

## A funded pension for Georgia

### Abstract

*This article is an assessment of the transition from the current Pay-As-You-Go (PAYG) system to a funded pension scheme in Georgia. The project evaluates the nature of the threats to the current system and also discusses the reform planned by the Ministry of Economy and Sustainable Development of Georgia. The proposed reform is compared to various alternative models in order to highlight the flaws and the strengths of the proposal. All the comparisons are made in terms of replacement rates and budget expenditures. From the point of view of the simulations we developed to deliver our assessment, the current proposal's quasi-mandatory nature (people are made a member of the system but they can opt-out) is problematic; but also at issue is the level of contributions going into the system: the current proposal has contribution rates that are essentially conservative and this will deliver pensions in retirement which have only very low income replacement rates. Nevertheless, the article highlights that some form of reform of the system is absolutely essential.*

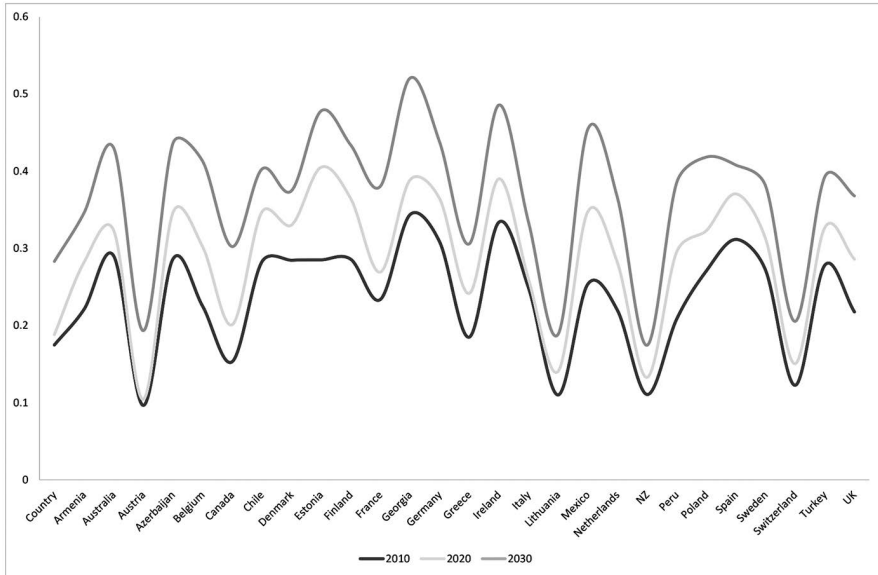
**Keywords:** funded pension systems, PAYG, replacement rates, longevity, dependency ratio

### The problem defined

Starting with the existing PAYG system, the first problem posed is the current demographic state of the Georgian population. Fertility rates are decreasing while life expectancy is increasing, skewing the population towards the more elderly. This problem is a global one and is associated with several key factors of the past century. One of these is the sharp increase in fertility rates after World War II, also known as the 'baby boom'; while the other is the worldwide increase in life expectancy, resulting in a rapidly-aging population as the 'baby boomers' are about to retire. Figure 1 graphs the projections of the United Nation's Population Division, showing the expected levels of the old-age dependency ratio in a range of countries for 2010, 2020 and 2030.

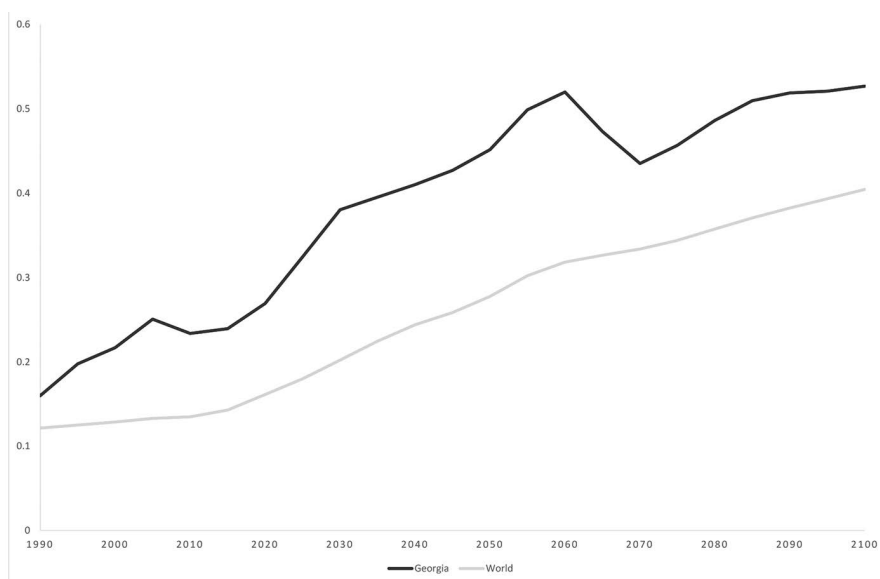
The graph highlights that, in most countries, the number of pensioners relative to the active population, i.e. the 20-64 age group, almost doubles by 2030. Figure 2 demonstrates how this ratio is expected to evolve in the case of Georgia compared to the combined figure for the rest of world, according to the same source.

**Figure 1 – Old age dependency ratio: the number of people aged at least 65 divided by those aged 20 to 64 (UN, 2012)**



Source: UN (2012)

Figure 2 – Old age dependency ratio, 1990-2100 for Georgia compared to world average



Source: UN (2012)

The PAYG scheme depends completely on the contributions of existing employees – so the increase in the number of elderly people and the shrinking of the labour force is a major risk to the sustainability of such a scheme. Numbers of countries have responded to this threat by adopting funded pension systems to avoid massive fiscal pressures in the future.

Similar to other imposed responsibilities, such as the payment of scholarships for students in the future, or the provisions of social safety programmes, promises by governments to pay old age pensions to citizens represent an implicit liability of governments and, in line with the usual public debt (foreign/domestic) of a country, they carry an unavoidable fiscal burden.

Therefore, when assessing the long-term sustainability of a country's fiscal position, it is crucial not to neglect the existence of this implicit pension debt and its implications for future tax policies in terms of the need to finance growing claims of retirement benefits. Studies have been conducted in order to derive magnitudes for implicit debt, mostly for advanced economies (van der Noord and Herd, 1993). Kane and Palacios (1996) also argue that ignoring the implicit pension debt will be especially costly for economies which used to be centrally-planned, which includes Georgia as it is a post-soviet country. Moreover, the dimensions of the benefits of classic PAYG types of pensions systems tends to have an increasing nature. This is because increases in defined benefit pay-outs will occur every now and then and will, more or less, gain political support, so no ruling party will be able to handle the social back-

lash of a reduction in benefits. This amplifies the above arguments in that pension benefits have been growing over the last decade and, as they are still at very low levels compared to average pre-retirement salaries, they are expected to grow more (in real terms), contributing to higher future fiscal burdens at a time when the population is aging.

Some other concerns associated with the existing system in Georgia are as follows:

- the compulsory nature of the system – each employee, through income tax, is obliged to finance pensions in payment, with the magnitude of the benefit defined by the government
- the absence of private property and inheritance – beneficiaries are paid a fixed amount of pension regardless of their contributions and no funds are inherited in cases of early death.

The advantage of the PAYG system is that it has been operational for almost two decades. It is well-organised and fully covers the set of beneficiaries with the provision of equal pensions.

Moving to privately-funded systems, the following disadvantages are quickly apparent:

- the need for regulatory agencies – with the emergence of private investment funds, the government will have to create the necessary bodies which would regulate private organisations and ensure the security of their investments
- the financial risks faced by beneficiaries – with the government no longer responsible for pension claims, the yields and old-age welfare of each individual will depend on the performance of the private pension funds.

The advantages of a privately-funded system are:

- the existence of private accounts – each individual will have their own account which they will monitor and manage. Benefits in old age will no longer be equal and will dependent on contributions invested. For each participant in the private pension plan, this will be a way to connect/synchronise present and future spending, enabling employees from different age groups to control their retirement welfare according to their present income, perceived life expectancy and/or any other personal reason
- introduction of inheritability – after the death of a beneficiary, the remaining funds in the account will not be lost but, rather, transferred to pre-determined heirs
- flexible and effective investment of funds – the contributions of beneficiaries will be invested for a much greater return than the existing implicit rate of return in the PAYG system (this is discussed in detail later in the article). Each individual will be presented with the opportunity to choose between various portfolios according to their risk-aversion, age or income
- the stimulation and expansion of capital markets in Georgia – the implementation of a privately-funded system will help promote the development of capital markets as the pension fund will create large supplies of funds to be invested in stable and liquid domestic firms

- informal sector – the introduction of the Pension Fund will deliver incentives to the large share of the population employed in the informal sector to seek formal employment arrangements.

The reform planned by Ministry of the Economy and Sustainable Development of Georgia

In this section, we discuss the direction of the pension reform being planned by the Ministry of the Economy and Sustainable Development of Georgia, starting with a description of the main features of the ‘2%+2%+2%’ model being proposed by the government:

- quasi-mandatory enrolment, which means that every income tax payer will be enrolled automatically but with a right to opt out
- enrolled individuals will still receive the current pension on top of the funded one
- the income of employees who remain enrolled will be taxed at 22% instead of the current 20%, with the additional 2% going into individual’s pension account
- the employer will be obliged to contribute an additional 2% to the pension accounts of its enrolled employees
- the government will contribute an additional 2% to every enrolled individual’s pension account as an incentive, capped at an annual figure of 2,000 GEL (c. €815, at today’s exchange rates).

To sum up, the government offers a model in which the total monthly contribution will be 6% of the employee’s salary.

At first sight, a 6% contribution looks quite acceptable, but there are several problems which will not be solved by the government model, with some others even caused by it.

The first and biggest problem is that enrolment will not be mandatory. Taking into consideration Georgia’s low salaries, we may assume that no more than 30% of the employed population will choose to remain enrolled. This means that the reform will not affect the main problem discussed in this article (the growing nature of pension expenditure paid out of government funds, given that Georgia is about to face a sharp growth in the number of pensioners during the next 15-20 years). Those who are not enrolled in the funded system will still pressure the government to increase pensions regularly, causing problems to Georgia’s economy.

The second problem will occur in the obligation on businesses to increase their salary expenditure by an additional 2%. First of all, Georgia has to change its laws because, under the current legislation, it is employees who are obliged to pay income tax, not employers. Making such changes will take a lot of time and, ultimately, not a single business will motivate its staff to enrol in the reform. We can also assume that most of them will compensate for the increased tax by decreasing salaries or even reducing the number of staff they employ. Lower salaries will obviously dissatisfy employees, acting as a push factor for them to leave the funded system. So, in general, the model may become one of 4% (the individual’s contribution + the 2% govern-

ment contribution), which proves the assumption about low enrolment mentioned above.

The last but not least disadvantage of the proposed model is that individuals who have a monthly salary of more than 8,400 GEL will not actually receive an additional 2% from the government since this salary level will put them over the 2,000 GEL cap.

### Alternative models

The flaws in the reforms proposed by the government were discussed above. In the light of the disadvantages of the proposed funded scheme, we can consider two other reform designs and compare it with the government's preferred '2%+2%+2%' model.

The main disadvantage of the proposed model comes from its quasi-mandatory enrolment so, as one alternative option, we can take the same system but with mandatory enrolment and no cap on the government contribution. In such a case, we may assume that each and every income tax payer will be mandatorily enrolled in the funded scheme. Such a model would 'fix' the first and the third flaws in the proposed model. Each income tax payer (about one million) enrolled in the funded scheme on the basis of a 6% contribution will reduce the pressure as regards the increasing level of the state-backed pension. We go on here to show the impact of a mandatory enrolment scenario.

The second model we can examine is a 5%+5% one, meaning that the employer is taxed at a 5% level, with the government adding a further 5% on top, making a total monthly contribution of 10% rather than 6%. Our assessment, developed later in this article, is that even a 5% contribution from the government does not drastically affect the country's budget; and, in the long-run, the replacement rates are significantly increased.

### Estimating the annual number of pensioners

In order to develop our calculations, we will need estimates of the number of pensioners over the long-term. So, we will use the dynamic model of average remaining life expectancy developed by Ana Chorgolashvili, Tengiz Nozadze and Eka Svirava (2011). In this work, the model parameters are considered as a time series and, because of slight fluctuations and the high correlation between them, it makes forecasts based on linear regression analysis. This assist with the modelling of mortality tables for subsequent years (between 2010 and 2060).

Estimating the number of pensioners requires information on the number of retirees in each year for both men and women. The earliest source available is the number of live births in 1960 who, in 2010, turned 50. The source used in our calculations is the data of the Ministry of Labour, Health and Social Security of Georgia concerning the number of pensioners above pension age (starting at 65). The problem is the lack of information on the population aged between fifty and 65. To solve this problem, using mortality tables for 1995-2010 and the number of pensioners aged 65-80, we can work backwards to estimate the size of the population aged be-

tween 50 and 65, using these results to fill the gap in the data. It is arguable that the given assumption will cloud the reality, but there is no better solution available at this point.

Using the resulting data on the number of pensioners every year, according to the corresponding mortality tables, we now have forecasts for their distribution for the years up to 2060.

### Calculations

Having discussed the assumptions in the model – see also the Statistical Annex – let us now move to an actual demonstration of how the simulation process works. We should recall that our task is to simulate at least fifty years of future pension liabilities and the ability of the government to cope with them; to do this, we need to make some inferences regarding the future values of several variables. To start with, therefore, we state the assumptions that we have made along the way in the making of the necessary calculations:

- in the following fifty years, we will assume that Georgia will evolve towards a more developed, emerging market economy, justifying modest inflation and interest rates
- currently, the National Bank of Georgia is pursuing a policy of inflation targeting; therefore, the rate of inflation will be assumed to stay in the range desired by the government which, as stated in the long-term goals of the National Bank of Georgia, is 2% on average
- the interest rate is also highly dependent on government policies and will be assumed to follow the pattern of other emerging markets with similar inflation rates, converging to a nominal value of 4.5% in the long run, also with a linear path
- in most of the countries, unemployment is a stationary process. This implies that it is mean-reverting and that its simple average would often represent a reliable guess for the future. However, the result of the extreme lack of time-series data on unemployment rates in Georgia means that we must turn to the modern forecasting technique of Panel Vector Auto-Regressions; these use panel data from many other countries on unemployment in the past to make inferences about unemployment rates in Georgia
- given the lack of data in Georgia, as well as in the rest of the world, we have to make certain assumptions in making forecasts for the labour force. Specifically, we assume that its structure will stay unchanged and that it will grow and change in line with the growth rate of the population, which is forecasted using the same technique as the unemployment rate
- current average salaries will increase in line with the GDP growth rate (ranging between 9% and 3.5% over the period)
- Georgia's budget will also increase in line with the GDP growth rate (again: from 9% to 3.5% over the period).

Using these assumptions, we may define the variables which will be used in our simulations:

- $i_x$  – expected inflation in x year
- $P_x$  – expected Pension in x year
- $r_x$  – expected rate of return in x year
- $GDPG_x$  – expected GDP growth rate in x year
- $B_x$  – expected budget in x year
- $S_x$  – expected average salary in x year
- $NP_x$  – the expected number of pensioners in x year
- $NTP_x$  – the expected number of taxpayers in x year
- $PC_x$  – expected total pension expenditure in x year
- $FD_x$  – expected funded pension in x year
- $AC_x -5\%$  – additional cost to the budget in the case of the 5%+5% model in x year
- $AC_x -2\%$  – additional cost to the budget in the case of the 2%+2%+2% model in x year

We may also define some input information:

- current budget – 8.09bn
- income tax collected – 2.09bn
- pension expenditures – 1.39bn
- average salary – 818: male – 980; female – 617.9
- the number of income tax payers – 1.07m

And here are a few formulas developed to obtain some results:

- Replacement rate =  $P_x/S_x$
- Replacement rate (Funded) =  $(P_x+FD_x)/S_x$
- $PC_x = NP_x * P_x * 12$
- $AC_x -5\% = NTP_x * S_x * 12 * 0.05$
- $AC_x -2\% = NTP_x * S_x * 12 * 0.02$
- Pension to Budget ratio =  $(AC_x+PC_x)/B_x$ .

## Model comparisons

After identifying the necessary numbers and formulae, we can make comparisons of the different proposals for reform that we discussed previously.

First of all, we may compare the different models in terms of replacement rates, i.e. the ratio between pension and average salary. This shows the effectiveness of the model from an employee perspective.

The first model is the current PAYG system, which already has a low replacement rate and which decreases over time. The second model is the ‘2%+2%+2%’ one proposed by the government. In terms of the replacement rates, it does not make a difference whether or not it is mandatory, which is why we show only one result for quasi-mandatory and mandatory models. Compared to the PAYG system, its replacement rate has an increasing nature. However, in the long run a 6% contribution is insufficient to get replacement rates above 30%. The last model is the ‘5%+5%’

one: in terms of replacement rates this is obviously the best because of its highest total contribution.

Comparisons of all three models in terms of the replacement rate for both men and women can be seen in the following graphs.

**Figure 3 – Replacement rates: comparison for males**

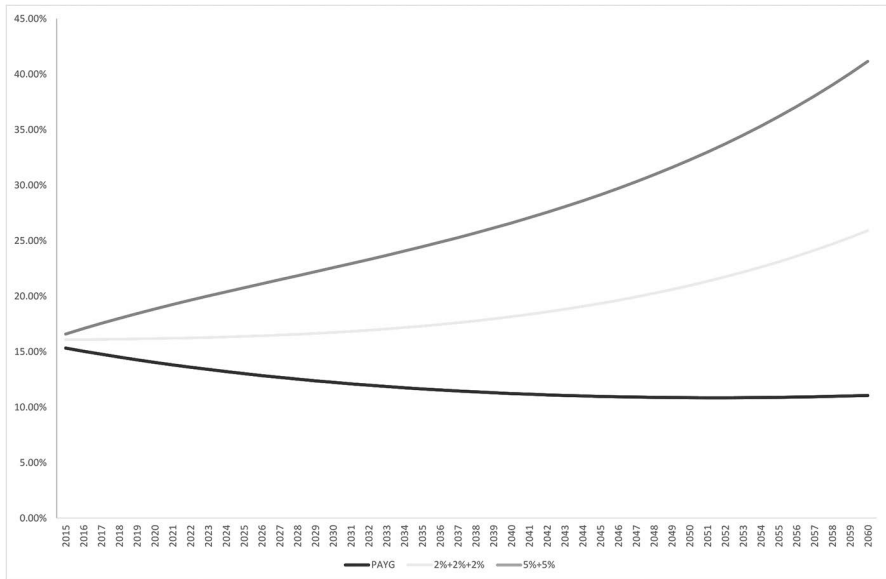
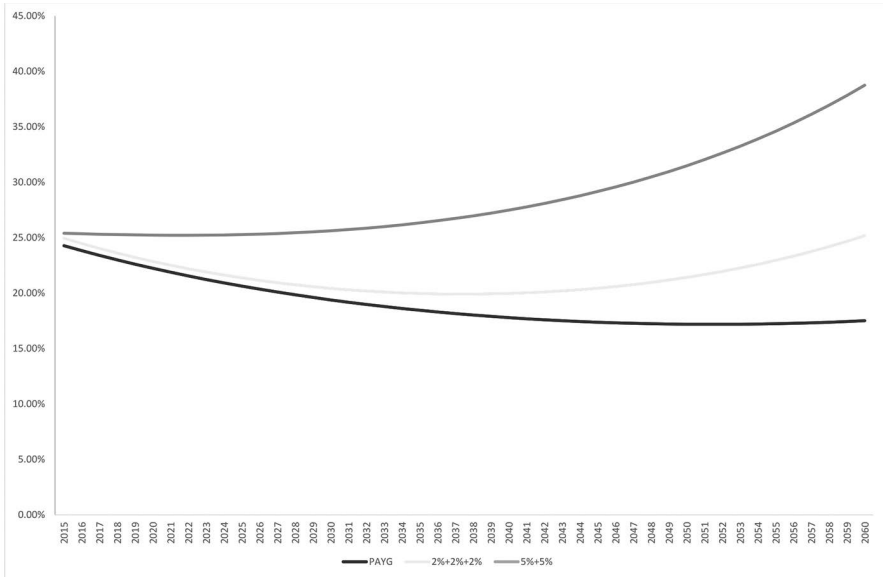


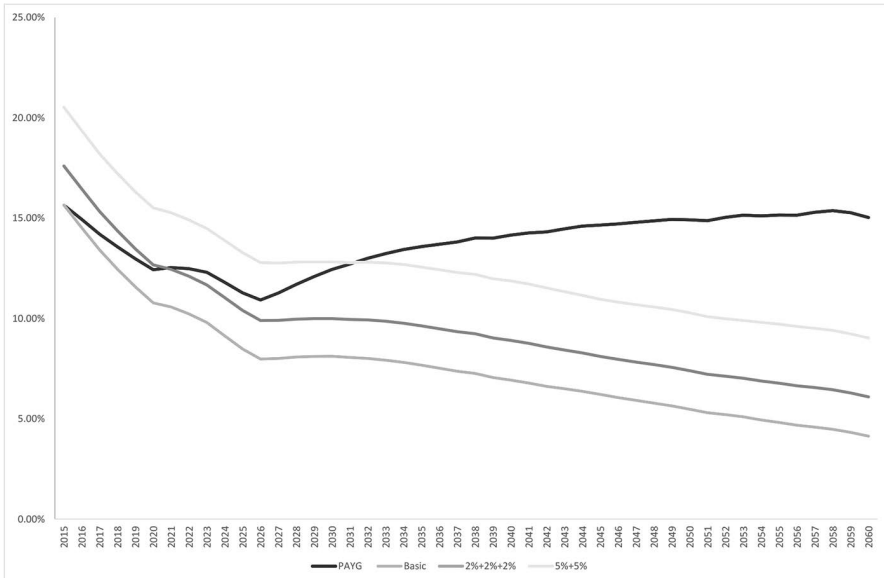
Figure 4 – Replacement rates: comparison for females



We can see from the above graphs that it is obvious that, in terms of replacement rates, a higher contribution is better, but we also have to observe what will happen to budget expenditure in order to say which model is the most efficient.

In case of pensions expenditure, we need to compare the same models: the current PAYG system; the government-proposed quasi-mandatory ‘2%+2%+2%’ model; and the ‘5%+5%’ model. Figure 5 shows the ratio of pensions expenditure for each specific model divided by the expected budget.

Figure 5 – Pension expenditures: comparisons for different models



The current PAYG system is currently the least costly of all the models, but Figure 5 demonstrates that it is the most expensive in the long run. This is because of the expected increasing nature of the pensions provided by it, as we have already mentioned, and because of the population distribution. In ten years, it is expected that the number of pensioners will increase dramatically and that this will continue increasing over a period of time, causing an increase in total pensions expenditure.

We can also see that the current PAYG system is the most expensive to have but also has the lowest replacement rates. Comparing the other two models is not easy: ‘5%+5%’ has a higher replacement rate alongside higher costs, so it is up to the government to decide whether or not this is worthwhile.

The shortage of information means that it is not easy to make an accurate assessment of the quasi-mandatory model proposed by the government. Nevertheless, if we assume that the pressures of the increasing state pension will remain, we can also assume that it will be more costly than a mandatory ‘2%+2%+2%’ model, but with exactly the same replacement rates.

## Conclusion

All our calculations have demonstrated that it is absolutely essential for Georgia to instigate reform of its pension system as soon as possible. We have also seen that the quasi-mandatory model proposed will not be an effective option in terms of pensions expenditure. From our calculations, it is obvious that Georgia has to choose between options that are mandatory in nature. Such systems are more effective in terms of their replacement rates and implied pensions expenditure compared to the current

PAYG system; while they are more effective than quasi-mandatory reform in terms of expenditure.

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## Statistical annex

### *Calculating expected pensions*

In order to calculate future expected pensions for the funded system, we will need to use lifetime annuity formulas, as discussed in this Annex.

An ordinary life annuity is the price that must be paid today by an  $x$ -year-old (client) in order to be eligible for fixed lifetime payments with a certain periodicity from an insurance company. In our case, we assume a unit payment with annual periodicity, constant interest rate  $i$  and discount coefficient  $v$ , with the payment due at the end of each year.

To calculate our value of interest (denoted  $a_x$ ), we use an approach based on mortality tables and the principal of balance.

Assuming the annuity will be bought by  $l_x$  people aged  $x$ , the total revenue of the insurance company will be:

$$l_x \cdot a_x.$$

The promised unit payment will be delivered to  $l_{x+1}$  people left alive after one year; therefore, the total payment is  $l_{x+1} = l_{x+1} \cdot 1$ , and its present value today is shown as:

$$v \cdot l_{x+1}.$$

Following the same pattern, after two years  $l_{x+2}$  people will have to be paid, amounting to a total present value of:

$$v^2 \cdot l_{x+2}.$$

Therefore, the expected payment to be delivered after  $\omega - x$  years will have a present value of:

$$v^{\omega-x} \cdot l_{\omega}$$

and the total present value of the future payments will be:

$$v \cdot l_{x+1} + v^2 \cdot l_{x+2} + \dots + v^{\omega-x} \cdot l_{\omega} = \sum_{k=1}^{\omega-x} v_k \cdot l_{x+k}$$

As the principal of balance dictates, total expenses must equal total revenue, implying that values of  $l_x \cdot a_x$  and

$v \cdot l_{x+1} + v^2 \cdot l_{x+2} + \dots + v^{\omega-x} \cdot l_{\omega} = \sum_{k=1}^{\omega-x} v_k \cdot l_{x+k}$ , must be equal, yielding an equation for  $a_x$ :

$$l_x \cdot a_x = \sum_{k=1}^{\omega-x} v_k \cdot l_{x+k}$$

Since:

$$l_{x+k} / l_x = {}_k p_x,$$

we may obtain our final solution:

$$a_x = \sum_{k=1}^{\omega-x} v_k \cdot {}_k p_x$$

## Forecasting methodology

### Panel VAR

For our purposes, we will use the Reduced Form Vector Auto-Regression (VAR) technique to forecast the future values of population growth and unemployment. VAR is a system of stochastic difference equations with one difference equation for each variable. It is similar to the Auto-Regressive (AR) representation of variables, except that in VAR each variable is represented by the lagged value of itself as well as the lagged values of the other variables. For example, AR with 3 lags would look like this:

$$y_t = \beta_1 y_{t-1} + \beta_2 y_{t-2} + \beta_3 y_{t-3} + \mu_t$$

where  $\mu_t$  is a random error term.

VAR lets us use information on the other variables as well, to forecast  $y_t$ . For example, a VAR equation system with two variables and 3 lags would look like this:

$$y_t = \beta_1 y_{t-1} + \beta_2 y_{t-2} + \beta_3 y_{t-3} + a_1 x_{t-1} + a_2 x_{t-2} + a_3 x_{t-3} + \mu_{1,t}$$

$$x_t = \gamma_1 y_{t-1} + \gamma_2 y_{t-2} + \gamma_3 y_{t-3} + \delta_1 x_{t-1} + \delta_2 x_{t-2} + \delta_3 x_{t-3} + \mu_{2,t}$$

In our case, we will estimate the similar bivariate VAR with *Unemployment* (per cent) and *population growth* (per cent) as variables.<sup>1</sup> For Panel VAR this means that, using data on both variables for 41 countries over 31 years (1980-2011), we may estimate these systems of equations using OLS and obtain estimates for  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$  coefficients for each of the 41 countries.

After obtaining parameter estimates, we can simply insert the latest values of *unemployment* and *population growth* into the equations and obtain year-by-year forecasts for each country

$$(E[\mu_1] = E[\mu_2] = \mathbf{0}).$$

### Forecasts for Georgia

What we now have is the resulting forecasts for both variables for each country up to 2060; what we still need is the same forecasts (i.e. for unemployment and population growth) for Georgia. Therefore, our next task is to use the 41 obtained forecasts for each year and to extract a best approximation for Georgia from them. The procedure to do this will be the same for the values of the unemployment rate as well as for the population growth rate, so we can narrow our discussion to the unemployment rate for now. Also, for simplicity, let us take a series of forecasts for the unemployment rate in a single year – 2013.

Unfortunately, the unemployment rate of Georgia will be neither that of any those 41 countries nor it will be their average. Rather, we can obtain data (for Georgia as well as for the other 41 countries) on relatively static country characteristics which determine, to some extent, the unemployment rate; establish the relationship between forecast unemployment values and the country characteristics; and predict Georgia's unemployment rate using data on the country characteristics of Georgia.

To clarify this, the exact procedure for each year's forecasts will be:

- obtain data on a set of static variables for all 41 countries as well as Georgia.
- for every forecasted year, regress the unemployment rate (with 41 observations) on a series of static variables and obtain coefficients
- use the resulting model and fit the values for the static variables for Georgia to predict the unemployment rate of Georgia.

## Data

### Data for Panel VAR

For our Panel VAR, we use a sample consisting of 41 countries over 32 years with annual periodicity. The time series covers the period from 1980 to 2012. The Vector Auto-Regression has two variables: unemployment; and population growth. The units of measurement for both variables are percentages (not ratio).

1 We use the AIC (Akaike Information Criteria) method in order to determine the most efficient number of lags for the equations; or in other words, to choose the best model for each country.

The data for these two variables were collected from the World Bank Online Database.

*Data on static variables*

The static variables used for the identification of values for the unemployment of Georgia are:

- human development index  
(source: UNDP indices & data)
- open economy dummy  
(equals 1 if the country has free or ‘mostly free’ financial and trade markets, according to the Heritage index)
- average growth  
twenty-year average growth rate (source: World Bank online database)
- real interest rate  
twenty-year average real interest rate (source: World Bank online database)
- labour force participation  
ten-year average of the labour force participation rate (source: World Bank online database)
- export share  
ten-year average value for exports as a share of total GDP (%) (source: World Bank online database)
- rural share  
share of the rural population to the total population as of 2011 (source: World Bank online database)
- average inflation  
twenty-year average inflation rate (source: World Bank online database)
- three lags of the unemployment rate  
each regression includes 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> lagged variables of the unemployment rate.

The static variables used for the identification of values for the population growth of Georgia are:

- human development index  
(source: UNDP indices & data)
- rural share  
share of the rural to the total population, as of 2011 (source: World Bank online database)
- average growth  
twenty-year average growth rate (source: World Bank online database)
- fertility rate  
twenty-year average fertility rate (source: World Bank online database)
- mortality rate  
twenty-year average of average female and male mortality rates (source: World Bank online database)
- female share of the labour force

twenty-year average of the ratio of the female labour force participation rate to the male labour force participation rate (source: World Bank online database)

- GDP per capita  
GDP per capita as of 2011 (source: World Bank online database)
- three lags of population growth rate  
each regression includes 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> lagged variables of the population growth rate.

The list of countries used in the sample is as follows:

Argentina	France	Norway
Australia	Germany	Pakistan
Austria	Iceland	Paraguay
The Bahamas	Indonesia	Peru
Bolivia	Ireland	Philippines
Brazil	Israel	Portugal
Canada	Italy	Singapore
Chile	Japan	Spain
China	Luxembourg	Sweden
Colombia	Malaysia	Switzerland
Denmark	Mexico	Turkey
Arab Republic of Egypt	Morocco	United Kingdom
Estonia	Netherlands	United States
Finland	New Zealand	