(0.0114)	(0.00413)	(0.00549)	(0.00406)	(0.00330)
Age (continuous variable)													
Age	-0.0300***	-0.0271***	-0.0294***	-0.0354***	-0.0462***	-0.0466***	-0.0208***	-0.0193***	-0.0217***	-0.0379***	-0.0266***	-0.0164***	-0.0213***
	(6.52e-05)	(0.000235)	(0.000112)	(0.000474)	(0.000236)	(0.000573)	(0.000534)	(0.000198)	(0.000800)	(0.000606)	(0.000810)	(0.000536)	(0.000356)
Age of Spouse (continuous variable)													
Age of Spouse	-0.00393***	-0.00461***	-0.00392***	-0.00293***	-0.00379***	-0.00150***	-0.00542***	-0.00352***	-0.00279***	-0.00415***	-0.00498***	-0.00585***	-0.00218***
	(3.95e-05)	(0.000138)	(5.17e-05)	(0.000196)	(0.000143)	(0.000309)	(0.000374)	(8.43e-05)	(0.000352)	(0.000282)	(0.000310)	(0.000272)	(0.000175)
Education Attainment of Spouse													
Omitted Category: Spouse less than completed primary													
Spouse Completed Primary	-0.0235***	-0.0239***	-0.0719***	-0.0285***	0.0332***	-0.0296***	-0.0477***	-0.0383***	-0.140***	0.0568***	-0.00628	0.0135***	-0.0222***
	(0.000974)	(0.00255)	(0.00241)	(0.00435)	(0.00209)	(0.00455)	(0.0118)	(0.00221)	(0.0101)	(0.0105)	(0.00631)	(0.00460)	(0.00279)
Spouse Completed Secondary	-0.0394***	-0.0323***	-0.0748***	-0.0137	0.0461***	-0.0833***	-0.187*	-0.0662***	-0.226***	0.0895***	0.134***	-0.00269	-0.00856*
	(0.00259)	(0.0110)	(0.00346)	(0.0128)	(0.0109)	(0.0200)	(0.113)	(0.0106)	(0.0309)	(0.0188)	(0.0200)	(0.0160)	(0.00472)
Spouse Completed Univeristy	-0.0134***	-0.135***	-0.0930***	-0.0614	0.0649***	-0.142***	-0.0296	-0.0578***	-0.146	0.127***	0.119***	0.00564	0.0110
	(0.00512)	(0.0486)	(0.00838)	(0.0677)	(0.0174)	(0.0483)	(0.0709)	(0.0198)	(0.0917)	(0.0336)	(0.0338)	(0.0352)	(0.00683)
Family Household													
Omotted Category: Not a family household													
Family Household	-0.0377***	-0.0916***	-0.0757***	-0.0462***	0.0816***	-0.0721***	-0.0832***	-0.0755***	-0.0655***	-0.0144*	-0.184***	-0.00436	0.00737*
	(0.00115)	(0.00316)	(0.00172)	(0.00559)	(0.00271)	(0.0104)	(0.0123)	(0.00271)	(0.00836)	(0.00870)	(0.00938)	(0.00553)	(0.00401)
Children Alive													
Omitted Category: No children alive at time of census													
At Least One Child Alive	0.0491***	0.0345***	0.0485***	0.0163***	0.0949***	0.0261***	-0.0260***	0.0118***	0.00577	0.0396***	0.0258***	0.0350***	0.0318***
	(0.000639)	(0.00207)	(0.000989)	(0.00355)	(0.00172)	(0.00363)	(0.00622)	(0.00154)	(0.00675)	(0.00329)	(0.00534)	(0.00260)	(0.00258)
Year of Birth (continuous variable)													
Year of Birth	-0.00807***	-0.000755***	-0.00847***	-0.00797***	-0.0126***	-0.0163***	-0.00222***	-0.00707***	-0.00462***	-0.00947***		-0.00311***	-0.00322***
	(2.91e-05)	(0.000115)	(6.28e-05)	(0.000156)	(8.34e-05)	(0.000394)	(0.000237)	(0.000193)	(0.000268)	(0.000301)		(0.000233)	(0.000288)
Country Fixed Effects	YES												
Observations	4,350,394	387,033	1,646,238	148,600	732,254	124,039	41,858	614,362	29,620	154,784	65,132	180,240	226,234

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Marginal effects around the mean calculated from a probit estimation. dy/dx is for discrete change of dummy variable from 0 to 1

Table 8: The Effect of Social Security Tax Rate, Replacement Rate and Delay Incentive on Male Labor Force Participation Stratified by Education Attainment -- Completed Primary

	Pooled	Argentina	Austria	Brazil	Chile	France	Greece	Malaysia	Mexico	Panama	Portugal	South Africa	Spain	United States
Social Security Variables (continuous variables)														
Social Security Tax Rate	-0.107***	0.231***	-0.989***	0.0452	0.245***	0.338***	-0.373***		2.008***	-0.666***	-0.231		-0.532***	-1.874***
	(0.0115)	(0.0340)	(0.0912)	(0.0593)	(0.0287)	(0.0235)	(0.0792)		(0.199)	(0.212)	(0.172)		(0.124)	(0.0887)
Replacement Rate as a Fraction of Wage	-0.137***	-0.0657***	-0.0918***	-0.00481	-0.0684***	-0.166***	-0.0792***	-0.139***	-0.0187***	-0.101***	-0.104***	-0.105***	-0.301***	-0.145***
	(0.000652)	(0.00212)	(0.00246)	(0.00548)	(0.00482)	(0.00172)	(0.00268)	(0.00670)	(0.00281)	(0.0160)	(0.0175)	(0.0103)	(0.00401)	(0.00124)
Delay Incentive as a Fraction of Wage	0.000886***	0.00108***	-0.00212***	-0.000441***	0.00120***	0.0167***	0.000421***	-0.0473	-0.000429***	-0.000189	0.00107***	0.00729***	0.00163***	0.000860***
	(1.64e-05)	(0.000145)	(0.000191)	(0.000103)	(0.000126)	(0.000233)	(4.55e-05)	(0.0371)	(5.34e-05)	(0.000305)	(0.000203)	(0.000741)	(3.18e-05)	(4.19e-05)
Marital Status														
Omitted Category: Single														
Married or in Union	0.202***	0.255***		0.319***	0.256***	-0.00621	0.173***	0.478***	0.383***	0.307***	0.264***	0.305***	0.304***	0.220***
	(0.00326)	(0.00928)		(0.0126)	(0.0141)	(0.0114)	(0.0141)	(0.0445)	(0.0107)	(0.0358)	(0.0496)	(0.0230)	(0.0123)	(0.00542)
Separated or Divorced	0.0150***	0.0304***	0.0998***	0.0251***	0.0200**	-0.00212	-0.00249	-0.122**	0.0245***	0.0241	0.0260	-0.0205	-0.00129	0.0631***
	(0.00159)	(0.00426)	(0.00696)	(0.00861)	(0.00822)	(0.00445)	(0.0116)	(0.0595)	(0.00608)	(0.0164)	(0.0310)	(0.0140)	(0.00878)	(0.00241)
Widowed	-0.0319***	-0.0511***	-0.0247***	-0.0605***	-0.0498***	-0.122***	-0.0292***	-0.103***	-0.0186***	-0.000165	-0.0537*	-0.124***	-0.0641***	0.0443***
	(0.00167)	(0.00430)	(0.00677)	(0.0102)	(0.00813)	(0.00430)	(0.00868)	(0.0356)	(0.00602)	(0.0216)	(0.0324)	(0.0127)	(0.00772)	(0.00269)
Labor Force Participation of Spouse														
Omitted Category: No														
Yes	0.165***	0.116***	0.189***	0.121***	0.117***	0.247***	0.253***	0.130***	0.0774***	0.0666***	0.132***	0.244***	0.0946***	0.134***
	(0.000783)	(0.00213)	(0.00446)	(0.00349)	(0.00499)	(0.00205)	(0.00290)	(0.00895)	(0.00279)	(0.0118)	(0.0103)	(0.00594)	(0.00380)	(0.00120)
Age (continuous variable)														
Age	-0.0313***	-0.0247***	-0.0396***	-0.0263***	-0.0275***	-0.0514***	-0.0440***	-0.0179***	-0.0191***	-0.0218***	-0.0373***		-0.0326***	-0.0249***
	(9.02e-05)	(0.000239)	(0.000406)	(0.000488)	(0.000552)	(0.000306)	(0.000412)	(0.00104)	(0.000401)	(0.00148)	(0.00190)		(0.000644)	(0.000156)
Age of Spouse (continuous variable)														
Age of Spouse	-0.00334***	-0.00450***	-0.00281***	-0.00531***	-0.00447***	-0.00272***	-0.00187***	-0.00792***	-0.00482***	-0.00419***	-0.00487***	-0.00687***	-0.00712***	-0.00257***
	(5.38e-05)	(0.000141)	(0.000264)	(0.000195)	(0.000223)	(0.000182)	(0.000218)	(0.000640)	(0.000145)	(0.000540)	(0.000788)	(0.000425)	(0.000324)	(8.30e-05)
Education Attainment of Spouse														
Omitted Category: Spouse less than completed primary														
Spouse Completed Primary	0.00480***	0.0174***	0.141***	0.0150***	-0.0395***	0.0219***	-0.0495***	-0.0511***	-0.0211***	-0.0588***	0.0123	-0.0149*	0.0276***	0.0394***
	(0.000962)	(0.00226)	(0.0135)	(0.00351)	(0.00399)	(0.00209)	(0.00294)	(0.00843)	(0.00228)	(0.0111)	(0.0102)	(0.00762)	(0.00464)	(0.00318)
Spouse Completed Secondary	0.0332***	0.0143***	0.191***	-0.000350	-0.0279***	0.00937*	-0.0903***	-0.0983*	-0.0319***	-0.108***	0.0183	0.0124	0.0294***	0.0685***
	(0.00132)	(0.00402)	(0.0212)	(0.00480)	(0.00655)	(0.00567)	(0.00623)	(0.0593)	(0.00524)	(0.0173)	(0.0170)	(0.0136)	(0.00907)	(0.00329)
Spouse Completed Univeristy	0.0422***	0.00129	0.324***	0.00947	-0.0696***	0.0124	-0.175***	-0.152**	-0.0470***	-0.0855**	-0.0315	0.0315	0.0534***	0.0762***
	(0.00191)	(0.0117)	(0.0518)	(0.00865)	(0.0236)	(0.0109)	(0.0159)	(0.0650)	(0.0116)	(0.0336)	(0.0273)	(0.0237)	(0.0196)	(0.00356)
Family Household														
Omotted Category: Not a family household														
Family Household	0.0138***	-0.0381***	-0.00930*	-0.0537***	-0.0106	0.0273***	-0.0275***	-0.108***	-0.0543***	-0.0763***	-0.0282	-0.0946***	0.0157**	0.0151***
	(0.00135)	(0.00358)	(0.00536)	(0.00727)	(0.00716)	(0.00369)	(0.00785)	(0.0232)	(0.00490)	(0.0145)	(0.0258)	(0.0116)	(0.00663)	(0.00200)
Children Alive														
Omitted Category: No children alive at time of census														
At Least One Child Alive	0.0509***	0.0243***	0.0750***	0.0392***	0.00517	0.109***	0.0442***	0.00241	0.0238***	0.00313	0.0517***	0.0591***	0.0687***	0.0413***
	(0.000706)	(0.00187)	(0.00297)	(0.00354)	(0.00372)	(0.00195)	(0.00253)	(0.0108)	(0.00265)	(0.00991)	(0.00971)	(0.00598)	(0.00305)	(0.00112)
Year of Birth (continuous variable)														
Year of Birth	-0.00752***	0.00185***	-0.00616***	-0.00323***	-0.00154***	-0.0129***	-0.00949***	-0.00286***	-0.00373***	-0.00132***	-0.00916***	0.0274***	-0.00714***	-0.00508***
	(3.26e-05)	(0.000109)	(0.000214)	(0.000296)	(0.000179)	(9.66e-05)	(0.000269)	(0.000438)	(0.000392)	(0.000470)	(0.000888)	(0.00107)	(0.000256)	(0.000123)
Country Fixed Effects	YES													
Observations	3,864,534	440,034	153,601	129,668	121,212	610,959	262,331	15,890	225,308	17,044	17,997	48,327	252,279	1,566,118

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Marginal effects around the mean calculated from a probit estimation. dy/dx is for discrete change of dummy variable from 0 to 1

Table 9: The Effect of Social Security Tax Rate, Replacement Rate and Delay Incentive on Male Labor Force Participation Stratified by Education Attainment -- Completed Secondary

	Pooled	Argentina	Austria	Brazil	Chile	France	Greece	Malaysia	Mexico	Panama	Portugal	South Africa	Spain	United States
Social Security Variables (continuous variables)														
Social Security Tax Rate	-0.210***	-0.0575	-2.163***	-0.136*	0.241***	0.205***	-2.170***		-0.475	-0.268	-0.175		-0.481**	-2.177***
	(0.0221)	(0.0901)	(0.108)	(0.0758)	(0.0424)	(0.0689)	(0.161)		(0.522)	(0.455)	(0.246)		(0.231)	(0.0977)
Replacement Rate as a Fraction of Wage	-0.129***	-0.0608***	-0.122***	-0.0210***	-0.0510***	-0.148***	-0.0549***	-0.177***	-0.0229***	-0.170***	-0.0437*	-0.0626***	-0.260***	-0.117***
	(0.000967)	(0.00526)	(0.00264)	(0.00619)	(0.00659)	(0.00410)	(0.00518)	(0.0401)	(0.00666)	(0.0317)	(0.0237)	(0.0158)	(0.00837)	(0.00142)
Delay Incentive as a Fraction of Wage	0.000309***	0.000191	-0.00228***	-0.000829***	0.000301	0.0115***	0.000383***		-0.000553***	0.000719	-6.98e-05	0.000362	0.00128***	-0.000328***
	(2.61e-05)	(0.000503)	(0.000177)	(0.000124)	(0.000196)	(0.000612)	(9.21e-05)		(0.000123)	(0.000578)	(0.000278)	(0.00118)	(6.98e-05)	(4.78e-05)
Marital Status														
Omitted Category: Single														
Married or in Union	0.179***	0.176***		0.213***	0.283***	0.103***	0.237***	0.361	0.288***	0.245***	0.218***	0.248***	0.213***	0.186***
	(0.00531)	(0.0250)		(0.0163)	(0.0240)	(0.0291)	(0.0243)	(0.287)	(0.0273)	(0.0732)	(0.0697)	(0.0514)	(0.0379)	(0.00964)
Separated or Divorced	0.0283***	0.0677***	0.0315***	0.0391***	0.0265**	-0.130***	0.0335**		0.00309	-0.0296	0.0956**	-0.000955	-0.0117	0.0591***
	(0.00212)	(0.00773)	(0.00812)	(0.00999)	(0.0109)	(0.0109)	(0.0165)		(0.0138)	(0.0357)	(0.0391)	(0.0248)	(0.0151)	(0.00253)
Widowed	-0.0237***	-0.0262***	-0.0833***	-0.0419***	-0.0689***	-0.253***	-0.0875***	-0.0364	-0.0653***	-0.0612	0.0443	-0.156***	-0.158***	0.0269***
	(0.00261)	(0.0101)	(0.00896)	(0.0128)	(0.0132)	(0.0110)	(0.0166)	(0.241)	(0.0160)	(0.0504)	(0.0415)	(0.0272)	(0.0187)	(0.00313)
Labor Force Participation of Spouse														
Omitted Category: No														
Yes	0.160***	0.123***	0.127***	0.135***	0.118***	0.191***	0.166***	0.0377	0.0673***	0.0862***	0.192***	0.259***	0.127***	0.160***
	(0.000964)	(0.00426)	(0.00393)	(0.00398)	(0.00549)	(0.00534)	(0.00616)	(0.0563)	(0.00578)	(0.0193)	(0.0137)	(0.00897)	(0.00679)	(0.00116)
Age (continuous variable)														
Age	-0.0299***	-0.0250***	-0.0601***	-0.0301***	-0.0180***	-0.0449***	-0.0396***	-0.0245***	-0.0157***	-0.0192***	-0.0466***	-0.0276***	-0.0411***	-0.0256***
	(0.000128)	(0.000566)	(0.000538)	(0.000636)	(0.000754)	(0.000737)	(0.000866)	(0.00823)	(0.00104)	(0.00297)	(0.00266)	(0.00167)	(0.00132)	(0.000179)
Age of Spouse (continuous variable)														
Age of Spouse	-0.00285***	-0.00346***	-0.00362***	-0.00385***	-0.00421***	-0.00523***	-0.00451***	-0.00127	-0.00429***	-0.00500***	-0.00319***	-0.00517***	-0.00555***	-0.00249***
	(7.55e-05)	(0.000330)	(0.000314)	(0.000237)	(0.000320)	(0.000440)	(0.000431)	(0.00413)	(0.000329)	(0.00102)	(0.00107)	(0.000759)	(0.000635)	(9.60e-05)
Education Attainment of Spouse														
Omitted Category: Spouse less than completed primary														
Spouse Completed Primary	0.00154	0.0401***	0.113***	0.0182***	-0.0413***	-0.0294***	-0.0617***	0.0232	0.00859	0.0323	-0.0482***	-0.107***	0.0293**	0.0402***
	(0.00254)	(0.00980)	(0.0197)	(0.00479)	(0.00910)	(0.00716)	(0.0120)	(0.0587)	(0.00828)	(0.0342)	(0.0169)	(0.0249)	(0.0116)	(0.00740)
Spouse Completed Secondary	0.0298***	0.0405***	0.183***	0.0385***	-0.0322***	-0.0766***	-0.0633***	-0.0715	0.0148*	0.0115	-0.0342**	-0.0580**	0.0211*	0.0627***
	(0.00253)	(0.00992)	(0.0199)	(0.00446)	(0.00908)	(0.00839)	(0.0121)	(0.0822)	(0.00871)	(0.0348)	(0.0155)	(0.0244)	(0.0123)	(0.00743)
Spouse Completed Univeristy	0.0342***	0.0155	0.285***	0.0173**	-0.0553***	-0.00568	-0.0806***	-0.163	0.0253**	0.00823	-0.0556**	-0.0440	0.00280	0.0623***
	(0.00272)	(0.0130)	(0.0255)	(0.00691)	(0.0161)	(0.0134)	(0.0144)	(0.116)	(0.0125)	(0.0412)	(0.0246)	(0.0286)	(0.0181)	(0.00732)
Family Household														
Omotted Category: Not a family household														
Family Household	-0.000143	-0.0148*	-0.0135**	-0.0515***	-0.00831	-0.0571***	0.00547	-0.190	-0.0346***	-0.00214	0.0213	-0.0343*	-0.00458	0.00173
	(0.00187)	(0.00776)	(0.00686)	(0.00876)	(0.00988)	(0.00953)	(0.0134)	(0.139)	(0.0115)	(0.0322)	(0.0351)	(0.0206)	(0.0137)	(0.00228)
Children Alive														
Omitted Category: No children alive at time of census														
At Least One Child Alive	0.0544***	0.0338***	0.0720***	0.0394***	0.00534	0.118***	0.0349***	0.0636	0.0388***	0.0140	0.0427***	0.0830***	0.101***	0.0527***
	(0.000963)	(0.00415)	(0.00321)	(0.00418)	(0.00504)	(0.00491)	(0.00516)	(0.0695)	(0.00604)	(0.0183)	(0.0133)	(0.00928)	(0.00667)	(0.00121)
Year of Birth (continuous variable)														
Year of Birth	-0.00604***	-0.00188***	-0.00854***	-0.00481***	0.00236***	-0.0106***	-0.000206	-0.00290	0.000903	-0.00249**	-0.0111***		-0.0150***	-0.00334***
	(5.09e-05)	(0.000335)	(0.000224)	(0.000395)	(0.000268)	(0.000259)	(0.000526)	(0.00318)	(0.00109)	(0.00110)	(0.00127)		(0.000595)	(0.000122)
Country Fixed Effects	YES													
Observations	2,049,951	82,934	202,982	94,350	54,146	86,727	68,464	492	40,320	5,196	9,979	18,310	56,334	1,329,717

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Marginal effects around the mean calculated from a probit estimation. dy/dx is for discrete change of dummy variable from 0 to 1

Table 10: The Effect of Social Security Tax Rate, Replacement Rate and Delay Incentive on Male Labor Force Participation Stratified by Education Attainment -- Completed University

	Pooled	Argentina	Austria	Brazil	Chile	France	Greece	Malaysia	Mexico	Panama	Portugal	South Africa	Spain	United States
Social Security Variables (continuous variables)														
Social Security Tax Rate	-0.292***	0.0124	-0.341	-0.365***	0.101*	0.245***	-2.238***		-0.0662	0.404	0.127		0.657***	-1.732***
	(0.0236)	(0.0745)	(0.302)	(0.0662)	(0.0565)	(0.0655)	(0.213)		(0.382)	(0.664)	(0.181)		(0.207)	(0.0772)
Replacement Rate as a Fraction of Wage	-0.0827***	-0.0373***	-0.0744***	-0.0281***	-0.0324***	-0.124***	-0.0360***	-0.159***	-0.00587	-0.130***	-0.0116	-0.0271	-0.224***	-0.0753***
	(0.000927)	(0.00468)	(0.00787)	(0.00693)	(0.00946)	(0.00373)	(0.00641)	(0.0194)	(0.00527)	(0.0439)	(0.0201)	(0.0204)	(0.0111)	(0.00114)
Delay Incentive as a Fraction of Wage	3.04e-05	0.000775**	-0.00237***	-0.000367***	0.000522*	0.0101***	-0.000102		-0.000294***	0.00116	-0.000206	-0.000845	0.00173***	-0.000357***
	(2.65e-05)	(0.000345)	(0.000359)	(0.000116)	(0.000278)	(0.000584)	(0.000118)		(9.34e-05)	(0.000827)	(0.000241)	(0.00156)	(9.62e-05)	(3.87e-05)
Marital Status														
Omitted Category: Single														
Married or in Union	0.110***	0.0845**		0.0560***	0.227***	0.174***	0.229***	0.408**	0.219***	-0.0822	-0.0522	0.113	-0.00716	0.0839***
	(0.00560)	(0.0341)		(0.0175)	(0.0604)	(0.0284)	(0.0449)	(0.171)	(0.0292)	(0.109)	(0.0602)	(0.0781)	(0.0507)	(0.00937)
Separated or Divorced	0.0279***	0.0404***	-0.165***	0.00690	0.0571***	-0.0575***	0.0239	0.199***	0.00715	-0.00772	-0.0904**	-0.0235	-0.0876***	0.0450***
	(0.00171)	(0.00780)	(0.0195)	(0.00944)	(0.0125)	(0.0100)	(0.0199)	(0.0472)	(0.0105)	(0.0510)	(0.0367)	(0.0359)	(0.0209)	(0.00185)
Widowed	-0.0365***	-0.0122	-0.302***	-0.0815***	-0.00346	-0.188***	-0.0770***	0.0352	-0.0315**	-0.0335	-0.136***	-0.117***	-0.146***	-0.0159***
	(0.00241)	(0.0111)	(0.0270)	(0.0138)	(0.0200)	(0.0125)	(0.0221)	(0.0962)	(0.0134)	(0.0746)	(0.0418)	(0.0410)	(0.0269)	(0.00262)
Labor Force Participation of Spouse														
Omitted Category: No														
Yes	0.156***	0.0889***	0.174***	0.111***	0.0747***	0.145***	0.139***	0.104***	0.0517***	0.115***	0.145***	0.240***	0.142***	0.163***
	(0.000789)	(0.00439)	(0.01000)	(0.00392)	(0.00792)	(0.00539)	(0.00763)	(0.0264)	(0.00439)	(0.0239)	(0.0140)	(0.0116)	(0.00926)	(0.000862)
Age (continuous variable)														
Age	-0.0257***	-0.0155***	-0.0498***	-0.0245***	-0.0131***	-0.0428***	-0.0369***	-0.0198***	-0.0153***	-0.0186***	-0.0329***		-0.0306***	-0.0240***
	(0.000111)	(0.000551)	(0.00126)	(0.000544)	(0.00110)	(0.000673)	(0.00103)	(0.00390)	(0.000774)	(0.00419)	(0.00216)		(0.00166)	(0.000137)
Age of Spouse (continuous variable)														
Age of Spouse	-0.00223***	-0.00193***	-0.00386***	-0.00203***	-0.00206***	-0.00457***	-0.00405***	-0.00584***	-0.00294***	-0.000615	-0.00196**	-0.00304***	-0.00307***	-0.00221***
	(6.45e-05)	(0.000329)	(0.000750)	(0.000237)	(0.000509)	(0.000394)	(0.000557)	(0.00204)	(0.000278)	(0.00148)	(0.000953)	(0.00103)	(0.000756)	(7.28e-05)
Education Attainment of Spouse														
Omitted Category: Spouse less than completed primary														
Spouse Completed Primary	0.00733**	0.0602***	-0.0238	0.0328***	-0.0268	-0.0626***	-0.115***	0.0381	0.00392	0.0644	0.0350*	-0.108***	0.0696***	0.0464***
	(0.00320)	(0.0160)	(0.0519)	(0.00594)	(0.0250)	(0.00758)	(0.0295)	(0.0341)	(0.0101)	(0.0704)	(0.0183)	(0.0372)	(0.0198)	(0.00700)
Spouse Completed Secondary	0.0372***	0.0605***	-0.0146	0.0634***	-0.0103	-0.0192**	-0.0521*	0.0993**	0.0218**	0.124*	0.0320*	-0.0552	0.0870***	0.0763***
	(0.00306)	(0.0165)	(0.0496)	(0.00540)	(0.0228)	(0.00828)	(0.0283)	(0.0479)	(0.00997)	(0.0686)	(0.0181)	(0.0345)	(0.0199)	(0.00688)
Spouse Completed Univeristy	0.0672***	0.0716***	0.00323	0.0684***	-0.0322	-0.0187**	-0.0562*	0.0506	0.0229**	0.112	0.0231	-0.0354	0.0660***	0.110***
	(0.00314)	(0.0149)	(0.0510)	(0.00575)	(0.0260)	(0.00845)	(0.0290)	(0.0364)	(0.0102)	(0.0687)	(0.0189)	(0.0340)	(0.0206)	(0.00741)
Family Household														
Omotted Category: Not a family household														
Family Household	-0.0175***	-0.0188**	-0.0136	-0.0587***	0.0130	-0.0331***	0.00761	-0.0965	-0.0269***	-0.0346	-0.0299	-0.0302	-0.0309*	-0.0177***
	(0.00164)	(0.00774)	(0.0182)	(0.00757)	(0.0158)	(0.00854)	(0.0169)	(0.0738)	(0.00868)	(0.0443)	(0.0263)	(0.0292)	(0.0169)	(0.00182)
Children Alive														
Omitted Category: No children alive at time of census														
At Least One Child Alive	0.0572***	0.0188***	0.104***	0.0335***	0.0187**	0.106***	0.0338***	0.0399	0.0343***	0.0164	0.0738***	0.0353***	0.107***	0.0573***
	(0.000841)	(0.00433)	(0.00916)	(0.00410)	(0.00772)	(0.00464)	(0.00675)	(0.0304)	(0.00485)	(0.0249)	(0.0129)	(0.0125)	(0.00939)	(0.000937)
Year of Birth (continuous variable)														
Year of Birth	-0.00439***	8.27e-05	-0.00852***	-0.00327***	0.00132***	-0.00949***	0.00352***	-0.00818***	0.000349	-0.00154	-0.00735***	0.0310***	-0.0106***	-0.00271***
	(4.69e-05)	(0.000289)	(0.000750)	(0.000338)	(0.000384)	(0.000252)	(0.000693)	(0.00211)	(0.000775)	(0.00147)	(0.00117)	(0.00218)	(0.000777)	(9.04e-05)
Country Fixed Effects	YES													
Observations	2,201,456	42,111	22,911	74,623	12,579	80,773	39,658	1,561	45,192	2,346	7,192	9,682	25,500	1,837,328

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Marginal effects around the mean calculated from a probit estimation. dy/dx is for discrete change of dummy variable from 0 to 1

Figure 15: The Effect of Social Security Tax Rate on Male Labor Force Participation Stratified by Education Attainment (Pooled and by Country)

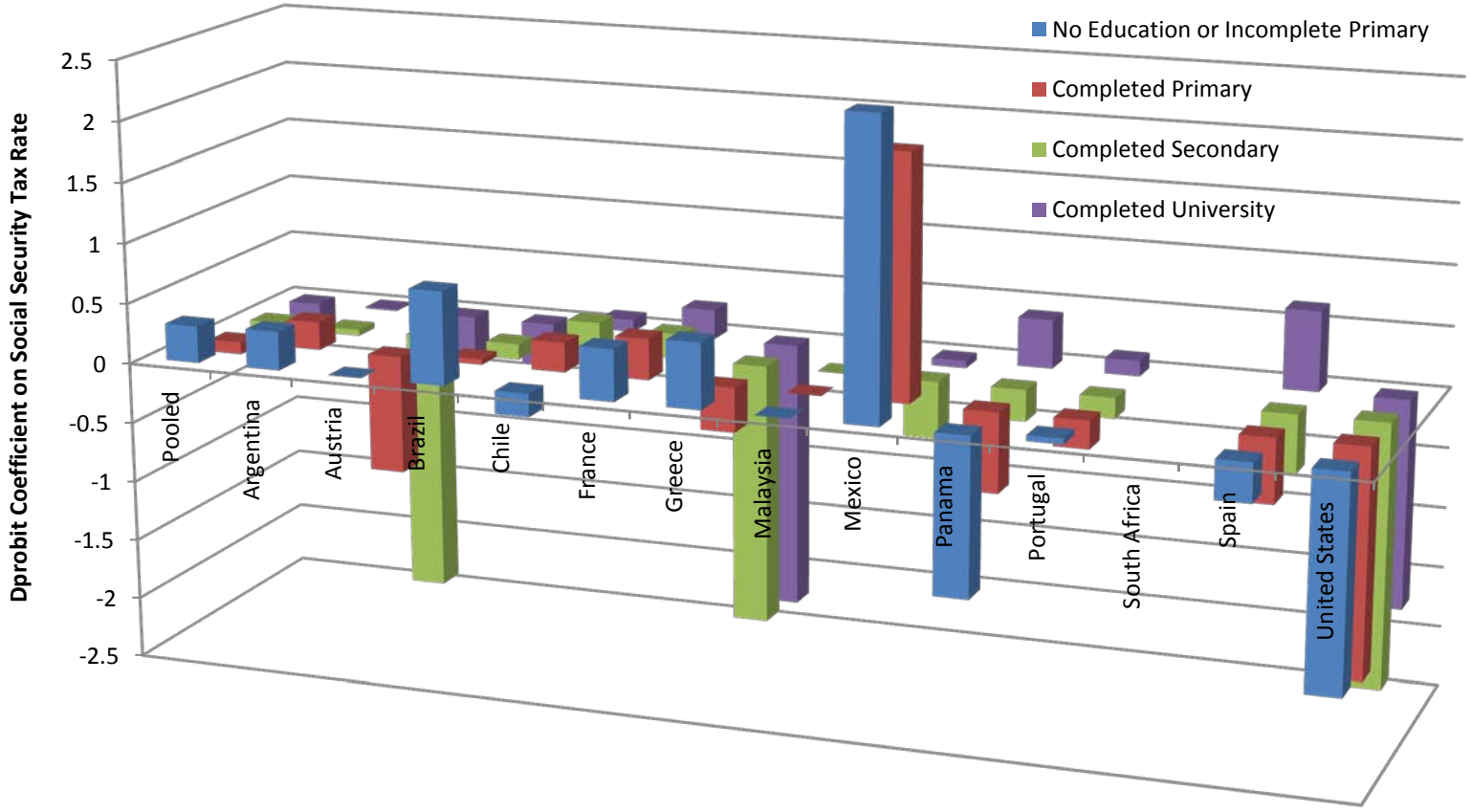


Figure 16: The Effect of Replacement Rate as a Fraction of Wage on Male Labor Force Participation Stratified by Education (Pooled and by Country)

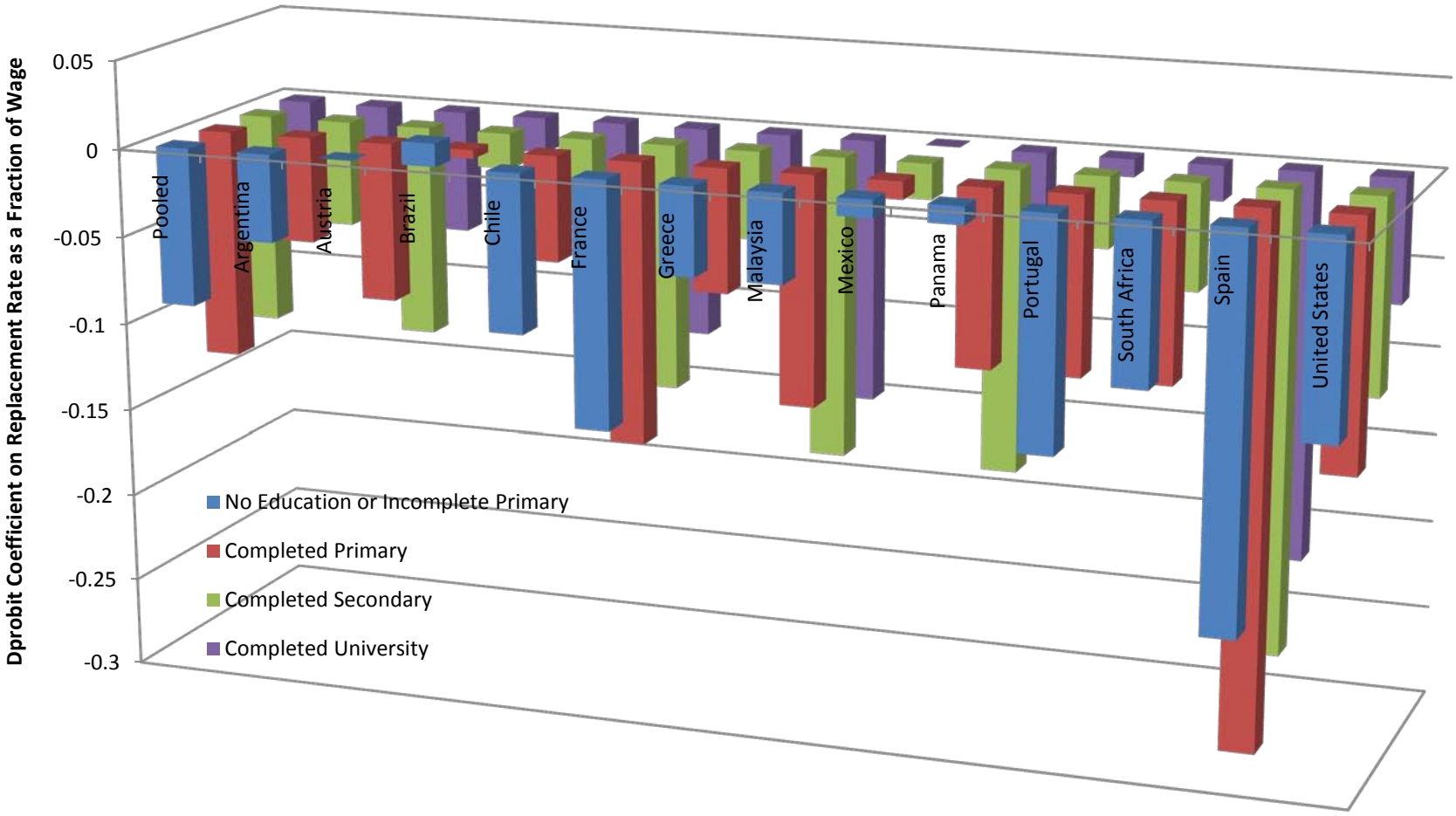
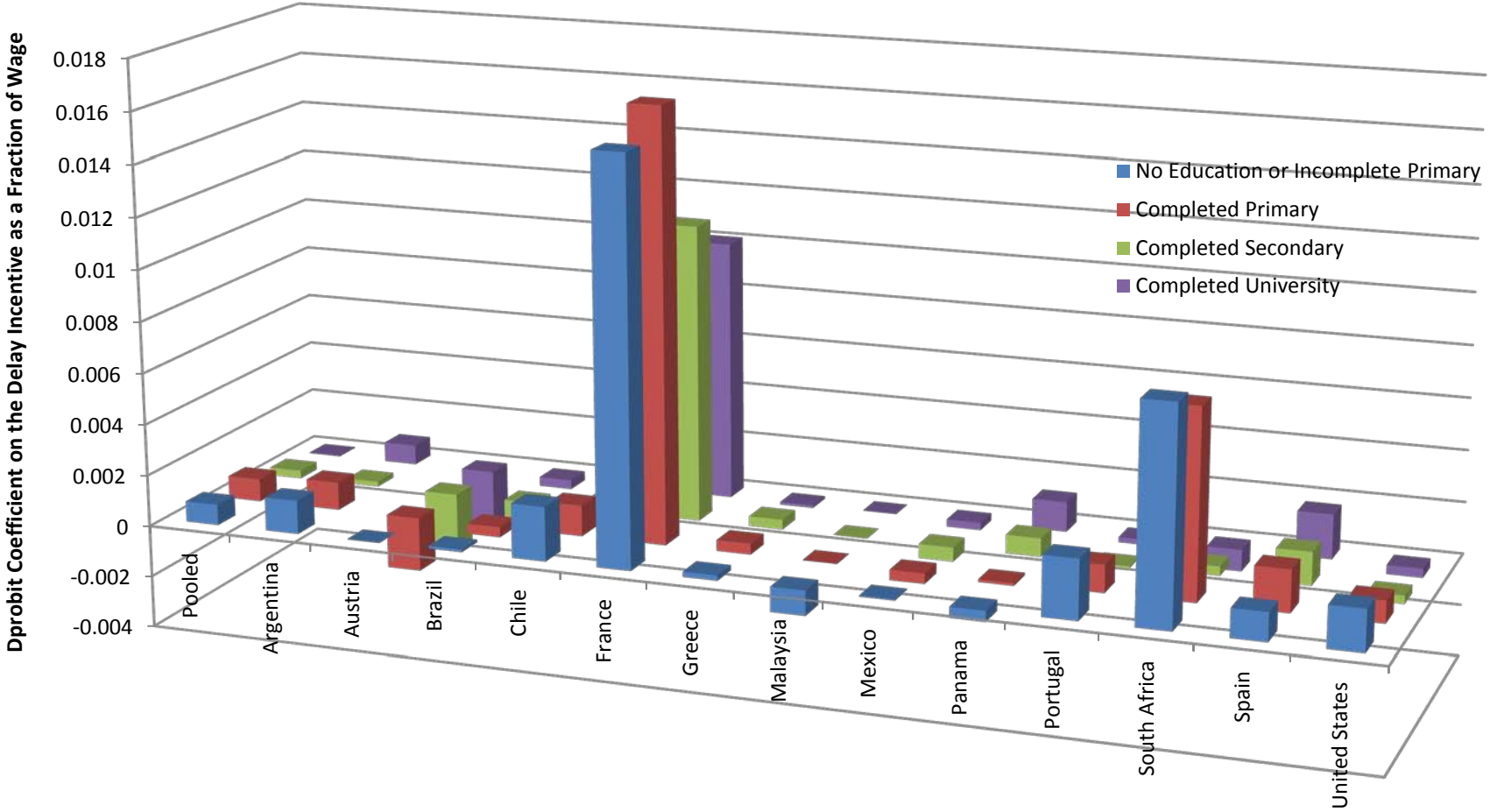

Dprobit Coefficient on Replacement Rate as a Fraction of Wage
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
Pooled
Argentina
Austria
Brazil
Chile
France
Greece
Malaysia
Mexico
Panama
Portugal
South Africa
Spain
United States
No Education or Incomplete Primary
Completed Primary
Completed Secondary
Completed University

Figure 17: The Effect of Delay Incentive as a Fraction of Wage on Male Labor Force Participation Stratified by Education Attainment (Pooled and by Country)



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