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A life-cycle analysis of ending mandatory retirement ☆

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ABSTRACT

In this paper a life-cycle model is constructed to study the macroeconomic effects and welfare implications associated with eliminating mandatory retirement. Our short run analysis reveals that changes in welfare during the transition depend on the dynamic nature of the wage rate adjustment process. We distinguish between transitions in which the wage rate clears the labor market and transitions with a sticky wage and youth unemployment. We also examine political feasibility by measuring the popular support that this type of policy might have under the two labor market scenarios. Finally, we identify the effects that the policy has on welfare in the long run.

1. Introduction

In this paper we study the macroeconomic effects and welfare implications associated with eliminating mandatory retirement. The analysis is performed using a large scale life-cycle model of the type developed by Auerbach and Kotlikoff (1987). The model features heterogeneous individuals with a lifetime labor/leisure choice and endogenous retirement decisions. Model parameters are calibrated with data from the Canadian economy and policy experiments are performed by removing mandatory termination of work. The reason for applying the model to study the Canadian experience is that in recent years several of Canada's provinces have abolished the policy of mandatory retirement.[1] Our analysis deals explicitly with policy short and long term macroeconomic effects and potential welfare gains and losses. In addition, we are also able to capture age specific outcomes that may arise in the course of the policy implementation process.

This paper is related in both methodology and consideration of a change in the statutory retirement age as a policy option to a large body of literature that has studied reforms to social security systems. These reforms have been proposed in the hope of alleviating pressures that arise from aging populations. Auerbach and Kotlikoff (1984) were the first to employ a large life-cycle model to study social security reforms in the U.S. economy. However, many studies followed, simulating the model by using parameters and demographic patterns specific to different countries. For example, extending retirement as part of pension reforms has been proposed and studied in life-cycle models by Hviding and Merette (1998) for a number of OECD countries; De Nardi et al. (1999), and Conesa and Garriga (2003) for the U.S.; Hirte (2002) for Germany; Lassila and Valkonen (2002) for Lithuania; Henin and Weitzenblum (2003) for France; Beetsma et al. (2003) for the Netherlands; Keuschnigg and Keuschnigg (2004) for Austria; and Hongxin and Merette (2005) for China.[2]

Unemployment effects are examined in only two of these studies. Hirte (2002) models under-employment that persists over the life-cycle due to a constant difference between the cost of labor and its marginal product, resulting to part of the individual time being employed and part of it being unemployed at each stage of the life-cycle. Keuschnigg and Keuschnigg (2004) look at pension reforms in a model that captures long run search unemployment.

We depart from the literature mentioned above in several respects. First, we model transitional unemployment for new entrants in the labor market, which in the model economy correspond to young generations. In this way we address one popular concern related to the policy of ending mandatory retirement which is the possibility of creating youth unemployment. Unemployment at early stages of the life-cycle is important for welfare outcomes as it may prevent individuals to

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[1] The remaining Canadian provinces have joined Alberta, Manitoba, Quebec and Prince Edward Island in banning the policy of mandatory retirement. These include Ontario in 2006, Newfoundland and Labrador and Saskatchewan in 2007, British Columbia in 2008 and Nova Scotia in 2009.

[2] The initial work of Auerbach and Kotlikoff (1987) was followed by numerous studies aimed at analyzing unsustainable social security systems. In this literature review, we only consider studies that include retirement reforms in the suggested policy remedies.

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build up necessary assets for retirement and induce them to work longer for the rest of their lifetime. Thus we examine transitional periods that follow two types of wage adjustment scenarios: a flexible wage which clears the labor market and a sticky wage which follows a slower adjustment and creates unemployment. We are able to compare welfare gains and losses in these two types of transitional structures, and in the long run equilibrium.

Second, we investigate age specific welfare outcomes at the start of each transitional path with clearing and non-clearing transitional labor markets. Any welfare changes of generations alive at this period will affect public support for the new policy. Thus we examine whether banning involuntary retirement is a feasible political equilibrium that is supported by a majority vote.

Third, we examine the effects of banning mandatory retirement in Canada. In provinces which previously allowed mandatory retirement, the normal age of retirement was typically at the age of 65. Although six percent of workers continue to work full-time after the normal age of retirement, the current average retirement age in Canada is 62. Thus, it would appear that the policy might have small or no effect on economic outcomes and individual welfare. However, data from labor force surveys in the period 1997 to 2006 suggest that a trend to retire early, particularly prevalent in the 1990s, may be reversing (see Burbidge and Cuff, 2008). It is likely that this trend may continue to reverse due to several reasons: firstly, an aging population due to low fertility rates and combined with the baby boom generation will increase the number of old workers in the workforce (Martel et al., 2007); secondly, improvements in health and longevity allow for the possibility to work longer (Hogan and Lise, 2003); and thirdly, younger people now spend more time studying than in the past, and thus might be shifting working years to later in life (Beaujot, 2004).

To preview our main results, we find that when comparing long run equilibrium outcomes with and without mandatory retirement, new entrants in the labor market would actually prefer to be born in an economy with mandatory retirement. Welfare outcomes are also lower for individuals born during the transition to a voluntary retirement economy, and the reduction in welfare varies with the type of the wage rate adjustment process. In particular, individuals who enter the economy in a transition with flexible wages experience a lesser reduction in welfare than individuals born in the long run with voluntary retirement or a transition where wage rates are slow to adjust. Despite the fact that welfare is lower for all agents born after the policy change, for a majority of the current population welfare can be improved by removing the mandatory retirement rule. As a result, our measures of political feasibility concerning voters alive at the time of the policy announcement to end mandatory retirement indicate that the policy is supported by a majority vote.

The rest of the paper is organized as follows: the model is outlined in Section 2 and calibrated in Section 3. Policy experiments are performed and discussed in Section 4. Concluding remarks are provided in Section 5.

2. The benchmark economy

We model a variant of the Auerbach and Kotlikoff (1987) life-cycle economy. At each discrete point in time, overlapping generations of individuals differ with respect to their age, labor productivity endowments, probability of surviving into the next period, employment status and asset holdings. A new cohort enters the economy in every model period. Individuals live for a finite number of years and typically work for a large fraction of their lifetime. They are also faced with a period consumption/leisure choice in order to maximize their lifetime utility. The model has a pay-as-you-go public pension plan with flexible drawing dates which collects contributions from working individuals and redistributes funds to the current retired population or workers eligible to receive pension benefits.

2.1. Demographics

We assume that the demographic structure of the population is stationary.[3] The population grows at a constant rate n. The length of individual life lasts for a maximum of J model periods. At each age j, for $j = 1,..J-1$, the conditional probability of surviving from age j to age $j+1$ is given by $\psi_j \in (0,1)$. The probability of becoming s-years old is then $\Pi_{j=1}^{s}\{\psi_j\}$. A new generation enters and leaves the economy with certainty; consequently $\psi_0 = 1$ and $\psi_J = 0$. The fraction of each cohort in the total population is constant and given by $\mu_{j+1} = (1+n)^{-1}\mu_j\psi_j$ with $\sum_{j=1}^{J}\mu_j = 1$.

2.2. Individual problem

Each individual derives utility from consumption, c_j, and leisure l_j. The objective of a new entrant in the economy is to maximize her expected discounted lifetime utility:

$$E_0\sum_{j=1}^{J}\beta^{j-1}\left[\Pi_{s=1}^{j}\psi_s\right]U\left(c_j,l_j\right) \tag{1}$$

where β is the subjective discount factor.

The life of an economic agent is characterized by a working period and a retirement period. Individuals are endowed with one unit of time per period which they can choose to divide between working activities, h_j, and leisure, $l_j = 1 - h_j$. Average labor productivity varies with age. In particular, we assume that one unit of time, if devoted to work, can be converted to z_j efficiency units of labor. The benchmark economy is characterized by a mandatory retirement age which is denoted by jr. Individuals retire if they reach this age or if they do not choose to supply any positive amount of labor time.[4]

New generations enter the economy with zero assets. Income of the working young is generated from earnings from labor services and interest payments on accumulated assets. Retired older agents consume pension benefits, their private savings and interest returns. In periods of low income, consumption and leisure may be financed by borrowing. By the end of their lifespan, individuals pay any accumulated debt or deplete all of the remaining assets. Let q_j and k_j, respectively, indicate disposable non-capital income and individual private savings. The price of consumption goods is normalized to one. Also, relative factor prices are denoted by r and w for capital and labor, respectively. The budget constraint facing an individual is given by:

$$k_{j+1,t+1} = (1+r_t)k_{j,t} + q_{j,t} - c_{j,t}. \tag{2}$$

Non-capital income, q_j, includes disposable labor income and/or pension benefits, b. A contribution tax to the pension plan, τ, is applied to labor income for most of the working life. If individuals are eligible and elect to receive benefit payments, the contribution tax is removed. Pension benefits are intended to replace a fraction of an individual's labor income during retirement, however, the retirement age (jr) and the age that benefits are received (jb) may differ. The model places no restriction on the number of hours that pension recipients will decide to supply, should they continue to work. In this way the model mimics the flexible structures of Canada's pension plans. Finally, all individuals receive or pay lump-sum government transfers or taxes, tr. We assume that any accidental bequests left by individuals are equally redistributed

[3] The demographic structure in Canada is non-stationary, and the population's average agent is aging. However, in order to isolate the effects of ending mandatory retirement, these demographic changes must be addressed in a separate paper.

[4] Thus, in the benchmark economy the working life of an individual may vary but it continues for a maximum of jr-1 periods.