Social Security, Economic Development and the Labor Force Participation of the Elderly in Latin America[1]

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Abstract

In this paper I investigate labor force participation of older males in Latin America. The empirical analysis is divided in two parts. First, I use household survey data from twenty-three (23) Latin American and the Caribbean countries, from around 2005, to perform a cross-country analysis on labor force participation focusing on differences rural and urban status, formal and informal relation to the labor market and coverage of public pension programs. I also use the data to show different patterns by income level and stage of the demographic transition to describe historical trends in labor force participation rates of older workers. The second part of the paper, I use data on the 23 Latin American countries to investigate the effects of economic development and social security system in the labor force participation of the elderly for the past 30 years.

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Introduction

Demographic changes, especially population aging might have important impact on macroeconomic variables, public sector fiscal balance and other areas such as public pension and public health systems (Lee & Mason, 2011). An additional important and related question is how economic development, social security rules and population aging affects labor force participation for both males and females, especially at older ages for males (Clark at al, 1999; Gruber & Wise, 1999). The literature on this topic in developed countries is extensive (Costa, 1998; Burtless & Quinn, 2001; Gruber & Wise, 1999; Wise, 2004, Bloom et al. 2009, among others). People know a great deal about labor force behavior in different developed countries around the world, but very little is known about the interaction of these variables in emerging economies, such as in Latin America (Cotlear, 2010; Finlay and Fink, 2011). There are four main explanations for pattern of labor force participation of older persons. First, the existence of public pension systems (Gruber & Wise, 1999; 2004); second, higher income and expansion of the leisure class (Costa, 1998). Third, Profeta (2004) argues that aging population increases political pressure on social security policies affecting labor force participation at older ages. Finally, Clark et al (1999) points that rising income and socioeconomic changes tend to affect negatively the proportion of the elderly that stay in the labor market. Population aging combined with early retirement has put social security systems across the industrialized world under pressure (Bongaarts, 2004). Thus, legislation changes have taken center stage in public policy debates in recent years (Wise, 2004; Bloom & McKinnon, 2010). Today, retirement is an important stage on one's life cycle, but it is important to maintain the sustainability of the public pension systems (Costa, 1998; Lee and Mason, 2011). Contrary to the past, most workers today enjoy a long and healthy period of retirement, in Brazil, for example, Queiroz (2008) estimated that the duration of retirement has doubled between 1960 and 2000. These changes are a paradox since at the same time people are entering the labor force later, because of increasing educational attainment, living longer; they are leaving the labor force at younger ages (Wise, 2010). In Latin America, the expansion of the social security system, economic development and rising income might have created incentives for more workers to leave the labor market. In addition, improvements in goods and services provided to the elderly have transformed retirement into a more pleasurable and desirable stage of life. What will happen in the future? Is Latin America ready to support a large population of retirees?

The rapidly aging population presents one of the greatest public policy challenges in Latin America (Saad, 2011). Compared to other emerging economies, the region is distinct for combining, in some countries, a relatively large public sector with rapidly aging population and declining labor force participation at older ages (Queiroz and Dias, 2009; Miller, Holz and Mason, 2010). The percentage of individuals age 65 and over is estimated to be around 20% in 2050, compared to 3% in 1970 (UN, 2010). These changes in population age structure may impose severe pressures on the public sector (Bongaarts, 2004; Queiroz and Figoli, 2011). Changes in female labor force participation might reduce the pressure of population aging on old-age support systems, by increasing the number of potential contributors to the systems. However, this change comes along with important changes in familiar support, that is, as we observe an increase in female labor supply there might be a reduction in the supply of familiar support for the elderly.

Latin America is one example of an important context for elaborating linkages between economic development, pension benefits provision and labor force participation of the elderly..The rapidly aging population presents one of the greatest public policy challenges in Latin America, and raises concerns about living conditions, social support and health care provision for the elderly, especially where economic development have weakened family support and a universal welfare system is not yet in place. Latin America is also interesting because it combines countries with more developed and less developed public pension programs. Also, it is normally argued that the pressure of youth unemployment might be reduced by creating incentives for the elderly to leave the labor force (Gruber and Wise, 2010). Thus, the region provides a series of examples and large variation in socioeconomic scenarios to study this problem. Despite the growing interest in this area (Clark, 1999; Bloom et al, 2009; Finlay and Fink, 2011), I am not aware of many studies aiming to examine trends in labor force participation of older workers and the evolution of labor force participation in Latin America. The study of labor force participation of older workers in the developing world can contribute to understand the pattern of decline in labor supply for two main reasons (Carvalho-Filho, 2008). First, income effects might be larger in low income countries, and, second, the structure of the labor market (high informality) might affect labor decisions differently from what is observed in the developed world.

In this paper I contribute to the debate by investigating labor force participation, especially for older males, in Latin America. The empirical analysis is divided in two parts. First, I use household survey data from twenty-three (23) Latin American and the Caribbean countries, from around 2005, to perform a cross-country analysis on labor force participation focusing on differences by pension coverage, rural and urban, and formal and informal labor market relation. I also use the data to show different patterns by income level and stage of the demographic transition to describe historical trends in labor force participation rates of older workers. The second part of the paper, I use data on the 23 Latin American countries to investigate the effects of economic development and their social security system in the labor force participation and retirement decisions of the elderly for the past 20 years. The second part of the paper follows research previously carried about by Clark (1999) and Bloom et al (2009). I constructed a country level panel data from different data sources (International Labor Organization, World Bank, United National, SEDLAC, and others) to analyze how economic development and the evolution of public pension system (coverage, expenditures, etc) in those countries affected old-age labor supply in Latin America[3].

My main goal is to elaborate stylized facts that will guide the discussion of labor force participation of older persons in future research for Latin America. Most of recent research in this area focuses on OECD countries (Gruber & Wise, 1999; 2004; Bloom et al, 2009) and very little is known for other regions, and especially, in Latin America. Latin America is important because it combines rapidly aging population, rapidly urbanization, and heterogeneous levels of economic development across countries, public and private pension coverage, and we also observe some countries spending a large amount of resources in social policies (health and retirement).

Population Aging in Latin America

The population in Latin America has undergone major transformations in the last few decades. Fertility decline and increase in life expectancy causes population aging, which has major impacts on the economic and social indicators. During some period of time there will be a

[3] In previous work, we perform a specific analysis for a series of Latin America countries using IPUMS microdata. The results also indicate important differences by educational attainment. The results were presented at the World Bank Workshop "Population Aging: is Latin America Ready".

window of opportunity to solve social problems because the total dependency ratio will first decline before increasing due to the population momentum (Saad, 2010).

Despite the demographic bonus population aging in most of Latin America is occurring at much faster rate than what was observed in the developed world. It is projected that in 25 years the population aged 65 and will double and reach 15% of the population. This transition took 115 years in France and 69 years in the United States. The rapid population aging raises concerns about living conditions, social support and health care provision for the elderly (NRC, 2001).

Figure 1 displays the trend in standard population (total, old and young) dependency ratio from 1980 to 2050. There trends show the socioeconomic impacts of this new demographic scenario. The dependency ratio will change from a youth based one to an elderly one. On average, the elderly dependency ratio will increase from 7,06% to 25.45%, from 1980 to 2050, imposing significant costs to the familial and public systems of old age support.

The population aging is not the only impressive phenomenon occurring in Latin America in recent years. In addition to the increasing share of elderly, more people are reaching older ages and life expectancy at older ages are increasing rapidly. Life expectancy at 60 show how many years on average a individual will live if they reach that age. The estimates produced by the United Nations show that in 50 years, life expectancy at age 60 increased by about 3 years in all countries analyzed, the change was more impressive in Chile where e60 jumped from 14.60 to 19.06 in 50 years. In some sense, this means that someone retiring at that age will receive pension benefits for an addition 20 years in Chile, 18 years in Brazil and 17 years in Argentina.

Data and Methods

The primary objective of the paper is to analyze how labor force participation rates, especially for older males, vary across Latin America countries. I use household samples available at the SEDLAC-World Bank project. The SEDLAC is a database of socioeconomic statistics constructed from micro-data of the Latin American and Caribbean household surveys, developed by CEDLAS and The World Bank. SEDLAC is divided into 13 sections: household surveys, incomes, poverty, inequality, demographics, education, employment, housing, infrastructure, durable goods and services, poverty-alleviation programs, aggregate welfare and pro-poor growth. In this paper, I use information on labor force participation, pension coverage (both

contribution and beneficiaries), region of residence, demographic characteristics and income. In part of the analysis, I present some results for gender and region of residence, but most of the analysis focuses on the patterns of older males. .

SEDLAC make all possible efforts to make statistics comparable across countries and over time by using similar definitions of variables in each country/year, and by applying consistent methods of processing the data. However, perfect comparability is not assured, as the coverage and questionnaires of household surveys differ among countries, and frequently also within countries over time (SEDLAC, 2009).

The study of retirement behavior and trends uses labor force participation rates as its basic measure (Costa, 1998; Hurd and Rohwedder, 2011). The idea is to follow the same approach in this paper. Labor force participation rate is defined by the International Labor Organization (ILO) as the proportion of the population of some specific age who is either working or actively seeking work to the total population in the same age group.

The labor force participation rate is a very useful measure to study the evolution of labor force participation over time and cross-countries. The main advantage of using the labor force participation rate, compared to other measures such as hours of work, work tenure, etc, is that it is available in all countries over a long period of time. We also consider the estimates of labor region of residence (rural and urban), educational groups, and for older persons by coverage of pension programs.

Based on the labor force participation rates it is possible to estimate two important summary and comparative measures: unused labor capacity (Gruber & Wise, 1999) and retirement hazard rate. The Unused Labor Capacity is a summary measure of the labor force participation of older workers. The measure is calculated by summing up the proportions of individuals out of the labor force between ages 50 and 69 and dividing it by 19. The measure is interpreted as follows. Suppose the unused capacity measure between ages 50 and 69 in a particular year is 50%. It means that a cohort experiencing the labor force participation rates in that year for their whole life would work only 50% of their potential life time person-working-years (Gruber & Wise, 1999). The retirement hazard rate is the transition out of the labor force. It is calculated by comparing the labor force participation of an age-group compared to the previous age group. It

can be calculated in a cross-section manner or following a pseudo-cohort, in case we have a time series of surveys.

In order to examine how labor force varies across countries (the first part of the analysis) we used various indicators of economic development. The indicators were obtained using the SEDLAC dataset. In general, they reflect national economic conditions, demographic structure, economic development and general composition of the population.

In the second part of the analysis, I estimate the determinants of elderly labor force participation in the dataset by two approaches. First, I use a simple regression model to estimate the determinants of old-age labor force participation rates over-time, ignoring the panel characteristics of the data. Second, I make full use of the panel data in order to investigate how unobserved characteristics might affect the labor supply of the elderly in recent decades.

I parameterize the determinants of labor force participation by using an probit specification. I concentrate my analysis on country characteristics such as mean years of schooling, enrollment in the labor market (formal and informal), urbanization, GDP per capita and a set of social security characteristics. In the model, LFPR (pi) represents the labor force participation rates for population aged 55-59, 60-64 and 65-69 and X is the matrix of explanatory variables and e_j is the error term. Table 1 shows the dependent and independent variables that will be included in the model, source and period.

Table 1 indicates the variables used in the regression model and the source of the data. We use GDP per capita as an indicator of economic well-being and development. According to economic theory, higher national income should be related to lower labor force participation of the elderly and higher female participation. We also consider the relation between percentage of elderly population and labor force participation, an increase in number of elderly might be related to more old-age support systems and lower participation. Finally, we also consider how the existence and size of pension systems are related to labor force participation rates. For social security, I used four different variables: the length of time the system exist, regular retirement age, coverage of the system in relation to the labor force, and whether the system is only a PAYGO or has some sort of private account mechanism.

Descriptive Analysis

In this section we focus on the relation between labor force participation by age and several characteristics and demographic and economic variables. The main idea is to show and discuss how rates vary across countries that are in different stages of economic development and demographic transition. First, I started with a brief discussion on the recent changes in population age structure and other demographic variables in Latin America (for more detailed discussion, see Saad, 2011).

Population Aging in Latin America

There is a large body of the literature on the population changes in Latin America (Saad, 2010; Cepal, 2008; Figoli and Wong, 2003, among others). It is important to stress that there are differences across the countries studied in this paper. I concentrated on the general trends to provide a brief overview of the changes. The demographic transition is characterized by the decline in fertility and mortality levels, leading in rapid population growth rate and very young population to a scenario of low mortality (high life expectancy) and low fertility, marked by old-age structure (Lee, 2003). In between those two scenarios, population goes thru a situation in which working age population grows faster than the age dependent groups, creating a period of opportunity to economic growth and important changes, called demographic dividends (Lee and Mason, 2011).

Figure 1 shows demographic dependency ratios (total, youth and old) overtime in Latin America. The dependency ratio is defined as the ratio between dependent population (those under 15 yrs of age and those above 65 in relation to the working age population). The figure shows clearly the process of demographic transition in Latin America, the region was marked by a very high youth dependency ratio in the past and it is moving towards a more old-age dependent population. The region is going to the demographic window of opportunity period, that is, the period of lower dependency ratio. Saad et al (2009) estimated that population changes alone could generate a potential growth of the GDP per capita of 0.4% per year. However, the authors also pointed that as the region grows older, social protection systems, especially health and social security, will face different and difficult challenges.

Labor Force Participation of Older Persons

The decline in labor force participation of older persons is one of the most important changes in the labor market in recent years (Costa, 1998; Gruber & Wise, 1998). In most of the developed world, elderly labor supply has declined by half in the last few decades (Gruber & Wise, 1999). In Latin America much less is known about the behavior of older persons in the labor market. Economic literature predicts that rising income, socioeconomic changes and the emergency of public pension systems play an important role in affecting the number of elderly that remain in the labor market.

Figure 2 depicts Labor Force Participation rates by age and sex. It is clear from the figure that labor supply declines rapidly with age. For males, at age 50, about 90% of individuals are still in the labor market. The decline after age 50 varies a lot across countries. For example, by age 65 labor force ranges from 15% to over 60%. In some countries, rates are as low as observed in developed countries studied by Gruber and Wise (1999; 2004). The difference in more striking when we considered labor force participation of workers covered and not covered by the pension system. The labor force participation of male workers covered and not covered by the pension system, by age, is show in Figure 2. The rates of those covered by the pension system are much lower than individuals not covered by the system. The results indicate that public pension system, and provision of pensions, might play a role in affecting labor supply in developing nations (Gruber & Wise, 2004; Costa, 1998).

In Latin America, as in other regions of the world, population with older age structures have lower labor force participation rates for older persons (Figure 3) Clark et al (1999) and Profeta (2002) argued that older populations have already create an universal system of old-age security and are, in general, more developed and wealthier. The combination of these elements leads to early retirement and lower labor force participation at older ages. The relation between these variables is less known in Latin America (Carvalho-Filho, 2008; Queiroz, 2008). In this section we try to shed light on this matter.

It is important to stress that coverage rates (% of beneficiaries) and contribution rates vary widely across Latin America (Figure 4). In one side, some countries have levels similar to what was observed in the Gruber & Wise (1999; 2004) study, while others have much lower coverage

rates. As population ages, it is important that countries devise programs to provide social assistant to their elderly before rapidly population aging turns this action more difficult and costly. Moreover, it is important to consider the possible relation between the existence of old-age support systems and retirement behavior (Gruber & Wise, 2004).

Figure 5 shows the relation between GDP per capita and the labor force participation of older workers. The graph shows a strong and negative relationship between the two variables, indicating more evidence that individuals in countries with higher income behave similar to what is observed in more developed nations and tends to leave the labor force at younger ages. A similar result is observed when we analyze the relation between pension coverage rate and labor force participation of older workers. In countries with higher coverage rate, like Brazil and Uruguay, the labor supply of older persons in much lower than compared to countries with lower coverage (Figure 6). More important, the relation holds for workers in the urban and rural sector despite much lower coverage rates observed in the rural areas of LAC countries. The observed relation indicates that further studies in this area are important, and that policy makers should be aware of individual behavior when designing and reforming pension system in less developed areas of the world.

Unused Labor Capacity, Pensions and Economic Development

Unused Labor Capacity is a measure developed by Gruber & Wise (1999) that summarizes the labor force participation rates and retirement behavior across countries. The unused capacity indicates the forgone productive capacity of older persons who leave the labor market. One of the advantages is that it allows us to consider more age groups compared to the analysis performed before, when we focus on the labor force participation of individuals aged 65 and above. The Unused Productive Capacity is a summary measure of the labor force participation of older workers. The measure is calculated by summing up the proportions of individuals out of the labor force between certain ages and dividing it by the age range. Suppose the unused capacity measure between ages 50 and 65 in a particular year are 50%. It means that a cohort experiencing the labor force participation rates in that year for their whole life would work only 50% of their potential life time person-working-years (Gruber & Wise, 1999). The measure is useful to compare a cross-section of countries and provides interesting insights on the analysis proposed here

Figure 7 shows the Unused Capacity for twenty-three Latin American countries around 2005 for the 50-65 age group. Unused capacity in this age group ranges from 15% in Guatemala to 40% in Uruguay. This means that in Uruguay, individuals aged 50-65 are working only 60% of their potential working life. We also observed a wide variation; the mean is about 30% with standard deviation of 10. We consider below how this measure of forgone productive relates to economic development, population aging and size of the pension system in these countries.

Unused Capacity is positive related to population aging, economic development and coverage of the pension system. The relation between unused capacity and GDP per capita, a measure of economic development, is shown in Figure 8. First, we find a positive relation between the two variables: as income increases, unused capacity also increases. A similar finding was observed by other authors studying more developed countries thought the world. The results indicate that in countries with low income per capita, most individuals remain in the labor force until very old ages (or they are able to work). As the economy develops there is a change in the composition of employment and emergence of old-age assistance programs, and individuals start to leave the labor force at younger ages. The level of economic development is also associated with demographic transition, and an older population age structure. Figure 9 shows as the percentage of individuals 65 and above increase, the unused capacity also increases. The combination of these two elements tends to bring a third one: the emergence of pension programs (Clark et al, 1999). We use the coverage rate (% of workers qualified to receive benefits when retired) to indicate the size of the pension system. We observe that as coverage rates increases individuals tend to leave the workforce at younger ages, thus rising unused capacity. Lastly, we also looked at the relationship between pension generosity and unused capacity (results not shown), and observed that in countries with large transfers to the elderly the forgone years of productivity are the largest in Latin America.

Retirement Hazard Rates and Economic Development

One very useful way to focus on timing of retirement and its changes is to calculate retirement hazard rates. I use labor force participation rates to estimate retirement hazard rates, or transition rates out of the labor force (Costa, 1998; Hurd, 1990). This rate is an estimate of the chances of leaving the labor force at a given age, conditional on being in the labor force in the previous year. The retirement rate shows whether there is a preferable retirement age, and it

helps to understand the effects of the social security system in the patterns of retirement. When these rates are being estimated from cross-sectional data, they do not represent the actual labor market transitions of individuals (Hurd, 1990). In most of my analysis, the retirement rate is simply the percentage decline in the proportion of individuals in the labor force between age n and n+1 in a particular year. I also estimated the transition rates using a synthetic cohort approach, that is, I compared the labor force participation rates of individuals aged 50-55 in 1990 to those aged 55-60 in 1995, and calculate the transition rate by dividing the labor force. The same procedure is done to all others ages.

Table 2 shows the results for the cross-sectional analysis and Table 3 shows the results using the pseudo-cohort approach. I observed that transition rates out of the labor force increase steeply with age and the relation maintains over time. That is, since 1990 older men in Latin America have been observing a similar transition pattern out of the labor force, despite the observed changes in the economic and social context of the region.

However, the most important point is the wide variation in transition rates observed in Table 2. I also show the minimum and maximum value observed for all Latin America countries included in the analysis, in the period analysis. For example, in 2000 I find that, on average, 16% of those in the labor force in the age groups 55-60 leave the labor force when they reach ages 60-65, but the country with the highest transition rate out of the labor force, Suriname, about 77% leave the labor force in that period. Contrary to what was observed in other countries (Hurd and Rohwedder, 2011), I do not find strong evidence, in any country, of substantial decline in the transition rates out the labor force for males in Latin America.

The observed variation in the labor force of older males and in the transition rates out of the labor force could be explained by a myriad of factors. The statistical analysis performed in the next section tries to shed some light on the relations observed in Latin America.

Statistical Analysis

Descriptive Statistics

Table 4 presents the descriptive statistics for the 23 Latin America and Caribbean countries in our dataset. The table reports the mean, standard deviation, maximum and minimum values for

the whole period pooled together (1990-2010). The main limitation to work with Latin America data is the available of complete information for all countries for a long period of time. We concentrate on the more recent period because we could gather all data necessary to perform our analysis, for a reduced number of countries it is possible to investigate similar questions for a longer period, but this analysis goes beyond the scope of the paper.

These means were calculated as an average across all countries over the entire period of time and were not weighted by population size. As shown before, for one point in time, labor force participation declines with age, from 92% for those aged 50-55 to less than 45% for those aged 65+. There is wide variation across Latin America countries, for example LFPR for males aged 55-60 range from 61% (very low to world patterns) to 94% (very high). The wide variation on male labor force participation rates is better seen when one looks at LFPR by income group. I divided the countries in 4 income group levels, poorer countries have much higher participation rates overtime than wealthier countries. For example, the participation rates for males aged 55-59 is about 91% in low income countries compare to 85% in wealthier countries, for older males the difference is greater, from ages 60 to 64 the rates range from 83% to 70% (results not shown).

The population is still quite young in the period of analysis, the percentage of population aged 65 and over ranges from as low as 3% to almost 14%, which is much lower than the majority of the percentage of elderly in more developed economies. As I pointed before, the largest percentage of the population concentrates in the working-age groups, those between ages 15 and 64. In Latin America, on average, 60% of the population is in this age group. There is still a large concentration of the labor force in the informal sector, on average 40% of workers are in the informal sector and most of them are not covered by the public pension system. This could have important impacts on the labor force participation of the elderly. Lastly, the region is also characterized by very low educational levels, although it is showing signs of improvement in recent years. On average, workers in Latin America have less than 7 years of formal education, ranging from 2.7 to 9.7 years.

Statistical Analysis – Simple Model

The previous analysis showed that labor force participation rates of elderly workers tend to be lower as income raises. In the following analysis, I investigate the impact of income levels on

male's labor force participation rates controlling for a series of economic, social, public pension characteristics and demographic variables. I also make use of the panel feature of the data, I report results using both pooled data and adding country fixed effects.

In Table 5, I report the estimates of the impact of GDP per capita (log) on the labor force participation rates for 4 age groups. In panel A, I report the results using the pooled data and panel B reports the results using country fixed effects. The first set of estimates (Panel A) shows the relation between income level (GDP per capita) and male labor force participation at different ages. Since I have data for the same country in different points of time, I can also examine the variation in the participation rates as the income level in each country evolves. I do that by running the same regression model (LFPR on the log of GDP per capita) with a set of country specific fixed-effects. When I run the equation considering the fixed effects, I am estimating the variation in income level within countries, instead of cross-country.

For males aged 65 and above, the estimate indicates that a 10% increase in the GDP per capita reduces the labor force participation in 1,3 percentage points (Panel A). The trend is also observed for younger age groups, but with a much smaller magnitude. For the older age group, a larger proportion of the variation is also explained by the variation in income level. The results are very similar to what Clark et al (1999) showed for a larger sample of countries in 1990. This indicates that the labor force participation rates of the elderly tend to be lower as income level rises.

However, since I have data for the same country in different points of time I was able to estimate a panel data model. Table 5, Panel B, shows the results for the fixed-effects model. The results are not statistically significant except for individuals aged 65 and above. The estimates indicate that, for the oldest age group, a increase of 10% in income level reduces the labor force participation in 0,5 percentage points. The fixed effect results indicate that the impact of income level on the labor force participation is smaller than compared to the cross-country variation. That is, the pace of change observed in the period of analysis is slower than what one could conclude analyzing only a cross-sectional estimate. The results also indicate that over 90% of the variance is due to difference across panels. The GDP per capita regression model explains significant part of the observed variation, especially for older workers, but it is important to

consider other variables related to economic development, demographic and labor market changes and the structure of old-age pension programs.

Statistical Analysis – Complete Model

In the more complete model, I include additional variables that are related to economic development, changes in economic growth, demographic changes and basic characteristics of the public pension system. I use data from the US Social Security Administration on Public Pensions throughout the world and data from the International Labor Organization (ILO) on social protection to create variables related to the pension system in each of the Latin America countries. I tested different models using both pooled and panel feature of the data.

Table 6 shows the results using pooled data for all countries and 4 different age groups. The estimates indicate that in countries with more mature pension system (measure by the time they exist) the labor force participation of males aged 60 and above decline. On the other hand, for males aged 55-60, a more mature system means that labor force is higher than in countries where the system is younger. This is probably related to the need to prove a certain time of working life in order to be eligible to pension benefits. We also find that in more urban countries, older males labor force participation rates are lower than in more rural countries. This is probably related to the composition of the industry, with greater concentration of workers in the industry and services. Along these lines, we find that as the share of workers in the informal sector increases, the labor force participation of older males also increase. In general, those workers are not covered by the public pension system and need to remain in the labor force for longer periods of time. Finally, we find that the age structure of the population play an important and interesting role in the labor force of older men. An increase in the share of working-age population reduces significantly the labor force of older men. This is an interesting results and demands more analysis. For example, for males aged 60-65 a 1% increase in the share of the working age population reduces the labor force of that group in 1.16 percentage points. I am currently working on the relation between youth unemployment and elderly employment that might shine some light on this issue.

Table 7 shows the results using fixed-effect model (panel data). As mentioned before, the advantage of the panel data is that I can follow the variation within country, differently from the

previous analysis that showed variation across LAC countries. The fixed-effects analysis, which allows me to estimate the variation within countries, shows very different results. The variable with more impact is the share of working age population, as countries go to the demographic dividend years (more working age individuals in relation to dependent ones), the labor force participation of older men declines significantly.

I also estimated an additional model using the retirement hazard rates as the dependent variable (results not shown). The estimates indicate that the percentage of the population in the working age groups plays an important role in increasing the retirement hazard rate in Latin America. I also find that the maturity of the pension system increases the retirement hazard between ages 55-60 to 65+.

Conclusion and Discussion

This paper shows that in Latin America countries with low income per capita, most men remain in the labor force until very old ages. As GDP per capita increases, meaning economic development, and related changes such as greater urbanization, reduction in the share of the population that is in the informal sector, population ages, and public pension programs become more mature the labor force participation of elderly men, even those aged 55-59, start to decline.

I estimate the relationship between male labor force participation for four (4) different age groups and the observed changes in the country for 23 Latin America countries from 1990 to 2010. In general, urbanization, economic growth, population aging and changes in the labor market are related to the reduction of the labor force participation rates for males. I am working on completing the database with information for additional years and more detailed information on the social protection system for the region. In any case, the results indicate that as economy develops (and ages) older workers tend to retire earlier to take benefit of the existing public pension systems or higher income.

Second, we observed that retirement is becoming a important stage on one's life cycle in Latin America although there are widespread differences across countries and the percentage of the elderly in the labor force in the region is higher than in more developed economies. In Latin America, especially in less developed countries, most persons remain in the labor market until

very old ages. For more developed economies in the region, countries with older population age structures, and where old-age support systems are already in place, labor force participation of older workers decline with age and over time. One of the most clear relationships affecting the labor supply of older workers is increases in per capita income and coverage of old-age support programs. In addition to that, we find that individuals in the rural sector present higher rates for males, especially beyond age 60, but lower for females. We should stress, however, that these relationships are complex and more analysis are necessary to better understand the labor market participation of older males.

The rapid process of population aging will have huge impacts on the public old-age support system for the elderly in Latin America. The increase in old age dependency ratio means that a larger number of potential beneficiaries will depend on a smaller number of workers. The results also indicate that as economies developed and pension systems become universal and more generous the labor force participation at older ages tend to decline more rapidly.

The importance of old-age support systems throughout the world is unquestionable, and the well-being of the elderly depends heavily on the provision of income from such programs. However, the necessity to adjust such programs to population aging is clear and fundamental. One of the main questions in this discussion is how the reform, and in some cases the implementation of the programs, should take place and which generations will afford for the burden of the reform.

I am now working with census microdata from fifteen (15) Latin America countries available at IPUMS-International. Census microdata will allow more detailed analysis on the determinants of older man labor force participation overtime and across countries. The project involves several steps. First, I use census data to describe historical trends in labor force participation rates of older workers. I also compare trends in labor force participation and retirement in Latin America with other developed and developing countries, following work done by Gruber and Wise. Next, I put forth a second and related question, namely how retirement hazard rates vary over time and the trends in median retirement age. Finally, I use microdata to study some of the main determinants of older male's labor force participation in Latin America.

In summary, the analysis on the determinants of male labor force participation rates at older ages in Latin America shows that economic development, population aging and variables related to

the structure of the old-age pension system have important impact on determining the observed variation. It is important to stress, however, that the impacts are stronger when one looks at cross-countries variations (pooled data) and much smaller (or non-existant) when we use a more complete panel data model that follows each country over time. I am also working on getting a longer time-series for all LAC countries regarding labor force participation rates and social, economic and demographic variables. The region went to important changes since the 1970s and it would be extremely helpful and interesting to perform similar macro-analysis using data from 1970, or earlier, to 2010.

References

Bloom, D., Canning, D., Sevilla, J (2003). Demographic Dividend: new perspective on economic consequences of population change**. Rand Coorporation**

Bloom, D., Canning, D., Fink, G. and Finlay, J. (2009.) The effect of social security reform on male retirement in high and middle income countries**. Program in the Global Demography of Aging, Harvard University Working Paper No. 48**

Bloom, D. and McKinnon, R. (2010). Social security and the challenge of demographic change. **International Social Security Review**, Vol. 63, Issue 3-4.

Bongaarts, J. (2004). "Population Aging and the Rising Costs of Public Pensions." **Population and Development Review** 30: 1-23.

Burtless, G. and J. Quinn (2001). Retirement Trends and Policies to Encourage Work Among Older Americans. Ensuring Health and Income Security for an Aging Workforce. P. Budetti, R. Burkhauser, J. Gragory and A. Hunt, W.E.Upjohn Institute for Employment Research: 375-415.

Carvalho-Filho, I. (2008). Old-Age Benefits and Retirement Decisions in Rural Brazil. **Journal of Development Economics** 80.

Cepal -Comisión Económica para América Latina y el Caribe. **Transformaciones demográficas y su influencia en el desarrollo en América Latina y el Caribe**. Santiago de Chile, Cepal, LC/G.2378(SES.32/14), 2008a.

Clark, R., Anker, R. (1990). Labour Force Participation Rates of Older Persons: an international comparison. **International Labour Review** 129(2): 255-271.

Clark, R., Anker, R. (1993). Cross-national analysis of labor force participation of older men and women. **Economic Development and Cultural Change** 41(3): 489-512.

Clark, R., York, A., Anker, R. (1999). Economic Development and Labor Force Participation of Older Persons. **Population Research and Policy Review** 18: 411-432.

Costa, D. (1998). **The Evolution of Retirement: An American Economic History, 1880-1990**, University of Chicago Press.

Cotlear, D. editor (2011). **Population Aging: is Latin America ready?** The World Bank Press

Dias, N.S.A and Queiroz, B.L. (2010). O Papel dos Programas de Seguridade Social Latino-Americanos na Evolução da Aposentadoria. **Anais do XVII Encontro Nacional de Estudos de População da ABEP**, Caxambu.

Figoli, M..; Wong, L..(2003) El camino hacia la estabilización demográfica y el proceso de envejecimiento en América Latina: una ilustración a partir de algunos países seleccionados. **Papeles de Población**, México, D.F., n. 35.

Finlay, J. And Fink, G. (2011). Social Security Reform and Male Labor Force Participation around the World. **Center for Retirement Research at Boston College. CRR – WP 2011-12.**

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

Gruber, J. and D. Wise, Eds. (2004). **Social Security and Retirement Around the World: micro-estimation**, The University of Chicago Press.

Gruber, J. and Wise, D eds. (2010) **Social Security Programs and Retirement around the World: the relationship to youth unemployment.** University of Chicago Press.

Hurd, M. and Rohwedder, S (2011). Trends in Labor Force Participation: how much is due to changes in pension? **Journal of Population Ageing**, 48: 81-96.

Hurd, M. (1990). "Research on the Elderly: Economic Status, Retirement, Consumption, and Savings." Journal of Economic Literature 28: 565-637

IPUMS (2012). Integrated Public Use Microdata Series. Disponível em http://www.ipums.org

Lee, R. and Mason, A. (2011). **Population Aging and the Generational Economy: a global perspective**. Edward Elgar Publishing, Massachusetts, USA

Lee, R. (2003) The Demographic Transition: three centuries of fundamental changes. **Journal of Economic Perspectives** 17

Lee, C. (2001). "The Expected Lenght of Male Retirement in the United States, 1850-1990." **Journal of Population Economics** 14: 641-650.

Mammen, K. and C. Paxson (2000). "Women´s Work and Economic Development." **Journal of Economic Perspectives** 14: 141-165.

Mason, A. & Lee, R. (2004) Reform and Support Systems for the Elderly in Developing Countries: capturing the second demographic dividend**. International Seminar on the Demographic Window and Health Aging**

Mason, A.; Lee, R. and Lee, S. (2010). Population Dynamics: social security, market and the families. **International Social Security Review**, Vol. 63, Issue 3-4.

Mastrobuoni, G. (2009). Labor supply effects of the recent social security benefits cuts: empirical estimates using cohort discontinuities. **Journal of Public Economics,** 93(11-12), pp 1224-1233.

O'Brien, M. (2010) Older male labor force participation in OECD countries: pension reform and "the reverse army of labour". **International Labour Review**, vol 149, issue 3 pps 239-259.

Profeta, P (2002) Aging and Retirement: evidence across countries**. International Tax and Public Finance** 9

Queiroz, B. and Dias, N.S.A (2009). Labor Force Participation of Older Males in Latin America – trends, cross-country comparison and the influence of pension systems. **World Bank Workshop – Population Aging: is Latin America Ready?** Washington, DC, July, 2009.

Queiroz, B. and Dias, N.S.A (2009). **Labor Market Participation – trends and cross-country comparisons**. Unpublished manuscript.

Queiroz, B (2008). **Labor Force Participation and Retirement Behavior in Brazil: impacts of Economic Development and Social Security System on Labor Supply in a Developing Nation**. VDM-Verlag Dr. Muller.

Queiroz, B. L. (2008) Retirement Incentives: Pension Wealth, Accrual and Implicit Tax. **Well-Being and Social Policy**, v. 4, p. 73-94.

Queisser, M, 1999. "Pension Reform: Lessons from Latin America," **OECD Development Centre Policy Briefs 15,** OECD Development Centre.

Rein, M., Jacobs, K (1993). Ageing and Employment trends: a comparative analysis for OECD countries. In: Johnson, P., Zimmermann, K (eds.) **Labour Markets in an Ageing Europe**, pp. 53-78, Cambridge: Cambridge University Press.

Saad, P. (2011). Demographic Trends in Latin America and the Caribbean. In: Cotlear, D. (ed) **Population Aging: is Latin America ready?** The World Bank Press.

Saad, P. M; Miller, T and Martinez, C (2009). Impacto de los cambios demográficos en las demandas sectoriales en América Latina. **Rev. bras. estud. popul. [online**]. vol.26, n.2

Turra, C. M.; Queiroz, B. L. (2009) Antes de que sea demasiado tarde: transición demográfica, mano de obra disponible y problemas de la seguridad social en el Brasil. **Notas de Población**, v. 86, p. 141-165.

Wise, D. (2010). "Facilitating Longer Working Lives: International Evidence on Why and How." **Demography 47**.Supplement

Wise, D. (2004). "Social Security Provision and the Labor Force Participation of Older Workers." **Population and Development Review** 30(Supplement).

Wise, D. (1997). Retirement Against the Demographic Trend: more older people living longer, working less and saving less. **Demography** 34

Zhang, J and Zhang, J. (2004). How does social security affect economic growth? Evidence from cross-country data. **Journal of Population Economics,** 17, pp. 473-500.

Box 1 – List of Countries

List of Countries	
1. Argentina	13. Nicaragua
2. Bolivia	14. Panama
3. Brazil	15. Paraguay
4. Chile	16. Peru
5. Colombia	17. Uruguay
6. Costa Rica	18. Venenuela
7. Dominican Republic	19. Bahamas
8. Ecuador	20. Belize
9. El Salvador	21. Haiti
10. Guatemala	22. Jamaica
11. Honduras	23. Suriname
12. Mexico	

Tables

Table 1 – Variables included in the regression model

Variables	Source	Period
Labor Force Participation Rates	International Labor Organization	1980-2010
GDP per capita and GDP growth rates	World Bank	1980-2010
Urbanization rates	World Bank	1980 -2010
Average years of education	World Bank	1980 - 2010
Composition of employment	World Bank	1980 - 2010
Population age structure	United Nations	1980 - 2010
Social security rules	US Social Security Administration	1980 - 2010
Social Security Measures (unused capacity, coverage rate, beneficiary rates)	SEDLAC	Available in database (most case circa 2005)

Table 2 – Five year transition out of the labor force, Males, 1990-2010 (percent)

	50-55 to 55-60			55-60 to 60 - 65			60-65 to 65-70		
Period	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
1990	4.9	0.6	10.9	17.9	0	75.7	37.3	15.4	67.4
1995	6.1	2.9	31.2	17.1	0	75.3	37.3	18.8	65.4
2000	5.5	1.2	12.2	16.2	.2	77.9	40.5	21.5	70.5
2005	5.8	0.9	16.3	17.4	2.6	73.1	41.7	22.7	72.0
2010	4.9	0.2	11.5	16.8	5.1	67.9	42.0	24.8	66.9

Source: International Labour Organization – Laborstat (2012)

Table 3 – Five-year transition rates out of the labor force, pseudo-cohort, 1990-2010 (percent)

Period	50 - 55	55 - 60	60 - 65
1990 – 1995	5.75	16.81	35.94
1995 – 2000	6.02	15.91	39.11
2000 – 2005	5.40	17.15	40.54
2005 - 2010	4.26	15.23	39.31

Source: International Labour Organization – Laborstat (2012)

Table 4 – Descriptive Statistics, Latin America, 1990-2010 (pooled)

Variable	Mean	Std. Dev	Min	Max
Male, LFPR,50-54	92.23	2.66	84.75	96.83
Male, LFPR,55-59	87.20	5.11	61.2	94.5
Male, LFPR,60-64	72.66	14.36	15.1	93.26
Male, LFPR,65 +	44.73	15.73	8.19	70.71
GDP per capita (PPP)	6852.48	4852.60	896.61	26351.26
Self-employed (%)	39.42	11.45	14.3	79.5
Gini Index	51.57	5.68	40.47	62.78
Urbanization (%)	66.65	16.13	28.5	94
Pop 65+ (%)	5.73	2.22	3.20	13.76
Pop 15-64 (%)	60.35	4.41	50.93	70.64
Life expectancy	70.76	4.75	55.1	79.2
Yrs of Schooling	6.73	1.73	2.7	9.7

Source: International Labor Organization Database, World Bank Development Data, United Nations Population Prospects

Table 5 – Determinants of Male Labor Force Participation Rate, estimates of income level effect, Latin America, 1990-2010

Variable	Panel A – Pooled Data				Panel B – Fixed Effects			
	50-55	55-60	60-65	65 +	50-55	55-60	60-65	65 +
Int.	99.77***	109.94***	120.52***	158.44***	91.15***	91.18***	61.78***	81.4 ***
GDP pc	-.87 ***	-2.64***	-5.52***	-13.19***	0.12	-.47	1.25	-4.34 ***
R2	5.09	12.58	7.69	34.98	5.09	12.58	7.69	34.98
Fixed Effects	NO				YES			

Note: *** sig at 1%, ** sig at 5%, * sig at 10%

Table 6 – Determinants of Male Labor Force Participation, Latin America, 1990-2010

Variables	50-55	55-60	60-65	65 +
Pension System	.015	.043 ***	-.006 ***	-.130 ***
Coverage (%)	-.036 *	-.065 ***	-.0556	.051
% Pop 15-64	-.446 **	-.772 ***	-1.16 ***	-1.619 ***
GDP pc	.425	1.74	4.02 *	3.793
% Urban Pop	-.013	-.159 ***	-.164 **	-.0497
Schooling (yrs)	.824 ***	.778 **	.478	-.639
% self-employed	.130 ***	.111 **	.357 ***	.596 ***
Intercept	106.70 ***	120.66 ***	107.44 ***	99.85 ***
R2	**55.92**	**71.22**	**72.00**	**85.35**

Note: *** sig at 1%, ** sig at 5%, * sig at 10%

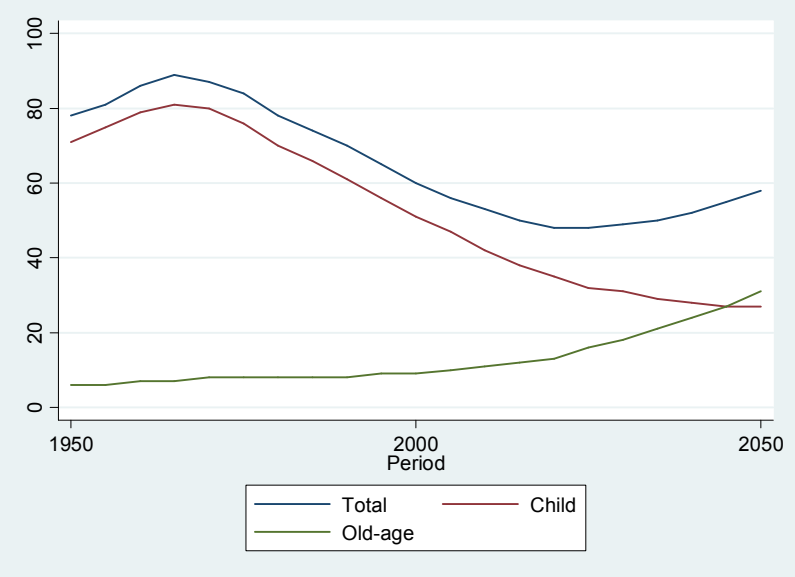
Table 7 – Determinants of Male Labor Force Participation, Latin America, 1990-2010 (fixed effects estimates)

Variables	50-55	55-60	60-65	65 +
Pension System	.116	.205	1.22 **	.150
% Pop 15-64	.033 ***	-.639 *	-2.49 ***	-.620
GDP pc	1.598	3.00	-3.05	.299
% Urban Pop	.050	.085	.048	-.065
Schooling (yrs)	-1.66	-1.40 *	-2.23	-1.56
% self-employed	-.019	-.077	-.136	-.041
Intercept	78.14 **	93.89 **	193.08 ***	87.98

Note: *** sig at 1%, ** sig at 5%, * sig at 10%

Figures

Figure 1 – Dependency Ratios, Latin America, 1950-2050



Source: United Nations Population Propects (2010)

Figure 2 – Male Labor Force Participation Rates, by pension coverage status, 2005

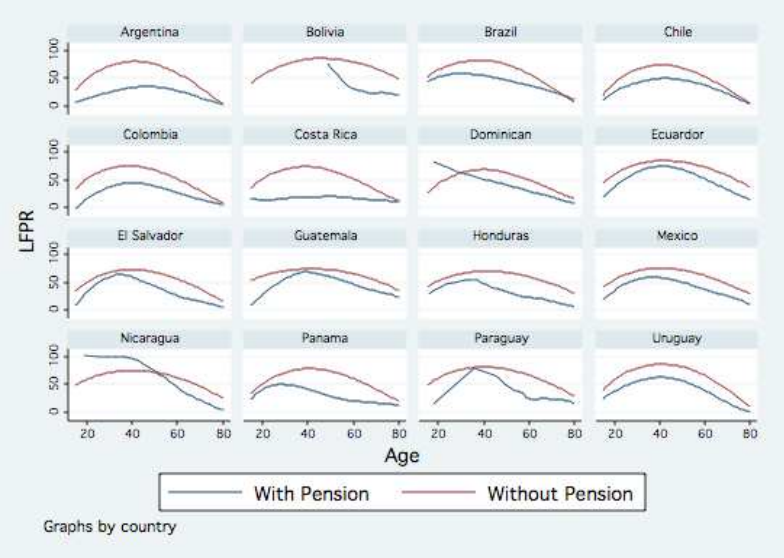


Figure 3 – Older Persons Labor Force Participation Rates and Percentage of Population Aged 65 and above, Latin America, 2005

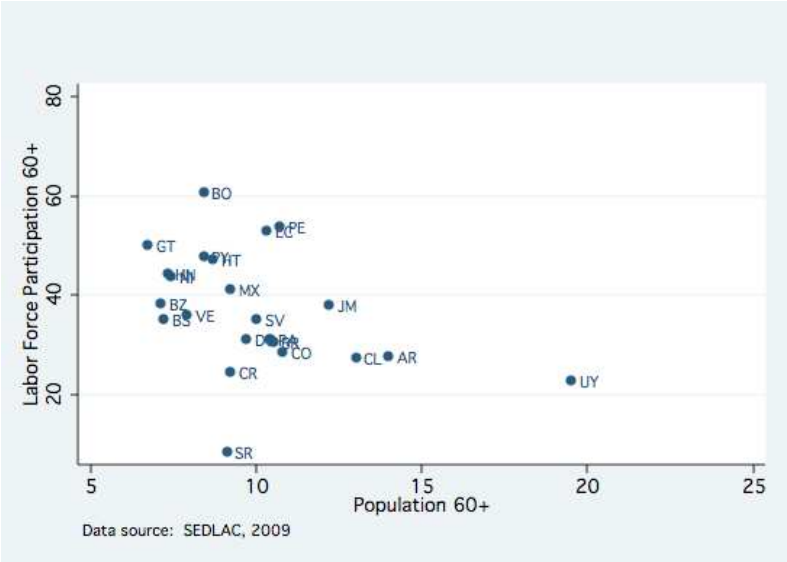


Figure 4 – Basic Characteristics of Labor Supply, Pension Coverage and Contribution Rate, by status of residence, Latin America, 2005

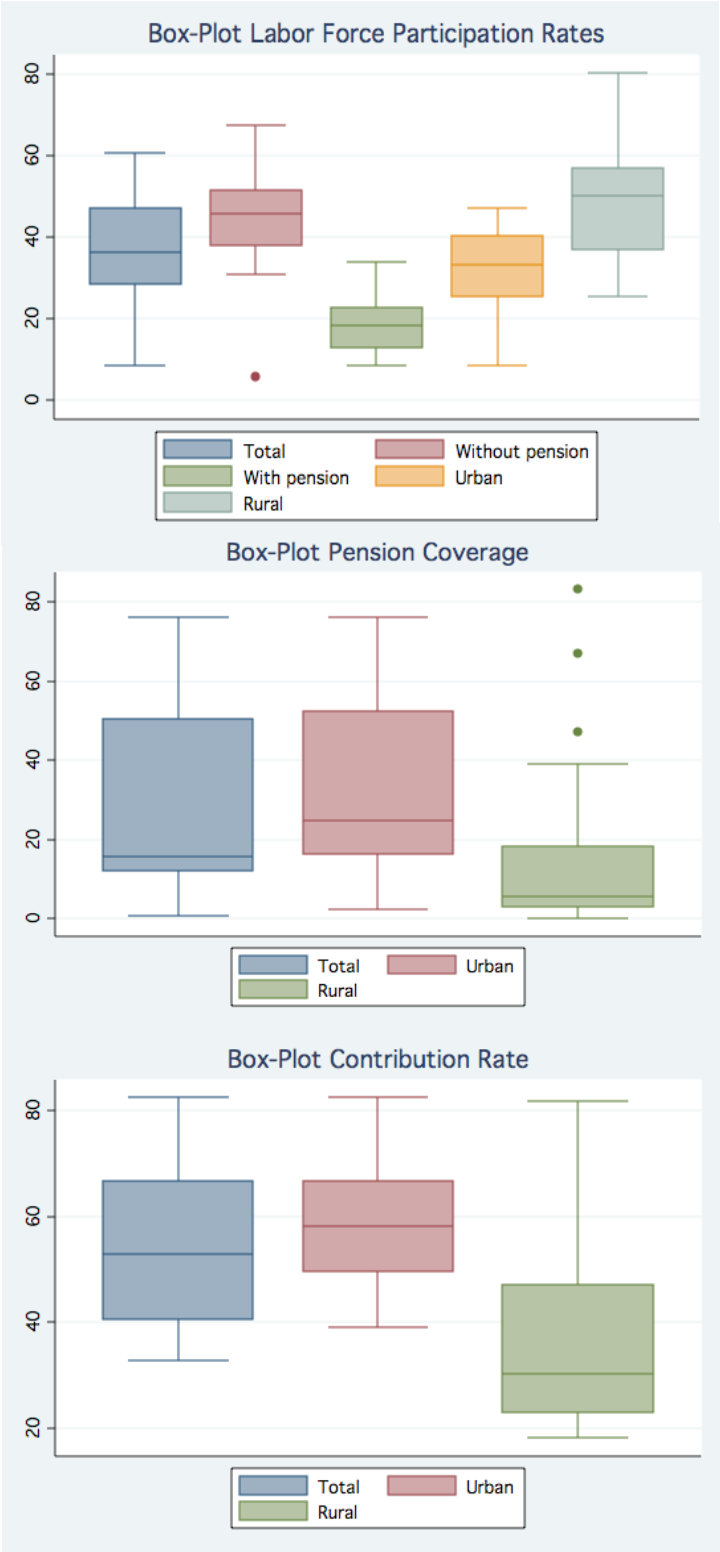


Figure 5 – Income per Capita and Older Person Labor Force Participation Rates, Latin America, Males, 2005

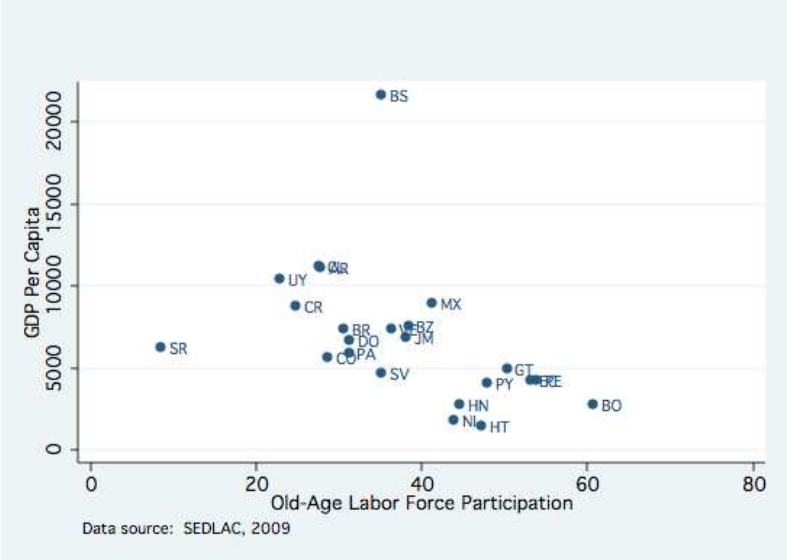


Figure 6 – Pension Coverage Ratio and Older Person Labor Force Participation Rates, Latin America, Males, 2005

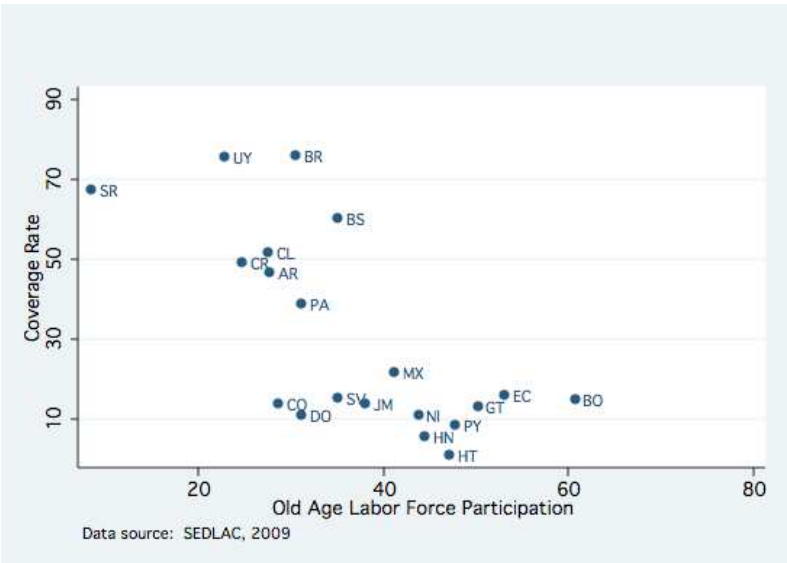


Figure 7 – Unused Labor Capacity (males), by country, Latin America, 2005

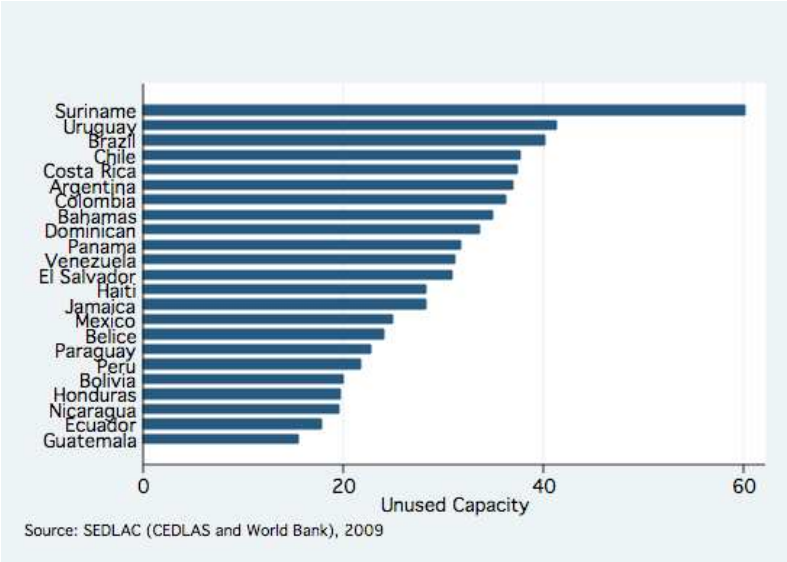


Figure 8 – Unused Labor Capacity (males) and GDP per Capita, Latin America, 2005

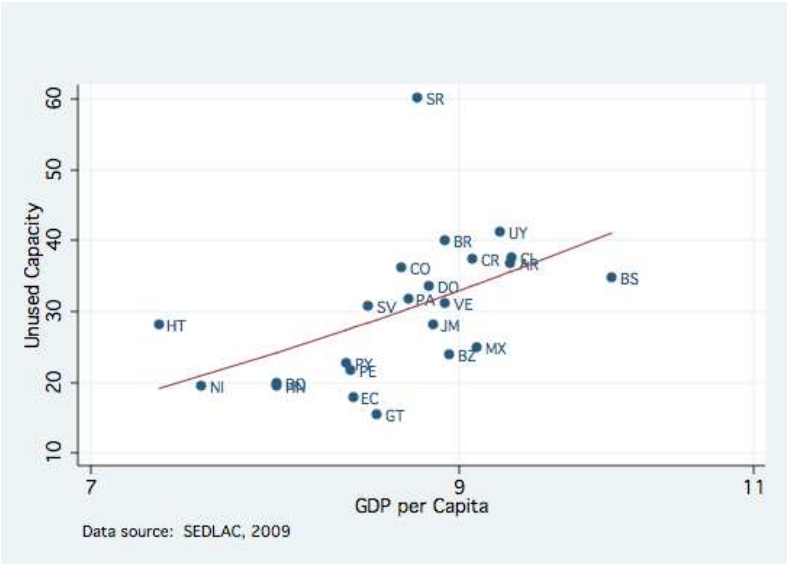


Figure 9 – Unused Labor Capacity and Percentage of Population 65+, Latin America, 2005