university of groningen

MSC ECONOMICS MASTER THESIS

On the Sustainability of the Albanian Pension System

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Abstract

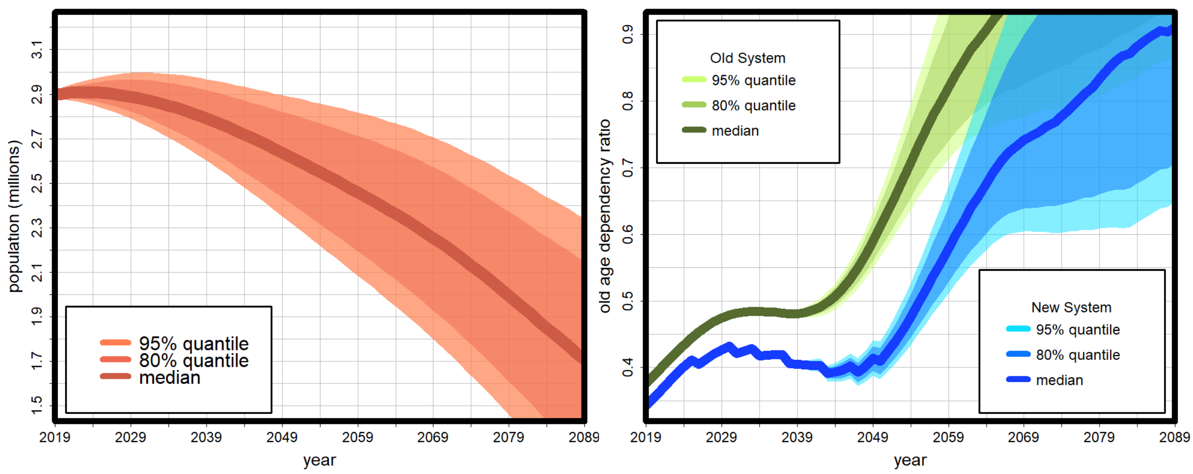
The paper examines the sustainability of the pension system in post-communist Albania. We model the impact of the latest pension reform on the contribution rate and other macroeconomic variables from a general equilibrium perspective. Our findings show how the reform has improved the sustainability of the system for the next three decades. However, doubts remain over the adequacy of the current benefit formula in the long term. Additional measures will be required and Albania should continuously monitor the demographic developments and proactively engage in the construction of complementary pillars.

1 Introduction

Despite a relatively young population, Albania is experiencing below-replacement fertility rates and an increasing life expectancy comparable to those of most Western European countries. Essentially, individuals tend to live longer lives while deciding to have fewer children.

An aging population, combined with a shrinking workforce, rises serious concerns over the sustainability of any pension system, particularly one which is fundamentally sustained by a single pay-as-you-go pillar. The current pension system has already been running at deficit for the last years and pressure to reform has come both from the European Union, in its enlargement-campaign-induced supervision process, and from external investors, concerned by the increasing deficit it entails.

A pension reform package came into force in January 2015 to address those concerns and invigorate the fiscal sustainability of the system. It was designed to progressively increase the retirement age, gradually phase out the subsidised rural pension scheme, strengthen the link between benefits and contributions, and indexing pensions to inflation. However, the current U.N. population forecasts suggest an exceptional demographic pressure on the system. Figure 1a shows how the total population could almost halve before the turn of the century. If mortality rates keep decreasing, the Old Age Dependency Ratio (OADR), the number of pensioners relative to the working population, could more then double during the same period of time, as shown in Figure 1b.



(a) Total Population (b) OADR under the Two Systems

Figure 1: U.N. Forecasts

The reform seems to be able to contain the increase of dependency ratio for the first half of the century only. If the current population pace is confirmed, additional postponements in the age of retirement will be necessary in the future. Nonetheless, the initial result only provides a rough approximation of the future course of the pension system as it does not take into account the behaviour adjustments of the economic agents participating in it. Similar figures have animated the public discussion about the necessity of pension reform and guided policy makers in the package construction, however, there is no trace in the literature, or in governmental reports, of economic models that capture the effect of the demographic challenge on the relevant macroeconomic variables.

The reform intended to mitigate negative demographic effects, increasing the credibility of the pension system. The scope of this contribution is to scrutinize its effectiveness. We propose a general equilibrium model of overlapping generations for Albania of the kind proposed by Auerbach and Kotlikoff (1987) to estimate the impact that the reform has on individual cohorts, their labour supply and their life consumption profiles. A general equilibrium approach of this kind allows us to further investigate the effect that the demographic change has on the economy as a whole, the path of capital accumulation, wages and interest rates. Our model is able to capture the change in the spending profile due to expected length of the retirement period. More importantly it allows us to calculate the effective contribution rate, either direct contribution or other forms of taxation, needed to maintain the promises made to current and future pensioners. If the increase in life expectancy outpaces the retirement postponement schedule that has been proposed, additional measure will be required. Our findings show that the new reform is able to keep the deficit originated from the pension system at bay for the next three decades, roughly the time needed for the reform to materialize in the first place. Further adjustments will be needed after that period, in a chasing pursue that could have distorting and deteriorating effects for the economy.

Albania could be faced with the Western curses of an aging population and a low productivity growth before it has reached its economic potential. Heavy reliance on a PAYG scheme could put extreme pressure on the public finances and curtail the sort of investments and reforms needed to escape the middle income trap. A modeling on alternative systems as well as a possible transition to a fully founded pension system is beyond the scope of this work and it will be left as a discussion. The policy space for government action is essentially constrained to three options: reduce the benefit it promises, use the time it has bought itself to transition to a more sustainable pension system or keep increasing the age of retirement after 2056. If the last option will be chosen, citizens have the right to know when they will mature the right to pension as early as they start contributing for it.

The paper is structured as follows. In the next section we present a short inquiry on the approaches proposed in the literature to tackle the problem. Section 3 is an overview of the historical context that gave rise to the conundrum. Section 4 highlights the main features of the Albanian pension system. Section 5 provides details of the data used in our simulation exercise. In section 6 we construct the model and present its solution method. Section 7 discusses the results and their limitation. In section 8 we conclude.

2 Literature Review

Overlapping generation models come in different flavors and degrees of complexity. The power and flexibility they provide has elevated them to be the paradigm when the objective is to capture the behaviour of individuals facing idiosyncratic incentives to which they react according to the generation they belong to. These models allow us to isolate the effects of fiscal policy, demographic change or a combination of the two for different cohorts and the economy as a whole.

Closely related to our work, De Nardi and Imrohoroglu (1998) study the implications of the population projections for the U.S pension system, concluding that additional postponements are need to maintain its financial sustainability. The also find that simpler accounting practice, as the one that could be based on Figure 1b alone, tend to underestimate the size of the necessary fiscal adjustments, providing a justification for the use of general equilibrium frameworks when constructing fiscal responses to change in the demographic landscape. Our theoretical model is similar in nature to the one proposed by Krueger and Ludwig (2006), however they propose a large scale model with multiple open economies, their main focus is to evaluate the direction, and intensity, of capital flow across regions that face different demographic outlooks.

An interesting theoretical exercise is the one proposed by Cooley and Soares (1996), they study the feasibility of different pension system reforms from a political economy perspective. They want to determine weather the reform considered would gather enough support in a majority-rule vote, an intriguing direction for future research that would extend the analysis beyond the economic realm.

Despite its popularity, to the best of our knowledge, the only similar pension sustainability check for a Western Balkan country is the one done by Verbic et al (2005), for Slovenia. They are also motivated by a similar drive, the effects of the latest pension reform on the welfare of different generations and the sustainability of the Slovenian finances. Their results have indeed been confirmed by later observations. They suggested that additional reforms were needed to reduce the deficit created by the pension system but with overall prospects much brighter then the ones for Albania. In these respect, despite borrowing from a vast literature in the topic, this contribution seems to stand alone in its geographic interest and hopes to stimulate the production of additional research that could help elucidate the feasibility of alternative policy paths for such a peculiar region.

3 Historical Context

3.1 Communist Era

The long history of isolation of the little Balkan country made it for a great comparative case study for historians and economists alike on the consequences of almost complete detachment from the rest of the world, before North Korea managed to take the spotlight, of course.

Surrounded by a harsh mountain range, the local population was able to preserve its culture and language, despite the expansionist ambitions of surrounding countries and a five centuries long Ottoman occupation.

By the beginning of the last century, the cultural heritage also came with huge burdens, an almost feudal economy, record levels of illiteracy and few institution that could serve a functioning modern state. A fertile soil for one of the harshest communist regimes to have been implemented.

The 100% employment rate of the communist period was paraded as the distinctive feature of the Marxist ideology and an indisputable proof of the alleged superiority of the Eastern Bloc compared to the rest of the world. The bright lantern was shading light to the rest of Europe[1].

It doesn't come as a surprise that the regime, in a characteristic paternal attitude, was providing a pension to all its citizen, which in turn did not know much about the process that created them and to a certain extent did not care, as long as the institutions were able to guarantee them benefits during retirement.

3.2 Democracy Now

The fall of Communist took down with it the record employment rate as well as the massive surveillance and control complex that sustained it. The newly formed proto-democratic

[1]an adaptation of a famous sentence uttered in he 7th Congress of the Communist Party of Albania by the former dictator Enver Hoxha

government encouraged the formation of private businesses and brought a general sense of euphoria in the population.

Also due to the very low starting point, the economy grew at high rates for some years, providing new prosperity and masking the true reason for the sudden capital inflow: remittances from emigrant workers, all sorts of creative kinds of illegal smuggling and a often politically-encouraged practice of money laundering. The mixture was explosive. Individuals started promising unrealistic returns on capital, in a classic example of pyramid scheme, this time on a national level. The population was even reassured by the prime minister of the time, Sali Berisha[2].

The pyramid erected in the center of Tirana as a museum for the legacy of Leader, is now a spectral, almost ironic, reminder of what came after and of the risks of pyramid schemes in a country with no financial literacy.

3.3 A New Framework

During the restructuring of the pension system that all the Eastern European countries undertook, was of particular temptation, if not political necessity, for the new democratic institutions to promise the same form of previous support, a defined benefit (DB), in a one-pillar pay-as-you-go (PAYG) public scheme.

The economic restructuring in post-communist countries led to sudden jump in the unemployment level as well as substantial reduction in tax compliance. It was soon clear that a modernization was needed. However, the multi-pillar model proposed by the World Bank for developing economies (World Bank, 1994) that was implemented by other countries, failed to be adopted in Albania, partly due to the lack of institutional support and partly consequent of scepticism about any form of private financial funds.

The PAYG financing regime, where benefits payed to the retirees come from contributions of the current workforce, performs fine if the growth rate of the working population is able to counterbalance the aging factor of the population, otherwise deficit in the public finances or real devaluation of the promised pensions must occur.

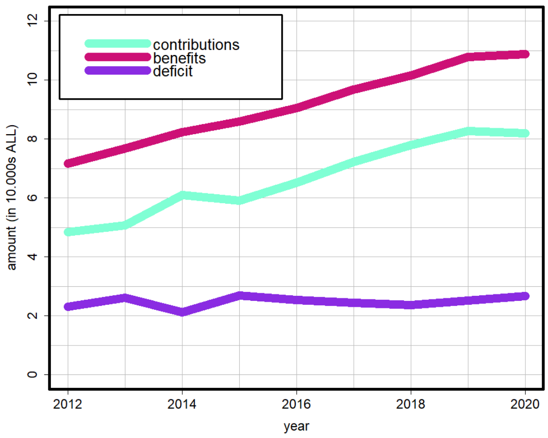
Despite having a young average population, the widespread informality of the labor force and the great outflow of human capital has compromised the public finances. The phenomenon was evident after the initial momentum of output growth was lost. With the current aging population and a decline fertility rate, if the society keeps hemorrhaging potential contributors, the social security budget will run at increasing deficits in the following years.

[2]from the archive of state television TVSH

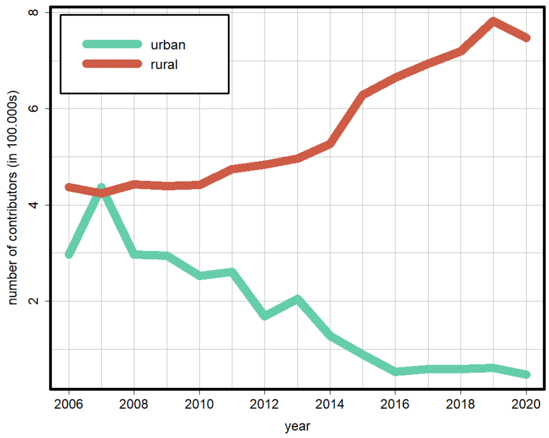
4 Pension System

Characteristics: Pay-as-you-go system with defined benefit and defined contributions, where the state covers the account deficit.

Regulatory Framework: The government is the ultimate supervisor and determines the social benefit policies. The Social Insurance Institute (ISSH) is the entity responsible for the administration of the different obligatory social insurance schemes, including old pensions. Most of the figures reported, such the number of participants and the exact amounts involved, come from their reports of the years 2006-2020[3]. The income from direct contributions, the expenses for the pension benefits and the resulting deficit are shown in Figure 2a for the period 2012-2020.



(a) Pension Accounts



(b) Urban and Rural Contributors

Figure 2: ISSH Accounts

Current Laws: The current legislation governing affairs of social security was introduce in 1993, Law no 7703[4], "On Social Insurance in the Republic of Albania" (amended). In 2015, important parametric reforms were introduced with the objective of adapting to the dynamic demographic changes and improve the fiscal sustainability of the system, among which a gradual increase in the retirement age and a new formula to calculate the benefits were implemented.

Regimes: Special regime for rural areas due to the economic discrepancy with the urban part, particularly the high incidence of informal jobs and the lower wages. The

[3]for the last one available: http://www.issh.gov.al/wp-content/uploads/2021/04/Perb_12_20-web_07_04_2021.pdf

[4]https://www.legislationline.org/documents/action/popup/id/16420

special regime concerned roughly 17% of the total pensions and are heavily subsidized by the government. The development of the number of contributors in the recent years coming from the different regimes is shown in Figure 2b.

Social Pension: Any resident for at least the last five years, aged 70 and non eligible for any other social insurance pension. In case of income from other sources lower then the social pension, the difference between the two is paid. Current social pension is $SP = 8570$ ALL.

Formula: The current formula for the monthly pension has a basic component, tied to the social pension, and a supplementary part. The basic pension is given by the ratio of the coverage period (CP) to the coverage period required by law (CP^*, currently 37 years and four months gradually rising by four months per year until reaching 40 years in 2029) times the amount of the social pension plus 1% of the average covered earnings for each year of contribution:

$$benefit = max\left\{SP, \quad \frac{CP}{CP^*} \times SP + \bar{w} \times CP \times 1\%\right\},$$

the minimum benefit is SP and the maximum can be obtained with at least CP^* years of coverage and an average salary higher or equal then the one used to calculate the maximum contribution.

Retirement Age: Currently 65 years for males and 61 and 8 months for women. The retirement age for women will increase by two months per year, reaching 63 years by 2032 and 67 by 2056. The age for men will also increase starting from 2023, by one month per year, until it reaches 67 by 2056. The planned developments to the age of retirement are shows in Figure 3.

Contribution Rates: 21.6% of gross salary (12.8% by the employer and 8.8% by the employee), since January 2021 the monthly minimum and maximum salary used for the calculation of mandatory social security contributions are ALL 30,000 and ALL 132,312, respectively.

Indexation: Social pension and regular pension are indexed with a 2.8% annual increase as of April 2019[5]. As shown in Table 1, the average pension has slightly increased up to 2019, however the replacement rate, the percentage of the average wage that the

[5]http://www.issh.gov.al/?p=9989lang=en

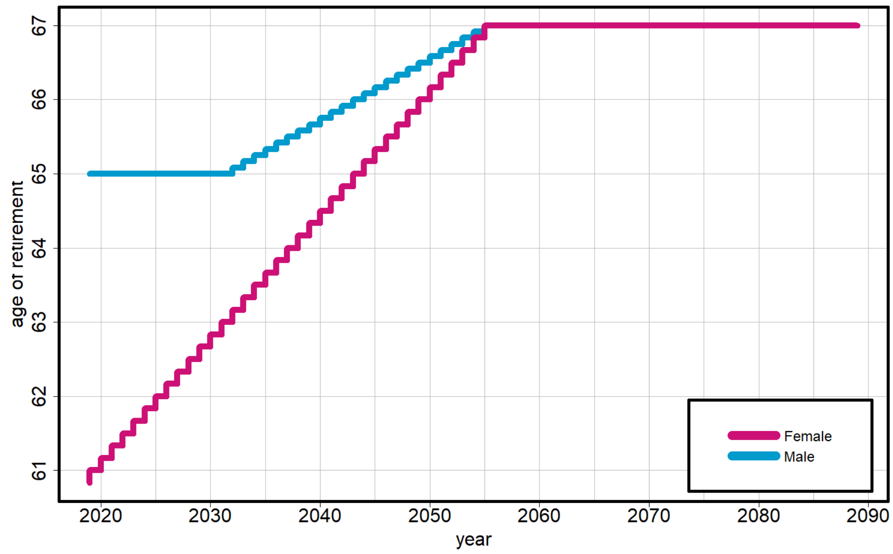


Figure 3: Future Retirement Age in Albania by Sex

Year	Urban	Rural
2020	15,732	9,295
2019	16,254	9,165
2018	15,875	8,792

Table 1: Average Pensions (ALL) in Albania

pensioner receives during retirement, has decreased.

5 Data

Our demographic forecasts are constructed from a combination of four different components: total fertility rate (TFR), sex ratio at birth, central mortality rates and current population figures. The values come from the 2019 revision of the United Nations *World Population Prospects* (United Nations, 2019). The Population Division of the Department of Economic and Social Affairs that regularly publishes the figures is particularly transparent[6] in the the method they use and the assumptions they make to construct their estimates. In this section we will analyse the variables under consideration as well as the method used to construct them.

5.1 Fertility

The key assumption used in their forecasting method is that fertility decline in all countries proceeds in phases and follows a specific pattern. An initial pre-transition phase (I)

[6]https://population.un.org/wpp/Publications/Files/WPP2019_Methodology.pdf

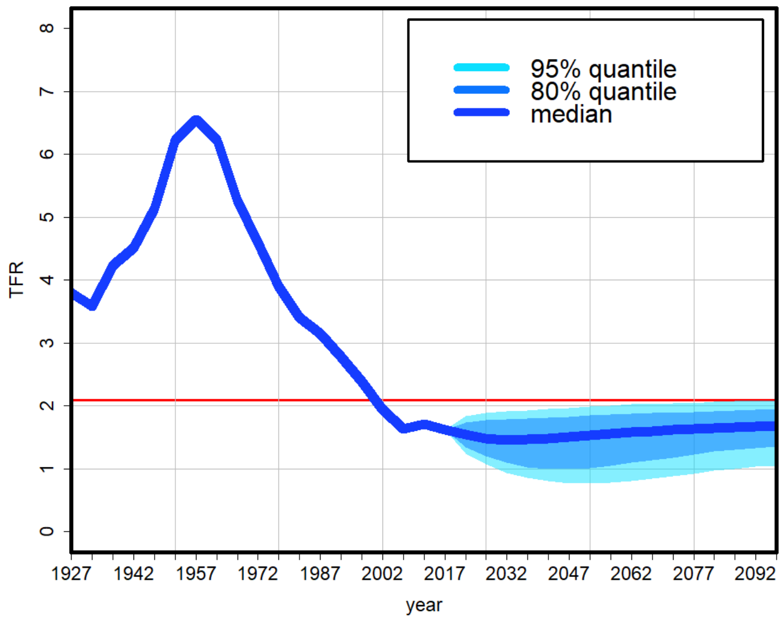


Figure 4: Total Fertility Rate in Albania, Historical and Projection

with high fertility, a transition phase (II) with declining rate and a final post-transition phase (III) with low fertility. According to these view, the country has reached phase III and fertility will converge to, and then fluctuate around, a country-specific long-term value with a behaviour modelled with a first-order auto-regressive AR(1) time series, in a Bayesian hierarchical framework, following Raftery et al (2014). The procedure allows for a country-specific parameter distribution as well as uncertainty about future fertility based on the experience of other countries which have gone through a similar phase. The development of TFR in Albania is shown in Figure 4. Fertility rate has largely dropped below the 2.1 replacement rate in the past decade but is expected to slowly increase in the next century. Comparing the fertility with the forecasts from the national institute of statistics (INSTAT) shows that the U.N. median estimate might be too pessimistic. However, no documentation has been provided by the national institute on the method used to construct their forecast. We will then prefer the U.N. values in our analysis.

The gender specific age of retirement used in the pension formula requires a distinction between male and female population forecasts. We split the number of newborns using the the sex ratio at birth. The ratio tends to be male-biased even without selective abortion. A natural value is around 106 boys per 100 girls which is assumed to be the value of converge in the next decades. No modeling of the converge path of the ratio has been discussed in the U.N. documentation, therefore we will use the forecasts as they are.

5.2 Mortality

Age-specific mortality rates are constructed by the U.N. with a two step procedure. For each country and gender, the gain in life expectancy is modelled as a double-logistic curve in the Bayesian hierarchical model were a large number of Markov chain Monte Carlo (MCMC) simulations are used to construct the trajectories and quantiles of life expectancy at birth. Once the path was estimated, the second step was to construct the mortality rates by five-year age group and sex. The abridged table they obtain is constructed with an group-specific patterns of mortality decline suggested by Gu et al. (2017). We then construct a complete life table from the abridged table using the 'Q2q' package developed by Farid Flice in R software. Shryock at al. (1993) provide a detailed overview of the methods commonly used to complete the table, we opt for a combination of two methods to interpolate mortality rates at all ages. For lower ages the most suitable method is the 6-terms Lagrange interpolation technique, while for higher ages the 'Karup-King' method provides a better performance. The methods are initially implemented separately and then the resulting curves are joined based on a 5-age averaged error between them.

5.3 Population

The population projections shown in Figure 1a are constructed from the combination of variables considered above. The main source of uncertainty in the forecasts comes from the number of newborns. To facilitate the illustration and simplify the analysis we use only the median forecast of the mortality rates for each of the different quantiles of fertility forecast. The result is an approximation of the estimation uncertainty exhibited in range around the median in all plots.

6 The Model

The model we propose is a discrete-time overlapping-generation model of the kind introduced by Auerbach and Kotlikoff (1987) in a one sector, closed economy setup. The main feature of the model is a life-cycle consumption profile for individual cohorts.

We will assume that the households are perfectly insured against the risk of premature death with positive wealth throughout their lives with an annuity market. Without bequests motive and with finite lives, we would expect individuals to have a much higher propensity to consume from the disposable wealth as they get older, as the death hazard is higher.

Different cohorts are also exposed to different economic situations and their optimal path may vary accordingly, the introduction of life and generational heterogeneity allows us to determine the magnitude and timing of fiscal policies, demographic changes or a combination of the two on the economy transition's path.

The economy sits at an initial steady state in period 0 and evolves following the current population forecasts for a number of $\mathcal{T}$ periods, where $\mathcal{T}$ is chosen big enough for the variables to accommodate the impact of potential policy changes in the different scenarios considered and the expected demographic pressure.

6.1 Demographics

The population change is introduced endogenously in the system and is the force behind the deviation from the initial steady-state in the base scenario.

Tho total population alive N_t at time t can be divided into J cohorts of different age

$$N_t = \sum_{j=1}^{J} N_{t,j} \qquad \text{where} \qquad N_{t,j} = N_{t-1,j-1} \cdot p_{j-1} \tag{1}$$

where p_j the probability that a life aged j survives to the next period $j+1$ and $N_{t,0}$, the number of newborns at time t, is given by the fertility projections shown in Figure 4.

6.1.1 Lexis Diagram

We can visualize the relationship between that different cohorts and the evolution of the system in time with the aid of the Lexis diagram, as in Figure 5.

In the diagram we highlight the whole period under consideration and the relevant actors participating in it, cohorts stretch diagonally across time, symbolizing the transition to an older cohort in the following period, with a new population given by (1), while the population of coexisting different cohorts at the same time is illustrated vertically, up to the maximum attainable age ω.

6.2 Production

Firms produce a homogeneous good in a perfectly competitive market, using technology to combine capital and labour according to a Cobb-Douglas production for an output given by

$$Y_t = f(K_t, L_t) = K_t^{\alpha} L_t^{1-\alpha}, \quad 0 < \alpha < 1.$$

where, for each period t, Y_t is aggregate output, K_t is t aggregate capital stock, L_t is the aggregate labor used in production and α is output elasticity of per capita capital

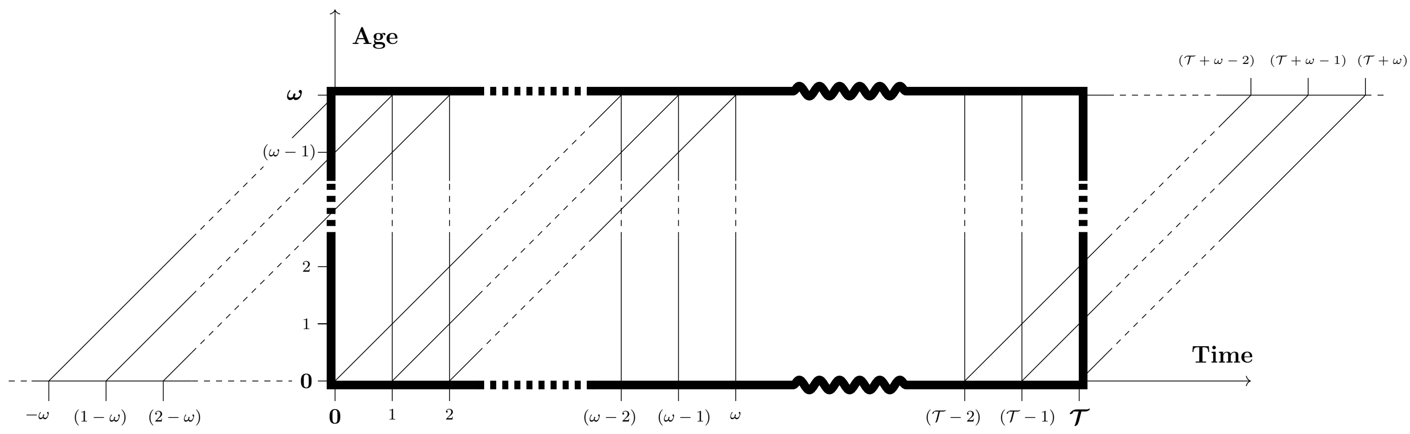


Figure 5: Lexis Diagram of the System

$k_t = \frac{K_t}{L_t}$. The marginal product of labor and capital are given by

$$f_{L_t} = (1-\alpha) \cdot k_t^{\alpha} \qquad MPL \tag{2}$$

$$f_{K_t} = \alpha \cdot k_t^{\alpha-1} \qquad MPK, \tag{3}$$

from which we can obtain

$$k_t = \left(\frac{1}{1-\alpha} \cdot f_{L_t} \right)^{\frac{1}{\alpha}} \tag{4}$$

$$k_t = \left(\frac{1}{\alpha} \cdot f_{K_t} \right)^{\frac{1}{\alpha-1}} \tag{5}$$

The assumption of constant return to scale $f(\theta K_t, \theta L_t) = \theta f(K_t, L_t)$ allows us to introduce the notion of a representative firm that statically chooses the optimal amount of labor and capital inputs it adoperates to maximize profits

$$\max_{L_t, K_t} \pi_t(L_t) = p_t Y_t - w_t^n L_t - I_t$$
$$s.t.$$
$$Y_t = K_t^{\alpha} L_t^{1-\alpha}$$
$$I_t = \delta K_t + r_t K_t,$$

where π_t are profits obtained, p_t is the current price level and w_t^n is the nominal wage, at time t.

In our formulation we implicitly assume no adjustments costs for the change in capital stock, therefore the level of investment I_t is determined solely by a constant depreciation rate δ and the current rental rate r_t.

Using p_t as the numeraire and introducing real wage $w = \frac{w_t^n}{p_t}$, we obtain the following FOCs

$$\frac{\partial \pi_t}{\partial L_t} = f_{L_t} - w_t = 0 \quad \Rightarrow \quad w_t = f_{L_t} \tag{6}$$

$$\frac{\partial \pi_t}{\partial K_t} = f_{K_t} - \delta - r_t = 0 \quad \Rightarrow \quad r_t = f_{K_t} - \delta, \tag{7}$$

Under perfect competition, both capital and labour are paid their marginal product.

6.3 Household

Cohorts choose the optimal paths for consumption and leisure that maximise their expected discounted life-time utility. Let (j) be a representative life of the cohort born j-years ago, we model the future lifetime of (j) by a continuous random variable we denoted by T_j, while the maximum remaining life time is given by $T = \omega - j$. Under uncertainty about her remaining lifetime T_j, her expected lifetime utility U_j is given by

$$\begin{aligned}
\mathbb{E}(U_j) &= \mathbb{E}\left(\sum_{t=1}^{T_j} \beta^{t-1} \cdot u(c_t, l_t)\right) \\
&= \sum_{t=1}^{\infty} \left(\beta^{t-1} \cdot u(c_t, l_t) \cdot Pr[T_j \geq t]\right) \\
&= \sum_{t=1}^{T} \left(\beta^{t-1} \cdot u(c_t, l_t) \cdot p_{j,t}\right),
\end{aligned}$$

where, in order of appearance, $\beta = \frac{1}{1+\rho}$ is the constant inter-temporal discount factor, with ρ being the parameter that captures impatience, $u(\cdot)$ is a utility function of c_t and l_t, the levels of consumption and leisure at time t, and $p_{j,t}$ is the probability that (j) survives at least t more years.

We have assumed intertemporal separability, our protagonist, based on her probability of surviving at least to period t, chooses a constant combination of consumption and leisure to hold in each period.

She uses her initial wealth a_1 and the earnings she generates each period to finance a life stream of consumption. Her dynamic intertemporal budget constraint can then be expresses as

$$\mathbb{E}\left(\sum_{t=1}^{T_j}\frac{c_t}{\prod_{s=1}^{t-1}(1+r_s)}\right)=a_1+\mathbb{E}\left(\sum_{t=1}^{T_j}\frac{y_t}{\prod_{s=1}^{t-1}(1+r_s)}\right)\Rightarrow$$
$$\sum_{t=1}^{T}\left(\frac{c_t}{\prod_{s=1}^{t-1}(1+r_s)}\cdot p_{j,t}\right)=a_1+\sum_{t=1}^{T}\left(\frac{y_t}{\prod_{s=1}^{t-1}(1+r_s)}\cdot p_{j,t}\right), \tag{8}$$

where $x_t = a_t + y_t$ represents all disposable wealth and $y_t = w_t \cdot l_t$ is the income obtained from working, in any given period t. The difference between the discounted sum of consumption and income must be equal to her initial wealth.
She now has enough information to formulate a multi-period maximization problem

$$\max_{\{c_t,l_t\}_1^T}\sum_{t=1}^{T}\left(\beta^{t-1}\cdot u(c_t,l_t)\cdot p_{j,t}\right) \tag{9}$$
$$\text{s.t.}\quad (8).$$

The Lagrangian is given by

$$\mathcal{L}=\sum_{t=1}^{T}\left(\beta^{t-1}\cdot u(c_t,l_t)\cdot p_{j,t}\right)+\lambda\left[\sum_{t=1}^{T}\left(\frac{c_t}{\prod_{s=1}^{t-1}(1+r_s)}\cdot p_{j,t}\right)-a_1-\sum_{t=1}^{T}\left(\frac{w_t\cdot(1-l_t)}{\prod_{s=1}^{t-1}(1+r_s)}\cdot p_{j,t}\right)\right],$$

where the FOCs w.r.t. c_t and l_t are

$$\mathcal{L}_{c_t}=\beta^{t-1}\cdot\frac{\partial u(c_t,l_t)}{\partial c_t}\cdot p_{j,t}+\lambda\left[\frac{p_{j,t}}{\prod_{s=1}^{t-1}(1+r_s)}\right]=0$$
$$\mathcal{L}_{l_t}=\beta^{t-1}\cdot\frac{\partial u(c_t,l_t)}{\partial l_t}\cdot p_{j,t}+\lambda\left[\frac{w_t\cdot p_{j,t}}{\prod_{s=1}^{t-1}(1+r_s)}\right]=0,$$

solving for λ and setting them equal yields

$$w_t=\frac{\frac{\partial u(c_t,l_t)}{\partial l_t}}{\frac{\partial u(c_t,l_t)}{\partial c_t}}=MRS_t=w_t^*, \tag{10}$$

she continues to supply labor until her marginal rate of substitution of leisure for consumption MRS_t falls below her reservation wage w_t^*.

The FOCs w.r.t. c_{t+1} and l_{t+1} are

$$\mathcal{L}_{c_{t+1}} = \beta^t \cdot \frac{\partial u(c_{t+1}, l_{t+1})}{\partial c_{t+1}} \cdot p_{x,t+1} + \lambda \left[\frac{p_{x,t+1}}{\prod_{s=1}^{t}(1+r_s)} \right] = 0$$
$$\mathcal{L}_{l_t+1} = \beta^t \cdot \frac{\partial u(c_{t+1}, l_{t+1})}{\partial l_{t+1}} \cdot p_{x,t+1} + \lambda \left[\frac{w_{t+1} \cdot p_{x,t+1}}{\prod_{s=1}^{t}(1+r_s)} \right] = 0,$$

which combined with the respective previous FOCs give us the inter-temporal *Euler equations* for consumption and leisure

$$\frac{\partial u(c_t, l_t)}{\partial c_t} = \left(\frac{1+r_t}{1+\rho} \right) \cdot \frac{\partial u(c_{t+1}, l_{t+1})}{\partial c_{t+1}} \tag{11}$$
$$\frac{\partial u(c_t, l_t)}{\partial l_t} = \left(\frac{1+r_t}{1+\rho} \right) \cdot \frac{w_t}{w_{t+1}} \cdot \frac{\partial u(c_{t+1}, l_{t+1})}{\partial l_{t+1}}, \tag{12}$$

that hold for periods $t \in \{1, 2, \ldots, T-1\}$.

6.3.1 Utility Function

She is subject to a Constant Relative Risk Aversion (CRRA) utility function with consumption and leisure given by

$$u(c_t, l_t) = \frac{1}{1-\theta}(c_t^{\phi} \cdot l_t^{1-\phi})^{1-\theta} \quad \text{for} \quad \theta > 0, \ \theta \neq 1$$

The marginal utilities in this case take the form

$$u_{c_t} = \phi \left(c_t^{\phi-\phi\theta-1} \cdot l_t^{1-\theta-\phi+\theta\phi} \right) \quad \text{and} \quad u_{l_t} = (1-\phi) \left(c_t^{\phi-\phi\theta} \cdot l_t^{\theta\phi-\theta-\phi} \right),$$

the consumption Euler equation in (11) can then be written as

$$\phi \left(c_t^{\phi-\phi\theta-1} \cdot l_t^{1-\theta-\phi+\theta\phi} \right) = \left(\frac{1+r_t}{1+\rho} \right) \phi \left(c_{t+1}^{\phi-\phi\theta-1} \cdot l_{t+1}^{1-\theta-\phi+\theta\phi} \right)$$
$$\frac{c_t}{c_{t+1}} = \left[\left(\frac{1+r_t}{1+\rho} \right) \left(\frac{l_{t+1}}{l_t} \right)^{1-\theta-\phi+\theta\phi} \right]^{\frac{1}{\phi-\phi\theta-1}} \tag{13}$$

and the one in (12) as

$$(1-\phi) \left(c_t^{\phi-\phi\theta} \cdot l_t^{\theta\phi-\theta-\phi} \right) = \left(\frac{1+r_t}{1+\rho} \right) \left(\frac{w_{t+1}}{w_t} \right) (1-\phi) \left(c_{t+1}^{\phi-\phi\theta} \cdot l_{t+1}^{\theta\phi-\theta-\phi} \right)$$
$$\frac{l_{t+1}}{l_t} = \left[\left(\frac{1+r_t}{1+\rho} \right)^{-1} \left(\frac{w_{t+1}}{w_t} \right) \left(\frac{c_t}{c_{t+1}} \right)^{\phi-\theta\phi} \right]^{\frac{1}{\phi\theta-\theta-\phi}}, \tag{14}$$

substituting (14) into (13) we obtain

$$\frac{c_{t+1}}{c_t} = \left[\left(\frac{1+r_t}{1+\rho} \right) \left(\frac{w_{t+1}}{w_t} \right)^{\theta+\phi-\theta\phi-1} \right]^{\frac{1}{\phi-\phi\theta-1}}$$

or

$$c_t = \left[(1+\rho)^{t-1} \cdot \prod_{s=1}^{t-1} (1+r_s) \left(\frac{w_{s+1}}{w_s} \right) \right]^{\frac{1}{\theta(1+\phi\theta-2\phi)}} \cdot c_1 \tag{15}$$

and from (13) into (14) we get

$$\frac{l_{t+1}}{l_t} = \left[\left(\frac{1+r_t}{1+\rho} \right) \left(\frac{w_{t+1}}{w_t} \right)^{\frac{1}{\theta\phi-\theta-\phi}} \right]^{\frac{1}{\theta}}$$

or

$$l_t = \left[(1+\rho)^{t-1} \cdot \prod_{s=1}^{t-1} (1+r_s) \left(\frac{w_{s+1}}{w_s} \right)^{\frac{1}{\theta\phi-\theta-\phi}} \right]^{\frac{1}{\theta}} \cdot l_1 \tag{16}$$

For given factor prices, wages and interest rates, the consumption path of all generations can be constructed with the Euler equation and the budget constraint.

6.4 Government

The sole role of the government in the model is to maintain a PAYG system with fixed contribution and varying replacement rate.

The government budget balance at time t is given by

$$\tau_t w_t \sum_{j=0}^{j^R} N_{t,j} = b_t \sum_{j=j^R+1}^{J} N_{t,j}$$
$$= rr_t(1-\tau_t)w_t \sum_{j=j^R+1}^{J} N_{t,j}$$

where, at time t, τ_t is the contribution rate, $N_{t,j}$ is the population of the cohort born j-years ago and rr is the replacement rate, the portion of the average wage which is given as a pension. Solving for τ_t yields

$$\tau_t = \frac{rr_t \cdot \sum_{j=j^R+1}^{J} N_{t,j}}{\sum_{j=0}^{j^R} N_{t,j} + rr \sum_{j=j^R+1}^{J} N_{t,j}} \tag{17}$$

The population of the different cohorts of the PAYG system is illustrated in Figure 6.

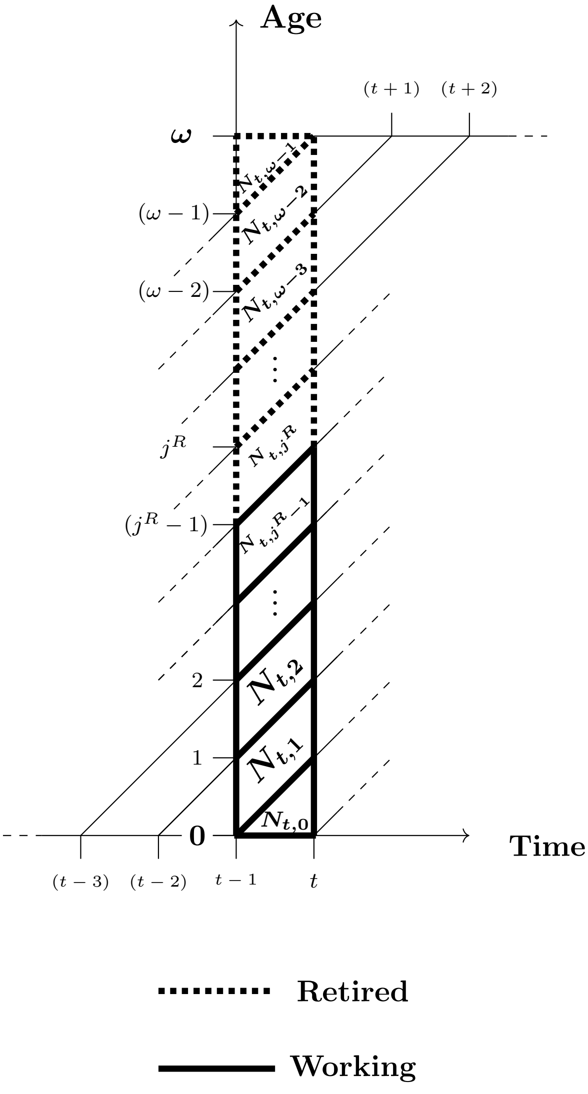


Figure 6: Lexis Diagram of the PAYG system

6.5 Equilibrium

A dynamic general equilibrium of the competitive model is defined as a sequence of the cohort specific variables, $\{c_{t,j}, l_{t,j}\}_{t=0}^{\mathcal{T}}$, aggregate variables, $\{C_t, L_t, K_t\}_{t=0}^{\mathcal{T}}$, wage rate $\{w_t\}_{t=0}^{\mathcal{T}}$ and interest rate $\{r_t\}_{t=0}^{\mathcal{T}}$ such that

- For given prices and initial conditions, for each cohort the solutions to (9), $c_{t,j}$ and $l_{t,j}$, satisfy (15) and (16).
- Wages and interest rate satisfy (6) and (7).
- Contribution rate in every every period is such that (17) is satisfied.
- Markets clear

$$L_t = \sum_{j=0}^{j^R} N_{t,j}$$
$$K_{t+1} = \sum_{j=0}^{J} a_{t+1,j+1}$$
$$\sum_{j=0}^{J} c_{t,j} N_{t,j} + K_{t+1} = K_t^{\alpha} L_t^{1-\alpha} + (1-\delta) K_t.$$

  or in words, under full employment, aggregate labour is equal to the sum of the cohort's populations, capital stock is equal to the aggregate assets hold by the cohorts and the goods market is in equilibrium. Firms borrow from savers and sell to consumers.

6.6 Solution Method

In each period, the solution of the model is represented by an interest rate for which the contribution rate and an optimal path for leisure and consumption clear the markets. The solution algorithm is a fixed point iteration that seeks the equilibrium interest rate for the initial, final and the transition periods.

6.6.1 Steady States

We will first solve the model for the steady states at $t = 0$ and at $t = \mathcal{T}$, before turning to the transitional dynamics. The steps to follow are the following, where we drop the time index t in the outer iterations for convenience:

1. Formulate an initial guesses for the interest rate r_0 and the final period of life consumption c_T.

2. In each iteration m for r_m

   (a) Calculate the marginal product of capital f_{K_m} according to (3);

   (b) Get the per capita capital k_m with (5);

   (c) Obtain the wage rate w_t from (2) and (6);

   (d) Solve the pension system for τ_m according to (17), for a fixed replacement rate w_t drops out the equation;

   (e) Solve the household problem for given r_m, net wage $w_m(1-\tau_m)$ and rr with a recursive method. An initial loop going from the final period of life with consumption equal to the initial guess c_T to the initial period c_1, that constructs the leisure-consumption vector and the second that, holding constant that ratio, gives the initial consumption c_1 satisfying the budget constraint:

      i. we know from (10) that workers are payed their reservation wage w^*,

$$w_t = w_t^* = MRS_t = \frac{u_{c_t}}{u_{l_t}} = \frac{\phi\left(c_t^{\phi}\cdot l_t^{1-\phi}\right)^{-\theta}\cdot\left(\frac{l}{c}\right)_t^{1-\phi}}{(1-\phi)\left(c_t^{\phi}\cdot l_t^{1-\phi}\right)^{-\theta}\cdot\left(\frac{l}{c}\right)_t^{-\phi}} = \frac{\phi}{(1-\phi)\cdot\left(\frac{l}{c}\right)_t}$$

$$\Rightarrow \quad \left(\frac{l}{c}\right)_t = \frac{1}{w_t}\cdot\frac{1-\phi}{\phi}. \tag{18}$$

      which gives us an expression for $\left(\frac{l}{c}\right)_t$, the leisure-consumption ratio at time t, as a function of w_t only.

      ii. Rewrite the marginal utilities as

$$u_{c_t} = \phi\left(c_t^{\phi}\cdot l_t^{1-\phi}\right)^{-\theta}\cdot\left(\frac{l}{c}\right)_t^{1-\phi} \tag{19}$$

      and

$$u_{l_t} = (1-\phi)\left(c_t^{\phi}\cdot l_t^{1-\phi}\right)^{-\theta}\cdot\left(\frac{l}{c}\right)_t^{-\phi}.$$

      iii. Invert the marginal utility of consumption to obtain values for c_t as a function of the marginal utility itself and the labor consumption ratio. It will then prove to be useful when dealing with the periods without wage to distinguish the case in which the representative individual is working, with c_t^W and l_t^W, and the one in which she is retired, with c_t^R and l_t^R.

A. While working $l_t \neq 1$ and we can use the value for $\left(\frac{l}{c}\right)_t$ to obtain c_t^W,

$$u_{c_t} = \phi\left(c_t^{\phi-\phi\theta-1} \cdot l_t^{(1-\phi)(1-\theta)}\right)$$

$$c_t^W = \left(\frac{u_{c_t}}{\phi\left(\frac{l}{c}\right)_t^{(1-\phi)(1-\theta)}}\right)^{-\frac{1}{\theta}}. \tag{20}$$

B. When retired she has a fixed amount of leisure $l_t = 1$, we can then easily invert the function to obtain the values for c_t as in the case of an exogenous labor supply

$$u_{c_t} = \phi \cdot c_t^{-\phi\theta} \cdot \left(\frac{1}{c_t}\right)^{1-\phi}$$

$$c_t^R = \left(\frac{u_{c_t}}{\phi}\right)^{\frac{1}{\phi(1-\theta)-1}}. \tag{21}$$

iv. Construct the backward loop that gives the consumption path from the consumption Euler equation in (11) for the initial guess of final consumption c_T, using (18), (19), (20) and (21) as

$$u_{c_t} = \beta \cdot p_{j,t} \cdot (1 + r_{t+1}) \cdot u_{c_{t+1}}$$

$$\left(\frac{l}{c}\right)_t^{(1-\phi)(1-\theta)} \phi c_t^{-\theta} = \beta \cdot p_{j,t} \cdot (1 + r_{t+1}) \cdot \left(\frac{l}{c}\right)_{t+1}^{(1-\phi)(1-\theta)} \phi c_{t+1}^{-\theta}$$

$$\left(\frac{1}{w_t} \cdot \frac{1-\phi}{\phi}\right)^{(1-\phi)(1-\theta)} \phi c_t^{-\theta} = \beta \cdot p_{j,t} \cdot (1 + r_{t+1}) \cdot \left(\frac{1}{w_{t+1}} \cdot \frac{1-\phi}{\phi}\right)^{(1-\phi)(1-\theta)} \phi c_{t+1}^{-\theta}$$

which yields

$$c_{t+1}^W = \left(\frac{\beta \cdot p_{j,t} \cdot (1 + r_{t+1})}{\Delta w_{t+1}^{(1-\phi)(1-\theta)}}\right)^{\frac{1}{\theta}} \cdot c_t^W,$$

while working, with $t \in \{1, \ldots, j^R - 2\}$ and where $\Delta w_{t+1} = w_{t+1} - w_t$, is the wage increase. The corresponding collecting vector is given by

$$\boldsymbol{c^W} = \begin{bmatrix} c_{j^R-1} \\ \vdots \\ c_1 \end{bmatrix},$$

and

$$c_{t+1}^R = (\beta \cdot p_{j,t} \cdot (1 + r_{t+1}))^{\frac{1}{1-\phi+\phi\theta}} \cdot c_t^R,$$

with $t \in \{j^R, \ldots, T-1\}$, such that

$$\boldsymbol{c^R} = \begin{bmatrix} c_T \\ \vdots \\ c_{j^R} \end{bmatrix},$$

when retired.

v. Calculate the consumption growth rate.

vi. Obtain the present value of income from labor and retirement and the one for consumption, include the initial assets and find their ratio. Multiply the initial consumption by the present value ratio and update the optimal consumption with a forward loop using again (18), (19), (20) and (21) such that (15) and (16) are satisfied and store the results in a vector given by

$$\boldsymbol{c} = \begin{bmatrix} c_T \\ \vdots \\ c_1 \end{bmatrix} = \begin{bmatrix} \boldsymbol{c^R} \\ \boldsymbol{c^W} \end{bmatrix} \tag{22}$$

where the related utility maximising vectors that can be obtained element-wise as

$$\begin{aligned} l_{t+1} &= c_{t+1} \cdot \left(\frac{l}{c}\right)_{t+1}, \\ h_{t+1} &= 1 - l_{t+1}, \\ a_{t+1} &= (1+r_t)(a_t + b_t + w_t \cdot h_t - c_t), \end{aligned}$$

with $t \in \{1, \ldots, T-1\}$.

We can collect the corresponding vectors in a set $\boldsymbol{\Upsilon}_j = \{\boldsymbol{c_j}, \boldsymbol{l_j}, \boldsymbol{h_j}, \boldsymbol{a_j}\}$, corresponding to the whole-life series of consumption, leisure, work time and assets for the cohort born j-years ago. For given wages and interest rates each cohort constructs the consumption and leisure paths that optimizes its utility accord to the Euler equation and the budget constraint.

We can visualize the relationship between the results of the different cohorts' maximization problems in Figure 6

(f) Aggregate the variables of the economy, L_t, K_t, C_t, Y_t, summing over all cohorts alive at time t

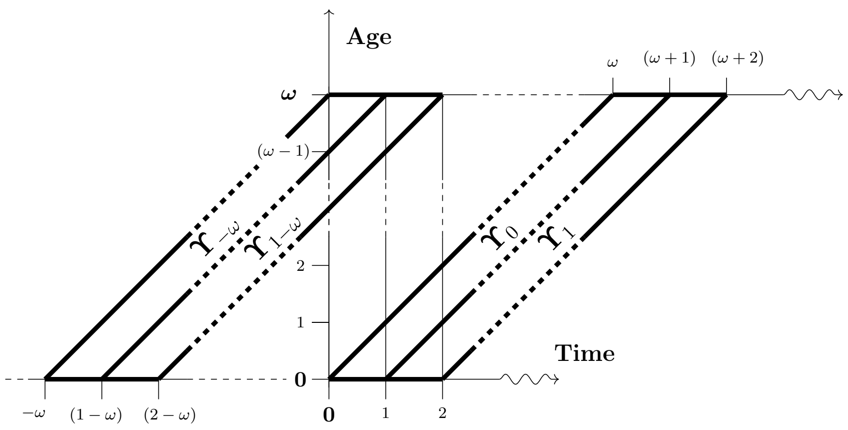


Figure 7: Lexis Diagram of the cohorts' maximization problem

$$L_t = \sum_{j=0}^{J} h_{t,j} \cdot N_{t,j} \qquad C_t = \sum_{j=0}^{J} c_{t,j} \cdot N_{t,j} \qquad K_{t+1} = \sum_{j=0}^{J} a_{t+1,j+1} \cdot N_{t,j}$$

in a similar fashion as before, we can collect them in a set $\Sigma_t = \{L_t, K_t, C_t, Y_t\}$ and place them in Lexis diagram as in Figure 8.

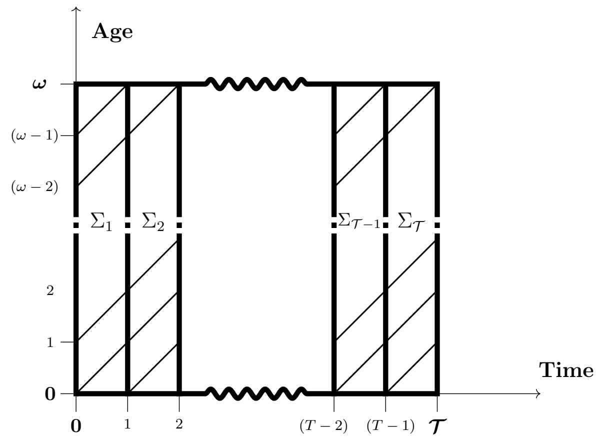


Figure 8: Lexis Diagram of Aggregate Variables

(g) Calculate $\tilde{r}_m$ from (7) as the interest rate corresponding to the aggregate capital stock;

(h) If the distance between r_m and $\tilde{r}_m$ falls below a pre-specified tolerance level ϵ, return its value (`if` $(||r_m - \tilde{r}_m|| < \epsilon)$ `stop, else`) otherwise construct an updated guess for the successive iteration as $r_{m+1} = \omega \cdot \tilde{r}_m + (1-\omega) \cdot r_m$, where ω is a dampening factor, the larger its value the bigger the correction step for the guess. Start from (a).

6.6.2 Transition

The solution algorithm for the transition periods is similar to the one described for the steady states. The solution to the initial period also provides the distribution of assets for the cohorts alive in period 0 which they carry over in the following period. The steps to find the solution to the transitional dynamics are:

1. formulate initial guesses for the interest rates $\{r_{t,0}\}_{t=1}^{\mathcal{T}-1}$ and the consequent marginal product of capital $\{f_{K_{t,0}}\}_{t=1}^{\mathcal{T}-1}$ with a linear interpolation from the initial to the final steady state values;

2. in each iteration m for $\{r_{t,m}\}_{t=1}^{\mathcal{T}}$

   (a) Repeat steps 2.1.2.(a)-2.1.2.(g) of the steady state solution for all $t = 1, \ldots, \mathcal{T}-1$ by solving the household problem as in 2.1.2.(e) for all households born in $t = 1, \ldots, T-1$ and the ones already alive in period one using the fact that $\{a_{j,1}\}_{j=0}^{J}$ is equal to the solution $\{\ a_{j,0}\}_{j=0}^{J}$ of the previous period.

   (b) `if` $(||r_m - \tilde{r}_m|| < \epsilon)$ `stop, else` update the initial guesses as in 2.1.2.(h) for all $t = 1, \ldots, \mathcal{T}-1$. Continue with step (a).

6.7 Parameter Calibration

6.7.1 Risk Aversion

Despite a vast interest in the litterature for the coefficient of risk aversion θ, there is no widely excepted estimation procedure, with values that usually are between 1 and 3, with examples that range from 0.2 and to 10. A common estimation procedure is based on a consumption-based capital asset pricing model (CAPM), however the results do not prove to be robust, in a sensitivity analysis, Hall (1988) shows how the results vary considerably for relative minor changes to the initial conditions. Gandelman and Hernández-Murillo (2014) estimate the parameter of a CRRA utility function for a wide range of countries, including Albania. They use self-reports on life satisfaction from the Gallup World Poll[7] and values of individual income, which they assume could be used as a proxy for consumption (and leisure in our case). The measure of income available is the current household income instead of the permanent individual income, and they use a Generalized Method of Moments (GMM) estimation and controls on age, gender, and other individual specific variable. The results from 453 respondents show how the country specific risk aversion parameter is $\theta = 0.14$. However, we believe the result to be

[7] for some details about the Gallop method see https://www.gallup.com/178667/gallup-world-poll-work.aspx

not suitable for our macroeconomic application, as the individuals would be extremely patient and postpone most of the consumption to the retirement period. The value of $\theta = 3$ instead delivers a realist approximation of lifetime consumption profiles and will be adopted.

6.7.2 Time Preference

The subjective discount rate ρ captures the degree by which individuals discount future income, it varies across regions and is peculiar to each culture, with an incredibly wide range of values. Frederick et al. (2002) provide e a comprehensive overview of the nature of the phenomenon and a wide review of the estimates and their distribution across the literature, the values vary substantially based on the sample chosen and the set up of the experiment. In order to construct our estimation we use the results from two independent papers. The first one, Wang et al. (2016) estimate the difference in time preference across students of the University of Zurich coming from different countries offering a choice between an immediate monetary compensation and one next month, from which they find that southern and eastern Europeans are among the most impatiens in the world, with no significant difference among students from those countries. In the second contribution, De Lipsis (2021), goes on to tackle a similar problem, this time estimating the discount rate ρ in an intertemporal optimization problem of a similar CRRA (only consumption) for six countries across Europe and five different income classes. They estimate the model with a GMM on macroeconomic time series.

The results for the closest country, Italy, show that in this particular case estimation results are not substantially different among different income groups and can be used for our purposes of homogeneous cohort. They report an average of $\rho = 0.03$ among different groups, we will use this value in our simulation.

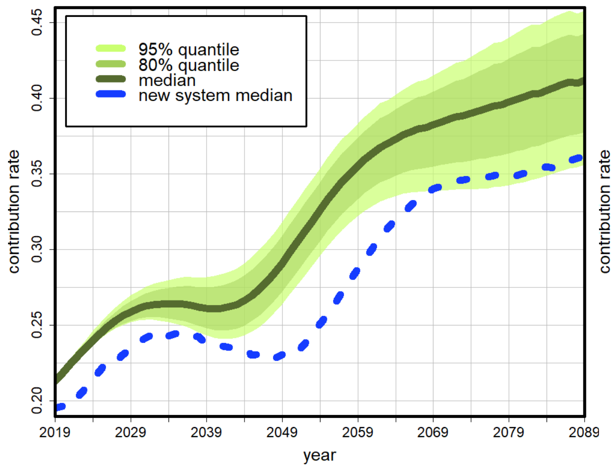
6.7.3 Other Parameters

According to the Penn World Table (Version 10) the depreciation rate in 2019 was $\delta = 0.02773$, stable for the last years. Standard values of $\alpha = 0.33$ and $\phi = 0.66$ we be also borrowed from the literature. The maximum attainable age will be set to $T = 100$ and individuals join the work force at the age of 21 on average.

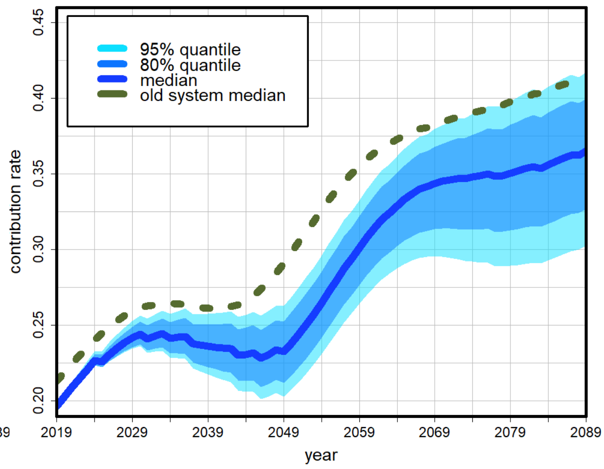
7 Results

In this section we present the results of our simulation exercise in a series of graphs. We illustrate the paths of the relevant macroeconomic variables capturing the development of the Albanian economy under the pension reform. Different shades of green and blue are meant to represent the uncertainty around the population forecasts.

The contribution rate τ needed to maintain the replacement rate at the current level for the system without reform (old system), and the system with reform (new system), are shown in Figure 9a and 9b, respectively. The increase in retirement age is able to substantially constraint the increase in contribution rate, on average 5% less by the time the reform is finalized. Nevertheless, the rate is projected to increase to 23% by 2050 from the current 21.6%. After that period, the reform is not able to counterbalance the demographic pressure. If not further adjustments will be made, the contribution rate is set to substantially increase to 36% by 2089 for the median forecast, an unsustainable level for the individual contributors.



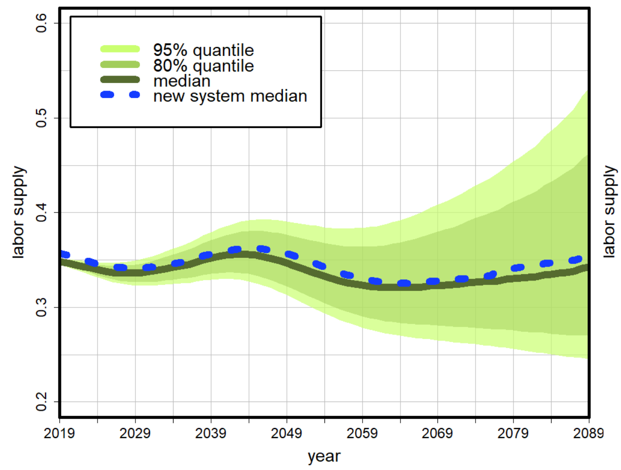
(a) Old System



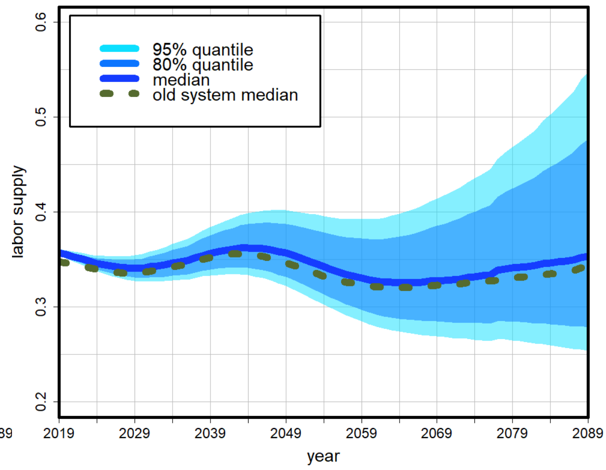
(b) New System

Figure 9: Contribution Rate

The effects of the reform will also propagate to the other macroeconomic variables. Production needs and the number of workers will dictate the development of wages, set to increase substantially during the period under consideration. The rise in gross wages due to the shortage of workers will be lower under the new rules as shown in Figure 11b and 11a. Individuals will tend work more, anticipating a longer period of retirement, as shown in Figure 10b and 10a. For a given demand, the increase of individual labour supply and longer work life will push down wages, somewhat offsetting the increase in the saving rates.

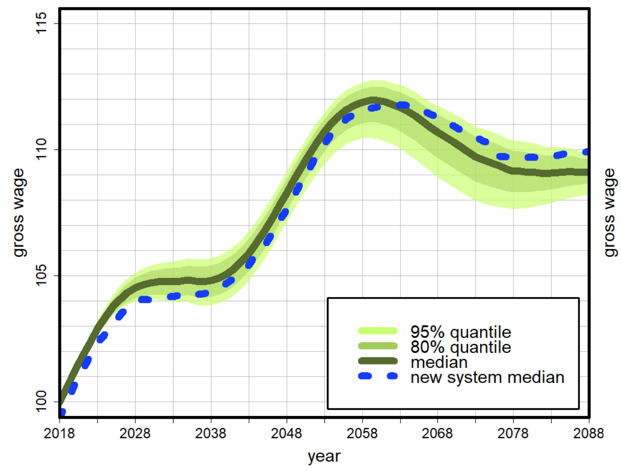


(a) Old System

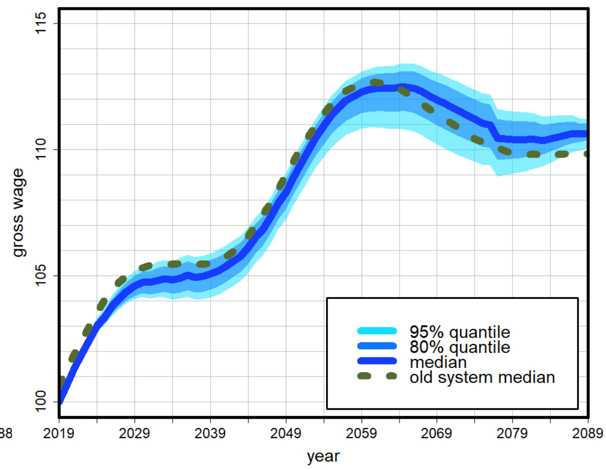


(b) New System

Figure 10: Individual Labour Supply



(a) Old System (Indexed)

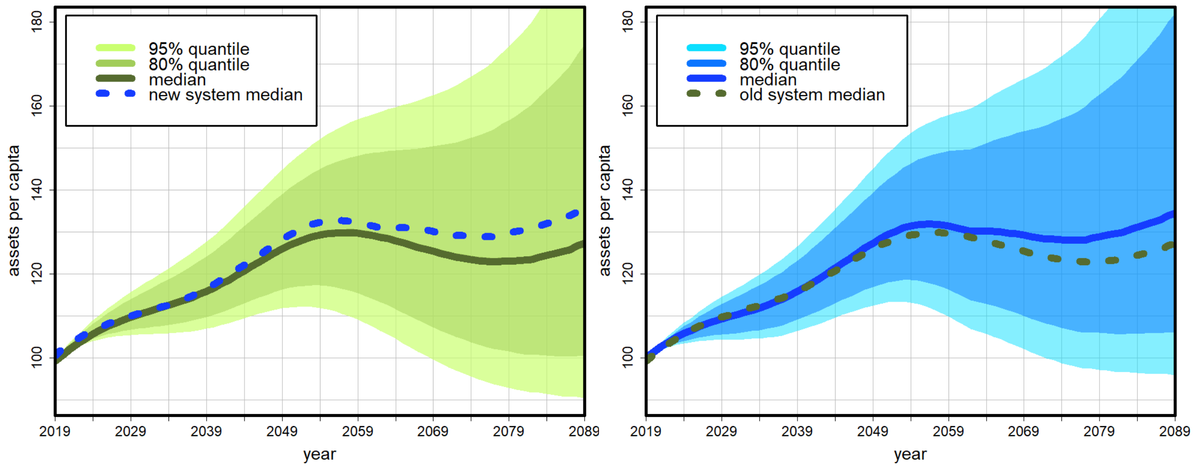


(b) New System (Indexed)

Figure 11: Gross Wages

Nevertheless, per capita asset accumulation will be higher under the new system. The difference is not substantial for the first couple of decades as the increase in the pension horizon for the current workers close to retirement will produce a positive effect on their lifetime income. The difference is more pronounced in the second half of the century, where it will be driven by the economic behaviour of new cohorts, which have a much stronger incentive to save as will start with no initial assets, as of model design.

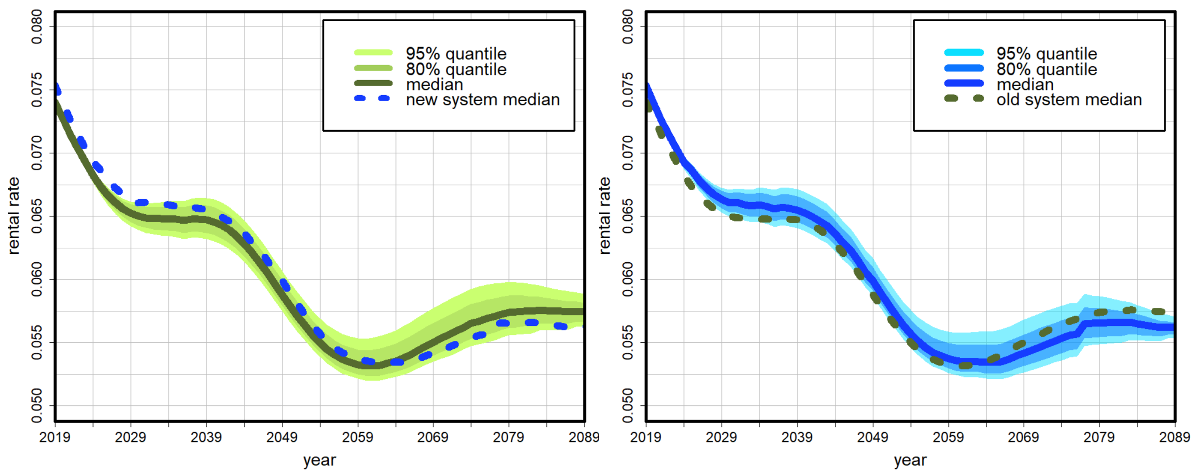
The cost of capital moves according to Figure 13a and 13b. Asset accumulation patterns previously observed will drive down the price of capital as more of it is available. The abundance of capital will be moderately offset in the new system due to the increase in output shown in 14a and 14b, motivated by the additional years of work and income.



(a) Old System (Indexed) (b) New System (Indexed)

Figure 12: Assets per Capita

After 2060, the widening gap in asset accumulation will have a stronger effect then output and the difference in rental rate is likely to flip. Current interest rate are much lower then the one indicated here. The effects of the unconventional monetary policy of the European Central Bank extend beyond the Euro area borders and especially influence economies closely dependent on it.

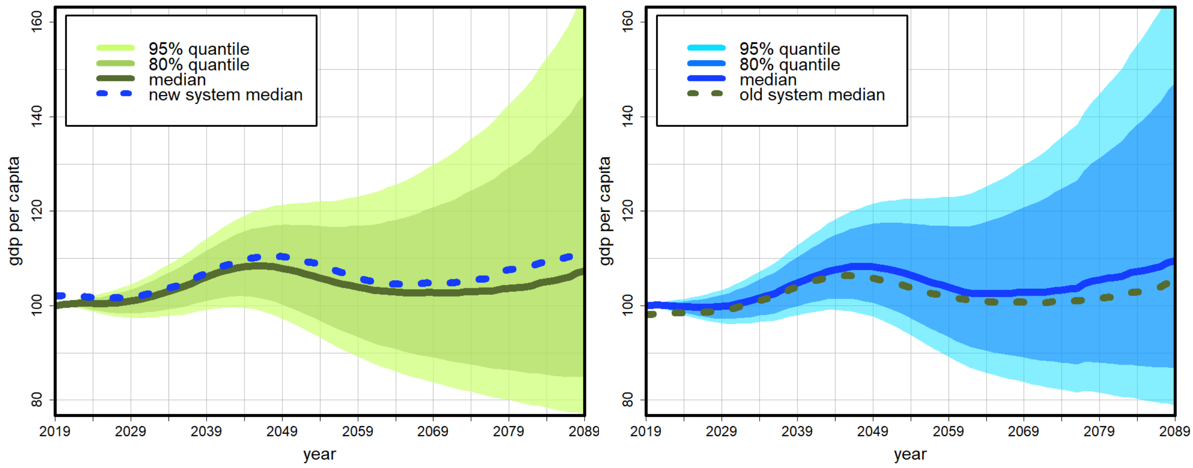


(a) Old System (Indexed) (b) New System (Indexed)

Figure 13: Rental Rate

7.1 Model Limitations

The results proposed above do not come without reserves. Some of the model specifications were optimistic for the sustainability of the pension system. We assumed full



(a) Old System (Indexed)

(b) New System (Indexed)

Figure 14: GDP per Capita

employment, a strong assumption for an economy which navigates at unemployment rates above 10%. The social pension guarantees a benefit to everyone despite the level of contribution. A more complete analysis would also require a realistic income and wage distribution among the system participant, despite heterogeneity among cohorts, individuals are assume to be the same within them. Rural pensions have also been ignored. The gradual phasing out the special regimes did not justify its introduction in our model. We've also abstracted from productivity gains that could offset the decrease in the workforce. Increasing sophistication could also improve realism and accuracy, such as stochastic income paths for individuals and an open economy that would allow for a free flow of capital and people. The topic of migration has been touched superficially, despite being of increasing concern for the whole society. Adverse migration patterns could undermine any policy effort to keep the system in place. An endogenous migration modeling could serve the purpose of estimating its effect. Another important aspect of the Albanian economy is its dependence on remittances which will not be considered here.

The most relevant limitation to our approach comes, however, from the limited degree of parameter calibration. General equilibrium models can be calibrated using a Generalized Method of Moments, refinements of this kind could prove to deliver more realistic forecasts.

Despite the array of limitations, we believe in the validity of the insights emerging from our simulation. Future research in the topic could address some of these concerns and in turn corroborate, or not, our findings.

8 Conclusion

We have investigated the consequences of the U.N. population prospects on the sustainability of Albanian pension system. Our approach allows for the modeling of a variety of behavioural patterns. Different cohorts are subject to particular incentives and engage asymmetrically with the pension scheme, the consequences of the choice heterogeneity has further ramifications for most of relevant macroeconomic variables. Our results show that the pension reform enacted by the government in 2015 will be enough to counteract the decease in fertility and mortality rates for three decades, not much longer then the time needed for the reform to be completed.

Additional measures are likely to be implemented in the near future, the easiest, and the most likely, is a further increase in the age of retirement. An alternative path is represented by transition to a founded pension system which necessitate, nonetheless, of a much deeper economical an political discussion.

This contribution seems to be one of the early attempt of this kind for the Albanian economy. Most of the other countries in the Western Balkans face similar challenges and some of the results drawn here may be particularly relevant for them as well. If the accession talks with the E.U. are ought to be credible, the demographic implications of such an historical moment should not compromise the stability of the pension system, in turn triggering a series of unpredictable negative effects for the society as a whole. There are multiple reasons that make the Western Balkans such pressing and interesting case study. The countries of the region face both developed and developing nations issues. On the one hand, these economies have not reached their full potential, on the other, they might never do so because of the lack of young population willing to work for it. Additionally, encompassed by E.U. member states, they are prone to emigration and not particularly attractive for immigrants. If the governments will not be able to offer the right incentives to the young population, these countries will fail to fully modernize and legalize their economies. They could fall outside the interest of the E.U. expansion process and possibly the reach of any economic model, however sophisticated it is, in capturing their complexity.

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