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Occupational change (and educational rise) implied later age of peak earnings and an earlier retirement in Latin America

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Abstract

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Introduction

Age-variation in earnings relates to consumption behaviour, demographic behaviour and well-being at different parts of the life cycle. It affects for instance the ages at which one is able to buy a house, enter parenthood and retire from work. Relative wages have been found to be strongly related to individuals' well-being, and to matter more than absolute income levels (Clark and Oswald, 1996, Grund and Sliwka, 2003). Therefore, decreased relative wages for young men could imply a decreased feeling of success in life and a perceived decline in living standards. Lutz et al. (2006) argue that the gap between income aspirations and expected/actual income is a key determinant of several important lifetime outcomes, including establishing a family and having children, as many wait to have children until they have secured what they perceive to be an adequate economic level.

Low income at younger ages can have affect earnings across the life cycle. Those who suffer relatively low wages early in life are at a higher risk of being „scarred” for life, implying that their risk of unemployment and their wage levels will be lower at higher ages than cohorts who experienced less difficult labor market conditions in their youth (Arulampalan et al. 2000; Gregg and Tominey 2005).

The shape of the age-earnings profile also has implications for firms and the macro-economy. Italian, German and American company surveys show that employers see high costs as one of the most important problems for employing older adults (Munnell et al. 2006; Bellmann 2007; Golini 2004; Kay et al. 2008). Surveys reveal a widespread perception that the wage-productivity ratio is lower towards the end of the working life and that population ageing induces growing firm costs (Conen et al. 2012). This follow the, still, common use of deferred payment or seniority based earnings systems (Lazear 1979). If age-productivity profile differs from the age-earnings profile, this can imply that the earnings systems has a redistribution across age-groups.

Age variation in earnings is not likely to follow from variation in productivity by age. While earnings peak relatively late in the working life, evidence on age-variation in individual work performance suggests a flat or an inverted U-shaped profile (Skirbekk 2008; Warr 1996). For example, firm level data where one compares variation in productivity and wages over the working life tend to conclude that wages increase faster than productivity (Flabbi and Inghino 2001; Dohmen 2004). Age-earnings systems where income peaks late in life are meant to create bonding and to reduce the agency problem of the implicit contract. Deferred payment theories suggest that workers are paid less than their marginal product when they are young and more when they grow old (Hutchens 1986; Daniel and Heywood 2007).

Seniority based earnings may persist when seniors constitute stronger political pressure group which advocate such systems -- the stronger political bargaining power of the elderly could provide one possible explanation for why they are able to earn increasingly more relative to younger age groups: Seniors organize better, are more likely to use their vote and receive more political support than younger adults (AARP 2008; Fieldhouse et al. 2007; Wass 2007; Hinrichs 2002).

In addition to the possible redistribution of wages within the working life (), results from the NTA project shows that seniors receive 7.5 times more public transfers in Brazil compare to Mexico (Turra, Queiroz and Rios-Neto, 2011). around 2000.. Younger age groups are often set through taxation to take the brunt of welfare, pension and labor reforms, e.g., pension reforms that gradually replace pay-as-you-go systems by funded pension systems tend to put a double burden on those who are currently young, who have to pay to finance the current seniors as well as save for their own pensions (Kohli 2005; Auerbach and Chun 2006).

Earnings tend to peak later in life for the better educated, while earnings profiles tend to peak earlier and be flatter among the less educated (Cushing and Rosenbaum 2010, Willis 1986). With growing education, age-earnings peak increasingly later. In parallel to the growth in education, there has been an industrial shift.

One central reason why working longer has changed from being a low status to becoming a high status characteristic is that the type of work conducted by seniors in industrialized countries has changed. Physical work demands have been decreasing for decades, while organizational and management skills, along with different types of cognitive performance are becoming increasingly important, which may make it easier for seniors to participate in the workforce at older ages ([Skirbekk and Frosch 2008](#)). This is particularly the case for the more educated, who both have better qualifications in the first place, but who also face more attractive labour market opportunities as they are more likely to keep their skills up-to-date through greater participation in training ([Arulampalam, Booth et al. 2000](#)).

Lee ([2002](#); [2010](#)) focus on labour market attachment of seniors in the US 1840-1940 and finds that the transition to industrialization may have worsened the situation of the older low skilled and also intermediate skilled individuals. Early retirement was in the US being increasingly common among the growing mid-level social classes of craftsmen, operatives, and salesmen ([Fischer 1977](#); [Lee 2005](#)). Epstein ([1928](#)) noted: "An examination of the census data by specified occupations shows that while the aged are still holding their places among the gainfully employed in agriculture, the professions, independent small businesses and even public service are practically eliminated from all the major industrial occupations". When work requires that skill demands for adaptation and physical agility has been related to younger retirement ([Squier 1912](#); [Epstein 1928](#)) and a lower success rate in adopting to a modern work environment ([Graebstein 1980](#)).

Farming and herding required many work tasks that did not necessitate high levels of physical strength, speed or dexterity, thus seniors' usefulness increased as they could continue with simpler and lighter tasks when their capacities weakened. When agriculture was the most common occupation, most individuals kept on working to higher ages, and more than half of 65+ males were employed in countries such as Spain, Sweden, France, Germany, Norway, UK and the US ([Costa and McCrae 1988](#); [Jacobs, Kohli et al. 1991](#); [Bull 2006](#); [Elu Terán 2006](#)). The self-employed can often remain in the workforce until old age by adjusting their work efforts in accordance with changing health, preference, and economic need. Quinn et al. ([1990](#)) find that farmers and other self-employed reduce working hours, while those who are employed leave the work-force altogether. In the early twentieth century United States, self-employed farmers were much less likely to retire than non-farm wage earners ([Lee 2002](#)), partly because farmers could do so through adjusting acreage, crop-mix and by productivity growth following mechanization ([Pedersen 1950](#)). The decline of agriculture brought a decline in the labor market involvement of older men ([Long 1958](#)). Sauré and Zoabi ([2011](#)) suggest that the differences in occupational composition explain up to 38% of the current cross-country variation in the current retirement age across the OECD.

Improving health and abilities improved senior work capacity, while the impact of rapid technological change can worsen the labour market position of seniors ([Skirbekk 2008](#)). Hence, one remains attractive on a competitive labour market and signals good health, high ability, and that unlike many of one's age-peers, is able to cope with new technologies and work forms. Surveys from Europe and North America reveal that employers see high costs relative to productivity as one of the most important reasons for not employing older adults ([Golini 2004](#); [Bellmann 2007](#); [Kay, Kranzusch et al. 2008](#); [Munnell and Sass 2008](#)), which implies that only more productive seniors are offered continued employment.

Individual work performance over the life cycle are in most studies of age-productivity variation found to either to be relatively flat or to decrease in the latter half of the working life. Underlying the reduction in working capacities in the latter half of life are decreases in several work-relevant cognitive abilities, health and motivation ([Warr 1994](#); [Flabbi and Ichino 2001](#); [Dohmen 2004](#); [Skirbekk 2008](#)). High income individuals with long education are at any given age on average better cognitively skilled than low ability groups, and may therefore be better able to continue to work to a higher age ([Verhaeghen and Salthouse 1997](#); [Park, Nisbett et al. 1999](#); [Maitland, Intrieri et al. 2000](#)).

Growing national income levels can increasingly enable seniors to retire, but national income growth is also usually related to a greater income potential and higher opportunity costs for continued work. Further, a high GDP may also correlate with health and skills at older ages, which can relate to a higher productivity potential at older ages, and hence this may explain the later retirement of richer countries ([Fischer and Sousa-Poza 2006](#); [Skirbekk, Loichinger et al. 2012](#)). The highly educated have more to gain from continuing work partly since deferred payment systems, where older workers above their marginal product are more commonly used among highly educated ([Hutchens 1986](#)). Earnings rise the most with age for the more educated; while the average wage ratio of 45-54 year olds to 25-29 year olds was 1.26 for those with upper secondary education it was 1.92 for those with university education ([OECD 1998](#)). This implies that working until higher ages can be more attractive among the better paid highly educated (although the wage-cost ratio is higher, making this group more costly to employ).

As income levels increased in the US since the mid-20th century, Coleman and Pencavel ([1993](#)) find that individuals with lower economic status reduced their number of working hours, while those with higher income levels increased their working hours. African-Americans aged 65+, with comparatively low education levels, had higher employment rates at ages 65+ than Americans of European descent from 1880 to 1950 – but lower employment from the mid-20th century onwards ([Holt 1997](#); [Costa 1998](#)). The relation between income and retirement is, however, not always consistent and many individuals use higher levels of income and wealth to retire early, as found in a US study by Gough et al. (2008) and in a Swiss survey by Bütler et al. ([2005](#)). However, Tysse ([2001](#)) finds a positive relation between income and the age at retirement using Norwegian census data and also Gruber and Wise (2004) conclude in a cross-country study that a higher life-time income raises the retirement age.

Latin America's two largest economies, Brazil and Mexico, offer an interesting case as they both have experienced a rapid industrialization with falling employment among the self-employed and declining importance of primary industries. Both have seen rapid increase in mortality and fertility causing a rapid population ageing, population aged 65 and above is projected to reach 24% and 27% in 2050 in Mexico and Brazil, respectively, compared to about 10% today (United Nations Population Prospects, 2012) GDP per capita in 2010-2011 was 12,789 USD per capita for Brazil and 10,153 USD for Mexico (International Monetary Fund, 2012). The extensions of old-age social security, however, have been uneven between the two countries. In Brazil, social security expenditures for workers in the public and private sector are about 11% of GDP whereas in Mexico it is about 3% of GDP (Queiroz, 2012). Mexico has the highest retirement age within the OECD, varying between 72.2 and 74.1 years for men in the 2000-2009 period. Brazil, on the other hand has an average effective retirement age of 54 years for the formal sector for workers retirement under the length of contribution rules, and the overall male retirement age is around 63 years.

The main objective of the paper is to investigate how changes in occupational composition and age-earnings profiles are related to different trends in the elderly labor force participation and retirement patterns in Brazil and Mexico? Our main working hypothesis is that the occupational change and educational rise caused a rapid shift towards an older age-earnings profile and at the same time a trend towards early withdrawal from the labor force.

Data

We use census data to study historical trends in labor force participation rates, occupation shifts and age-earning profiles. The data are public available at the Integrated Public Use Micro-data Sample (IPUMS). The available data allows aggregation at the household, state and region levels. IPUMS uses United Nations (UN) and International Labour Organization (ILO) labor force definitions to maintain consistent across time and countries, however they caution that small differences exist which can affect analysis of the results. In particular, the micro-data samples for, Brazil (1960,

1970, 1980, 1991, 2000, 2010) and Mexico (1970, 1990, 2000 and 2010) are the main basis for the empirical analysis of the labor force and retirement patterns of older workers.

IPUMS-International is a collection of publicly available individual-level census data. The data are samples from population censuses from around the world taken since 1960. IPUMS works with the data to make them comparable across different countries and years. IPUMS follows a coding scheme that reduced variables down to the lowest common denominator across all samples would inevitably lose important information. In this paper, we use three main variables: labor force participation, labor income and industry of occupation (IPUMS, 2012).

Methods

We separate the analysis in two parts. In the first part, we focus on a more descriptive analysis of occupational composition changes by birth cohorts for each country. We also investigate the changes in age-earning profiles for all employed workers and separately by different occupations and educational attainment overtime. In the second part of the analysis we use regression models to analyze how changes in age peak of earnings and trends in the labor supply of older workers, in Brazil and Mexico, are related to the changes in the educational and occupational composition in these two countries. We expect that the differences in occupation composition and age-earnings profile, in addition to the public pension system, have an important impact on explaining the trends in labor force participation at older ages in these two countries.

Anticipated Results

Table 1 shows the participation of primary sector in the employment level of Brazil, Mexico and the USA, used here as a comparison group. Primary sector includes workers in the agricultural and fishing sector, following the aggregation developed by IPUMS. From 1960 to 2000, primary industries employment fell from 60% to 24% in Brazil and from 41% in 1970 to 16% in 2000 in Mexico. In comparison, agriculture in the US fell from about 39% to 4% from 1900 to 1980.

Figures 1 and 2 show the percentage of workers in the agricultural sector by birth cohort overtime in Brazil and Mexico. Older cohorts have a very large percentage of workers in the agricultural sector in both countries the youngest cohort, those born between 1960-69 started at lower levels and see their participation decline further over time. The increase participation of older cohorts is probably due to the retirement of workers in other sectors as they age, which increases the participation of the agricultural sector.

Figures 3 and 4 show the percentage of workers in the agricultural sector over time controlling by age. In other words, it is showing how the share employed in agriculture by 10-year age group over time. In both countries, we observe a decline in the employment in agriculture at all ages, but the fastest change is observed in the youngest age group. The decline observed for the 10-19 years old is mostly explained by increasing educational attainment, so we expect similar pattern in other occupations as well. On one hand, the decline on the participation of agriculture in occupation is observe across all ages groups, giving evidence that workers in the agricultural sector are growing older what might have impacts in the productive levels in the near future. On the other hand, the increasing participation in manufacturing and services are also related to shorter working lives, and early retirement, what combined to population ageing might have significant impacts in the sustainability of the public pension system programs.

Figures and Tables

Table 1 – Percentage of population in the primary sector, Brazil and Mexico, males, 1960-2000

Year	Brazil	Mexico	United States
1960	60,76	31,82	7,35
1970	52,69	41,88	4,31
1980	36,22	N/A	3,45
1991	29,02	23,41	3,06
2000	23,54	16,55	2,49

Source: IPUMS (2012)

Figure 1 – Percentage of workers in the agricultural sector, Brazil, by birth cohort, 1960-2000

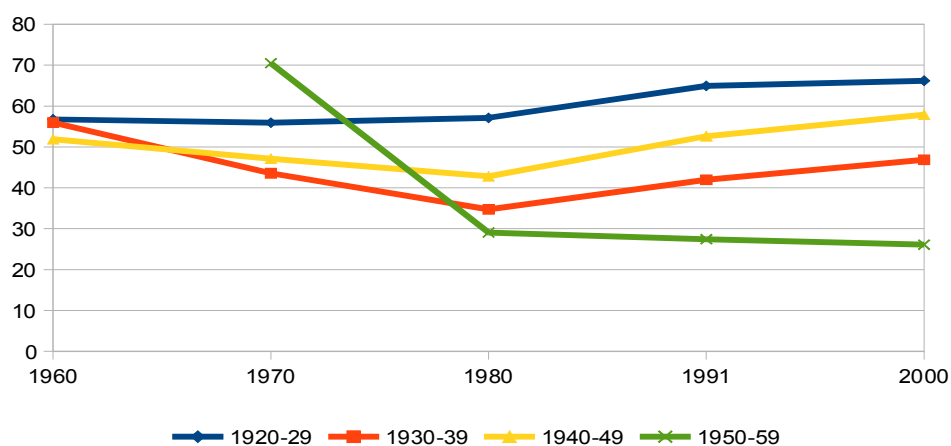


Figure 2 – Percentage of workers in the agricultural sector, Mexico, by birth cohort, 1960-2000

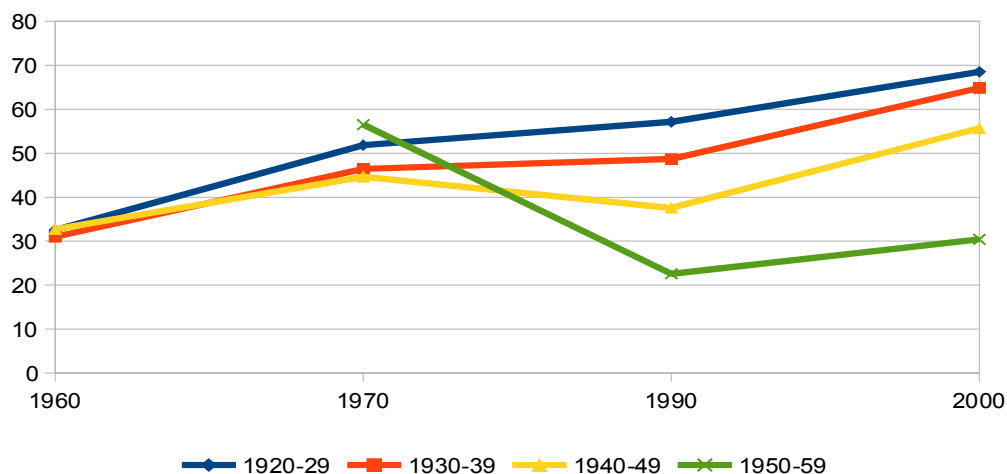


Figure 3 – Percentage of workers in the agricultural sector, Brazil, by age groups, 1960-2000

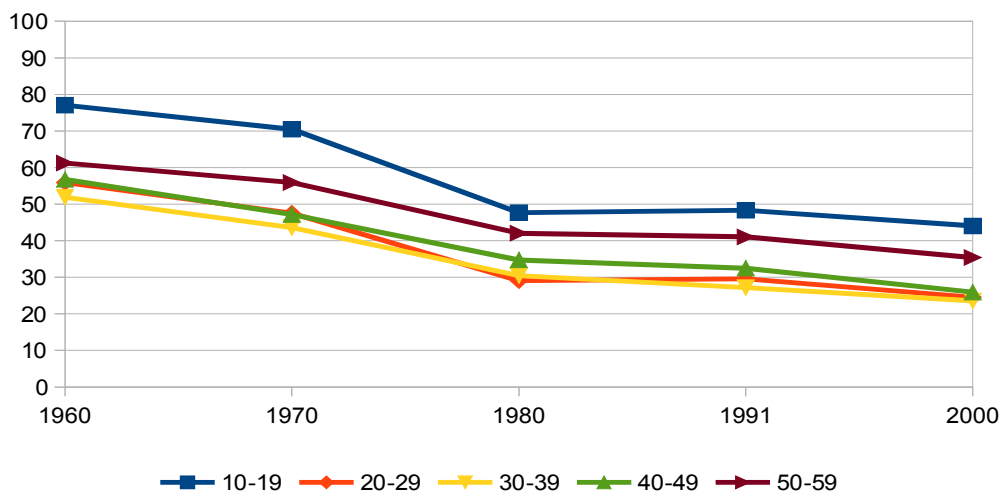


Figure 4 – Percentage of workers in the agricultural sector, Mexico, by age groups, 1960-2000

