

Aspects of Elderly Poverty in Cyprus

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Abstract

The paper examines the poverty risk among elderly in Cyprus both from a national and a comparative perspective. Using EU-SILC data we find that the elderly face four times higher risk of poverty than the working-age population, when the EU average is considerably lower. This is mostly due to a large wedge between income from wages and income from pensions. Homeownership plays a role, since it decreases the poverty risk of all age groups but more of the elderly. Furthermore, we use the most recent Family Expenditure Survey provided by the Statistical Service of Cyprus in order to estimate an econometric model that associates poverty in the old-age with certain demographic and socioeconomic characteristics. The results of our analysis are viewed in the light of certain institutional features of the Cypriot pension system and have useful policy implications as well as provide predictions about the trend of elderly poverty in the upcoming years.

Keywords: Elderly poverty, Cyprus.

1. Introduction

A consistent trend observed in most EU countries is the continuous rise in life expectancy. Meanwhile fertility rates have stagnated or even declined. The consequence is straightforward; societies are graying. While this could be arguably credited as an achievement of post-industrial societies, it does pose critical challenges. For, the exit of older workers from the labour market usually results to a gradual erosion of their relative living standard since their income sources (pensions and other old-age benefits) may not adjust fully to economic growth. Over the last decade, this resulted to large numbers of elderly people facing high risk of poverty. Making things worse, poverty in the old-age is usually persistent, since poor elderly persons lack the ability of re-entering the labour market in order to increase their income.

Compared with other countries, Cyprus appears to have a negative record. Elderly poverty is among the highest in Europe as documented by several

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reports and studies, (e.g. Zaidi, 2006a). According to EU-SILC data, about 47% of the elderly live below the poverty line. Admittedly, this figure stands far above the EU average (18.9% in 2008). The very high poverty among the elderly in Cyprus is surprising and perhaps counterintuitive for several reasons. The economy of Cyprus has performed very well during the last decade, a fact reflected not only in high rates of economic growth but also in the attractive conditions of the labour market. It is normally expected of prosperous societies to afford adequate economic sources for the elderly's well-being. Furthermore, the overall inequality and poverty in the country are relatively low (below EU average). So, why is the risk of poverty so asymmetrically distributed across age groups? Notably, the recent political debate is focused single-mindedly on the issue of the sustainability of the pension system. Concerns about the fiscal impact of population ageing monopolize public dialogue, while poverty in the old-age has received relatively less attention.

The purpose of the study is to provide explanations to statistical facts, trace future trends and provide policy recommendations regarding elderly poverty in Cyprus, without ignoring the fiscal necessities that have emerged due to the European debt crisis. The structure of the paper is the following: section 2 describes our methodological settings; sections 3, 4, 5 are devoted to comparative analysis, in sections 6 and 7 the focus of analysis is purely national; and section 8 concludes the paper.

2. Data and methods

The study utilizes EU-SILC data as well as the 2008/9 Cyprus Family Expenditure Survey. The former is employed for cross-country comparisons and the latter for delving into national-specific aspects of elderly poverty. Several other methodological settings are described as follows.

First, as it is normally the case, we set income as proxy of the unobserved welfare of the household. As income we define the sum of all monetary income components (wages, income from self-employment, passive income, pensions and cash transfers). But we also move beyond this by considering non-monetary incomes. Imputed rents are considered in the analysis as provided by the Eurostat¹. Imputed rent is the fictitious rent that homeowners would have to pay, if they were not homeowners.

¹ Some countries use econometric techniques for assessing imputed rental income, others use the method of self-assessment. Ideally, imputed rents should have been computed by identical –or almost identical– hedonic price models.

The unit of analysis is the individual in the context of the household and the distributions used are distributions of equivalised household disposable income per capita. The equivalised household disposable income is computed by adding all monetary incomes of the household members (thus assuming implicitly that income is altruistically shared within the family) and dividing by the number of “equivalent adults”. The latter is computed using equivalence scales which take into account economies of scale within the household as well as different needs among members of different age. This is necessary for making meaningful welfare comparisons between households with different household structures. Among the numerous equivalence scales available in the literature, we prefer the “modified OECD equivalence scales” that assign weights of 1.00 to the household head, 0.50 to each of the other adults in the household and 0.30 to each child², (Haagenars et al., 1994). There is no a priori argument in favour of these scales beyond their undisputed popularity that facilitates comparisons. Finally, we note that these assumptions are very common in the literature and usually adopted by most official statistic agencies.

The measurement of poverty presupposes the choice of a poverty line. Here we follow the approach of Eurostat and set the relative poverty line equal at 60% of the median of the distribution. This implies a framework of *relative* poverty measurement reflecting the minimum acceptable standard of living; thus the poverty line differs across countries and increases within a country as median income increases. The poverty indices selected for measuring relative poverty in our analysis belong to the parametric family of Foster et al. (1984), which is characterised by the choice of a parameter to reflect social aversion to poverty. As this parameter increases the society is considered to be more averse to poverty. In the extreme, as the parameter in question goes to infinity, the index collapses to the Rawlsian maximin principle: only the poverty of the poorest matters. A brief algebraic exposition of the index is provided in the Appendix.

3. Diagnosis of the situation and comparisons with the EU

We proceed to the empirical analysis by providing cross-country comparisons. In Table 1 we measure poverty in the old-age using the parametric family of FGT index. We set the parameter at 0, 1 and 2 and denote the resulting indices FGT1, FGT2 and FGT3, respectively. If the parameter is equal to 0, then the index is equal to the at-risk-of-poverty

² Children are defined as persons aged below 14.

rate (or headcount ratio). Thus, the second column of Table 1, under the heading FGT0, presents the proportion of poor elderly in each country. The informational context of FGT1 is more complex, since it takes into account not only the incidence of poverty (i.e. how many are poor) but also its intensity (i.e. how much poor are the poor). Finally, the FGT2 takes into account the income inequality among the poor. Thus, the three indicators cover the three dimensions of poverty: incidence, intensity and inequality.³ For each FGT index in Table 1, we also report the rank (from the highest to the lowest) of the corresponding country, a figure of particular interest in the analysis of our paper.

Overall, elderly poverty is high in many EU countries where, on average, about one out of five elderly persons is poor.⁴ A closer look at the figures reported in Table 1, shows that poverty rates vary considerably among EU countries, ranging from the extremely low rate of 5.4 per cent in Luxemburg to the very high rate of 49.8 per cent in Latvia. Cyprus has the second highest poverty rate among the 27 countries, irrespective of the FGT index chosen to measure poverty. The at-risk-of-poverty of 47.2 per cent indicates that almost one out of two elderly Cypriots is poor. The FGT1, the average proportionate poverty gap among all persons in the distribution, is estimated at 10 per cent. Increasing further the aversion parameter (thus placing more weight to the poorest among the poor) keeps Cyprus steadily in the second place, even though many changes in the ranking occur among other countries.

The conclusion emerging from the figures reported in Table 1 is that incidence, intensity and inequality of poverty among the elderly in Cyprus highly deviate from the EU norms. Other countries that exhibit high levels of poverty in the old-age are Latvia, Estonia, UK and Bulgaria. It is also noteworthy that Cyprus has peculiarly larger share of elderly among the poor than other Mediterranean countries (Italy, Greece, Spain and Portugal) despite the fact that it shares similar social structures and welfare state arrangements with them⁵. Policymakers are aware of the problem,

³ Furthermore, by increasing successively the poverty aversion parameter of the FGT index, we can test how far the observed poverty is the outcome of specific societal preferences.

⁴ We should keep in mind, however, that poverty thresholds are computed as proportion of the national median income. Thus, the high elderly poverty rates reflect the better situation of younger people and do not necessarily mean that many elderly people are in a state of severe impoverishment.

⁵ Traditionally the literature considers Greece, Italy, Spain and Portugal as forming the so-called Southern European model of welfare state, Ferrera (1996). More recently other scholars describe an extended family of Mediterranean welfare states including four other nations (Cyprus, Malta, Israel, Turkey), Gal (2010).

which has been acknowledged in the National Reform Programme of the country as a major social inclusion challenge and highlighted in the Country Specific Recommendations of the European Council.

TABLE 1
Elderly poverty in the EU, 2008

	FGT0		FGT1		FGT2	
	Index	Rank	Index	Rank	Index	Rank
Austria	0.1441	20	0.0222	20	0.0062	20
Belgium	0.2093	13	0.0387	14	0.0135	14
Bulgaria	0.3317	4	0.0683	5	0.0210	6
Cyprus	0.4717	2	0.1001	2	0.0299	2
Czech	0.0709	25	0.0081	26	0.0018	26
Germany	0.1493	19	0.0347	15	0.0151	13
Denmark	0.1728	16	0.0186	22	0.0044	24
Estonia	0.3819	3	0.0647	6	0.0159	10
Spain	0.2755	7	0.0610	7	0.0221	5
Finland	0.2223	9	0.0303	16	0.0067	19
Greece	0.2220	10	0.0491	9	0.0172	8
Hungary	0.0409	27	0.0058	27	0.0015	27
Ireland	0.2133	12	0.0391	13	0.0168	9
Iceland	0.1420	21	0.0228	19	0.0075	18
Italy	0.2057	14	0.0464	10	0.0176	7
Lithuania	0.2853	6	0.0535	8	0.0151	12
Luxembourg	0.0538	26	0.0113	25	0.0048	23
Latvia	0.4976	1	0.1391	1	0.0506	1
Netherlands	0.0897	24	0.0164	23	0.0055	22
Norway	0.1509	18	0.0253	17	0.0084	16
Poland	0.1192	22	0.0208	21	0.0058	21
Portugal	0.2186	11	0.0456	11	0.0152	11
Romania	0.2541	8	0.0686	4	0.0284	3
Sweden	0.1549	17	0.0246	18	0.0082	17
Slovenia	0.1897	15	0.0397	12	0.0132	15
Slovakia	0.0957	23	0.0125	24	0.0030	25
UK	0.3043	5	0.0702	3	0.0252	4

Sources: EU-SILC, Authors' Own Calculations.

But how does the poverty risk among elderly compares with that of the rest of the population? To answer this question we compute for each country in our sample the relative elderly poverty, defined as the ratio of the poverty rate of the elderly divided by that of working-age population (those aged 16-64 years old)

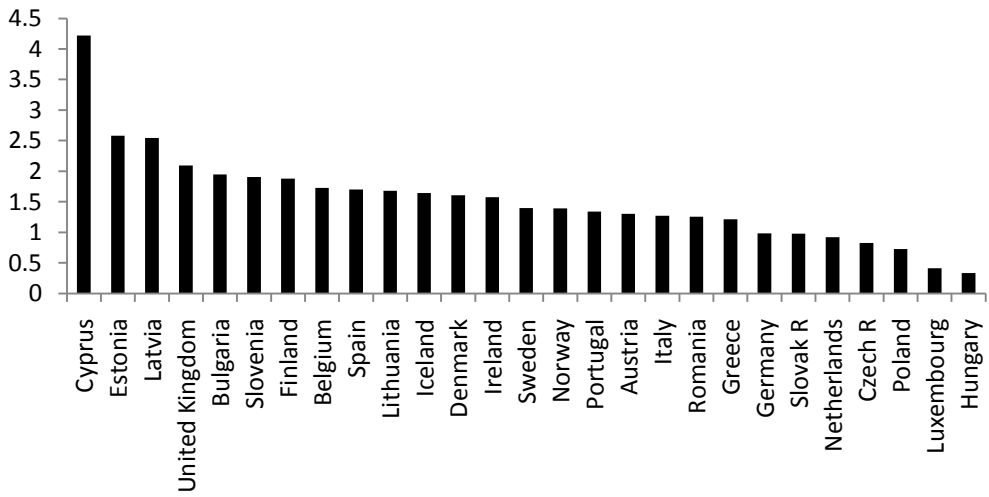
$$\text{REP} = \frac{\text{FGT0}_{+64}(a)}{\text{FGT0}_{18-64}(a)}$$

The results obtained are reported in Figure 1. In most countries the REP is above unity indicating that the elderly face higher risk of poverty than younger age groups. Cyprus, however, with REP of 4.2 is strikingly above every other country included in the analysis. Thus an elderly person faces 4.2 times higher risk of being poor than a working-age adult in Cyprus, while the corresponding weighted average in Europe is 1.34. It is also noteworthy that Cyprus overpasses by far other countries with high REP. (Estonia, Latvia, and UK).

The high elderly poverty rates, as well as the low income position of the elderly vis-à-vis the rest of the population, are at a certain extent the outcome of pensions' income inadequacy. The scatter plot in Figure 2 exposes this point. The horizontal axis is for elderly poverty rates and the vertical axis is for the aggregate replacement ratio which is calculated as the ratio of the median individual gross pension of retired persons aged between 65 and 74 years relative to the median individual gross earnings of persons aged between 50 and 59 years. Clearly, the relationship between the replacement ratio and old-age poverty rates is negative. Namely, countries with low replacement ratios (Cyprus stood at 0.33 in 2008 while the EU average at 0.50) tend to have higher shares of poor elderly. The figure also implies that if replacement ratio increases in Cyprus (as several actuarial reports predict), elderly poverty is likely to decrease.

FIGURE 1

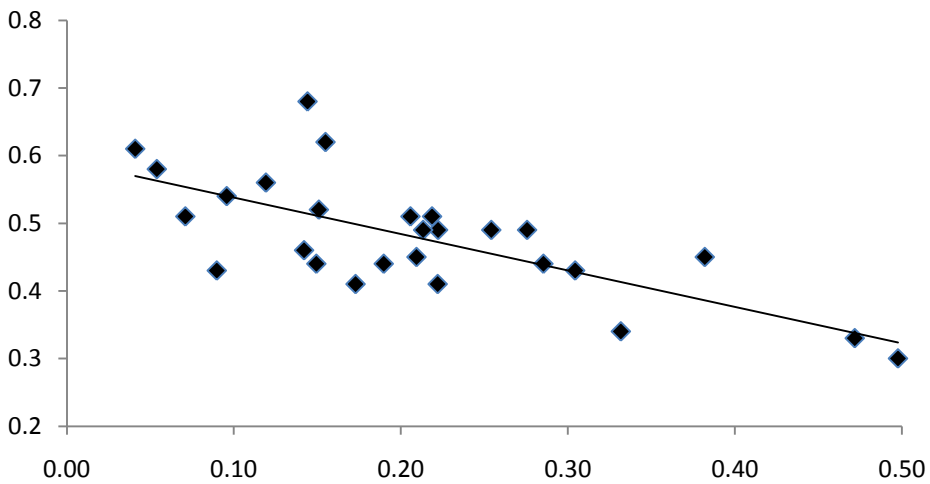
Relative poverty risk ratio among the elderly, 2008.



Source: EU-SILC. Authors' own calculations.

FIGURE 2

Elderly poverty and aggregate replacement ratio, 2008



Source: Eurostat Online Database and author's own calculations.

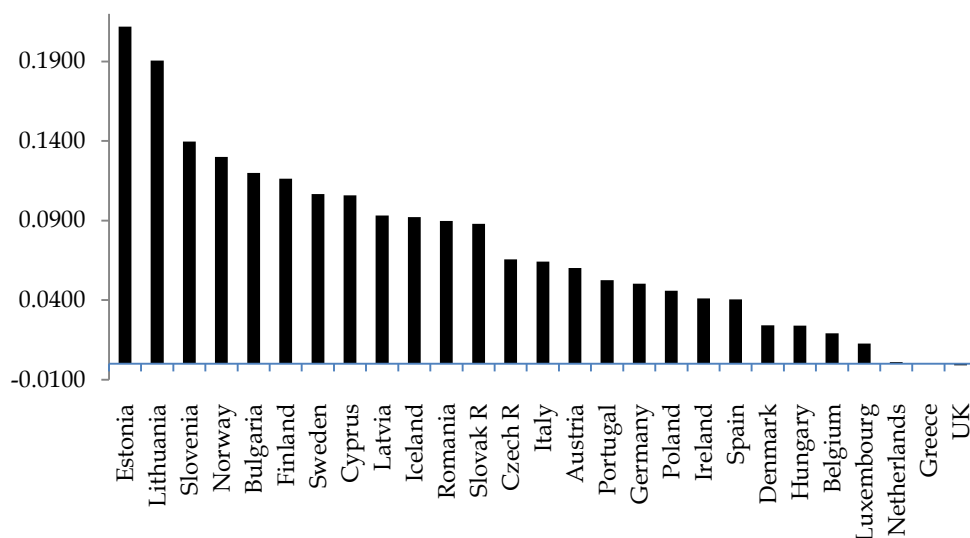
4. Has elderly poverty a gender dimension?

Here we investigate the gender dimension of elderly poverty. In Figure 3 we have estimated the difference between the female-specific poverty rate and the male-specific poverty rate among the elderly, using the FGT0 measure. The difference is positive in almost all countries despite the high variability that indicates the existence of various patterns among countries. On average women in the EU are 7.3 percentage points more probable to experience poverty than males. In Cyprus the corresponding figure is 10.6 per cent, considerably above the EU average. The largest gender difference is observed for Estonia (21.2%) and Lithuania (19.1%); while the lowest for Greece and UK, where gender differences in elderly poverty happen to be negligible.

Gender differences can be attributed to the combined effect of two factors: the higher life expectancy of women and the income inadequacy of widow pensions. Obviously, those issues are interrelated since one-person households are more vulnerable to poverty, because they fail to exploit household economies of scale in consumption. On top of that, the erosion of the real value of pensions and old-age benefits tend to affect women more than men, as the former live longer on average (Zaidi, 2006a). Therefore, if the levels of widows' pensions and other survivors' benefits are relatively low (at least lower than the full old-age pension), then it can be expected that pockets of poverty would exist among lone females (especially those aged above 75-80 years old).

Nevertheless, there are reasons to believe that gender differences are likely to be eradicated over time as the current generations of women tend to be more educated and participate more in the labour market. These patterns are evident in Cyprus. Female employment was 59.0 per cent in 2000 but increased to 67.3 in 2011, following clearly an upward trend during this decade. Similarly, education attainment for females is constantly increasing. According to Eurostat, only 20.6 per cent of the female population aged 15-64 had acquired tertiary qualifications in 2000. A decade later this figure reached at 36.6 per cent. Still gender biases exist in the labour market of Cyprus: female employment is lower than male's while inefficient wage setting mechanisms produce gender wage gaps (Christofides et al 2010).

FIGURE 3
Gender differential poverty risk, 2008

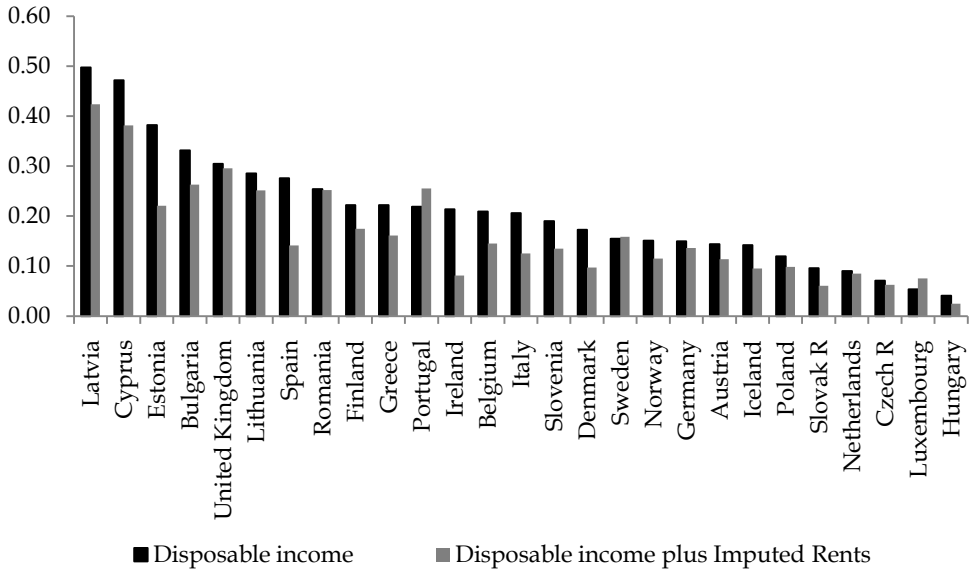


Source: EU-SILC. Authors' own calculations.

5. The effect of homeownership

In the analysis above we employed a monetary definition of income for identifying the poor. However, as several scholars have argued, omitting the effects of non-cash income in poverty analysis may result to biases (Smeeding et al, 1993). Such biases might be important when the analysis is targeted to specific population groups that benefit disproportionately more from non-cash incomes. In our setting, we find relevant the effect of homeownership. Expectedly, homeownership rates differ between elderly and non-elderly since the former are more probable to have invested their savings in housing property. Furthermore, older owner occupiers are more probable to have paid off their mortgages, thus they incur lower housing costs than younger owners. In these cases the omission of imputed rents (i.e. the fictitious cash flow that stems from owning a house) from the definition of income can result to underestimating -in relative terms- the economic well-being of those groups that enjoy higher rates of homeownership. To test this assumption, we added imputed rents in the concept of income and re-estimated the poverty indices. The results are shown in Figure 4.

FIGURE 4

Elderly poverty rates and the effect of imputed rents, 2008

Source: EU-SILC. Authors' own calculations.

Several interesting results emerge:

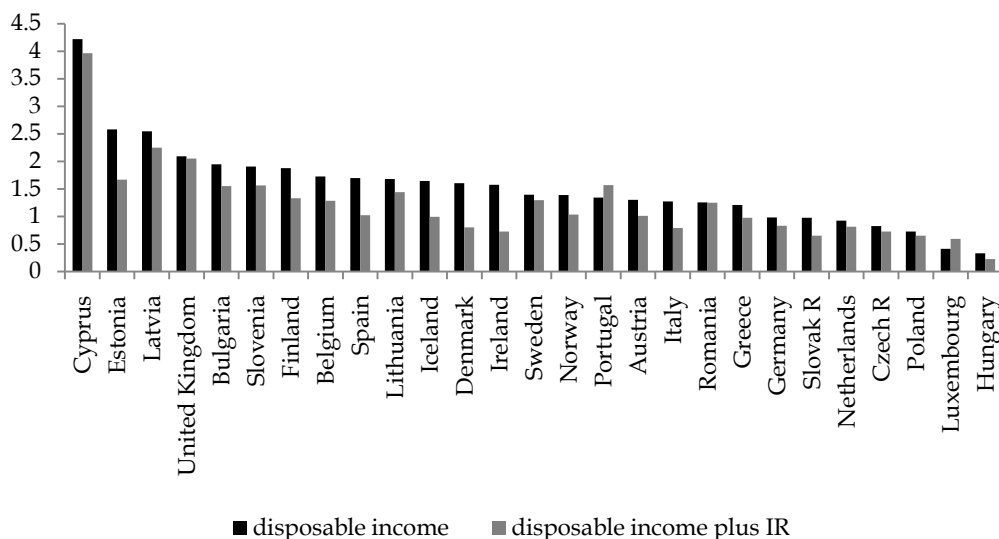
- In the majority of countries the inclusion of imputed rents results to strong decline in elderly poverty.
- The effect of homeownership on poverty varies from +2.3% (Denmark) to -48.6% (Spain). In Cyprus, poverty falls from 47.2% to 38.1%.
- The ranking of countries with respect to poverty in the old-age changes, but not dramatically. Cyprus still remains one of the countries with the highest poverty rates.

One, of course, can argue that homeownership exerts a poverty-reducing effect for all age-groups, not only for the elderly. Thus, it may change the level of poverty but not differences between age groups. To explore the validity of this argument in Figure 5 we report the REP ratio calculated without and with imputed rent included in household disposable income. The results show that the relative poverty risk ratio of elderly is reduced in the overwhelming majority of countries. In some countries, notably Denmark and Ireland, the drop at relative risk is impressive. In Cyprus, the relative risk slightly reduces from 4.21 to 3.96. This rather small decrease indicates that the elderly benefit more from the anti-poverty

effects of imputed rents, albeit by a small margin compared to other age groups. This is because homeownership is high among all age groups in Cyprus.

FIGURE 5

Relative Elderly Poverty (REP) without and with including imputed rents in household disposable income



Source: Author's calculations using EU-SILC data.

Overall, it appears that homeownership acts as a cushion that partially absorbs poverty risks. This argument holds for all groups but may be even more relevant to the elderly from a life-cycle perspective because their monetary incomes are relatively inelastic and, in most cases, lack the means of coping with income inadequacy (for example, asking for gainful employment in the labour market). Housing wealth merely reduces income uncertainty.

6. Econometric analysis

Henceforth the analysis focuses on Cyprus alone. In particular, we explore econometrically the association of poverty in the old-age with socio-demographic characteristics. Two econometric models are employed for that purpose:

- a) A probit model that associates the probability of being poor (incidence of poverty) with socio-demographic characteristics.
- b) A regression model that associates the intensity of poverty (the proportional difference between poor's income and the poverty line) with the same characteristics.

In the Appendix, we provide a brief algebraic presentation of the two models. The results are presented in Table 2. The first two columns list personal and household characteristics. The last two columns show the change (in percentage points) in the probability of being poor (third column) and in the intensity of poverty (fourth column) induced by a change in characteristics. The change in the incidence (or intensity) of poverty corresponds to the change in characteristic relative to the one in parenthesis while all other characteristics are held fixed. The stars next to the figures show the statistical reliability (significance) of the estimated effect.

Commenting on the results, we first observe that the two models exhibit similarities. Most of the factors that affect the incidence of poverty influence also its intensity. The variables which reliably explain the incidence of poverty are; the age of the individual, the household structure, his or her educational status, the area of residence as well as the dependency ratio of her household. On the other hand, gender and ethnicity appear to be statistically insignificant.

Age has a positive effect on poverty. Namely, persons aged between 74-84 face 6.7 per cent higher probability of poverty compared with those aged 63-73. For the very old (aged above 84 years) the risk of poverty increases dramatically. From the last column of the Table 2, we notice that age is also positively associated with the intensity of poverty. As age increases, the income of the poor tends to diverge from the poverty threshold.

Household structure appears to matter a lot. Older couples face 17.6 per cent lower probability of poverty than lone elderly. Even more protected are the elderly who live in extended families (three-generation families). These elderly benefit from this family arrangement due to income sharing with working-age adults. On the contrary, older people that live in smaller households fail to take advantage of large household consumption economies of scale. Yet the effect of residing in an extended family on the intensity of poverty is positive.

TABLE 2
The effect of characteristics on elderly poverty

	Characteristic	Incidence	Intensity
Ethnic group	(Cypriot)		
	Non-Cypriot	-7.0	-2.9
Gender	(Male)		
	Female	-0.9	1.7
Age	(63-73)		
	74-84	6.7**	2.5**
	84+	31.1**	5.0**
Household Structure	(Single person)		
	Older couple	-17.6**	-10.0**
	Extended family	-33.4**	21.3**
	Other	-13.5**	-8.2**
Educational attainment	(Primary or less)		
	Secondary or Tertiary	-26.5**	-0.02
Area of residence	(Urban areas)		
	Rural	8.4**	1.0
Dependency ratio	(continuous variable)	21.9**	-21.4**

Source: Author's calculations using FES data.

Notes: ** indicates significance at the 5% level, * indicates significance at the 10% level.

Educated persons are also better protected from poverty. Expectedly, the well educated have better jobs, richer contribution records and, accordingly, higher pensions during their retirement life. And, education is insignificant for explaining intensity of poverty exactly because the share of educated persons under the poverty line is low. Lastly, elderly living in rural areas are more vulnerable to poverty as well as families characterized by high dependency ratio (for example, multi-child families). These families are characterized by an unbalanced share of income earners to elderly and children and, thus, are more likely to be poor.

One of the interesting results of the model regards the relation between household structure and poverty in the old-age. It may be reasonably argued that strong family ties act as a shield against poverty. This finding is in accordance with several scholars that have highlighted the major role

of family as a provider of welfare in Mediterranean countries and how the family, in many cases, substitutes the state or the market, Naldini (2003).

We conclude the discussion of the results with a policy recommendation and a prediction. First, state should target subgroups of elderly that are very vulnerable to poverty. In that respect, more prone to poverty are the very oldest, especially those that live alone or/and in rural areas. Possibly, welfare programmes should target those groups of elderly by providing income support or in-kind benefits such as long-term care. Secondly, the model implies lower shares of poverty elderly in the future since the younger cohorts of pensioners are increasingly better educated than the older one.

7. The Cypriot Pension System: Institutional features and reforms

Previous findings are better viewed in the light of certain characteristics of the Cypriot pension system. Since the income of the elderly stems at a large extent from pensions, it comes as a natural that the structure of the pension system affects poverty in the old-age. Changes in pension policies may have also considerable and long-term impacts on poverty. In the Appendix we provide a brief description of the Cypriot pension system, but here we only focus to certain institutional features of the system:

- The current insurance scheme has not yet fully mature. The General Social Insurance Scheme was established in 1957 aiming at providing compulsory insurance to every person employed in Cyprus, including all categories of self-employed. But, in 1980 a major reform took place. The old flat-rate contributions and benefits scheme was substituted by an earnings-related insurance scheme. The 1980 system is expected to fully mature over the next decade. As a consequence many current pensioners receive pensions lower than the full old-age pension level. The average level of pensions is expected to increase over time as old pensioners are substituted by new pensioners (with larger contribution record). According to an actuarial report of the Ministry of Labour and Social Insurance (2011), the replacement ratios of the supplementary part⁶ of the pensions are projected to increase over time for all types of pensions. In 2010, the replacement ratios for the supplementary part of the old-age pension were at 24 per cent for males and 22 per cent for

⁶ Pensions consist of a supplementary and a basic part. Note that in the supplementary part of the scheme the pension is proportional to the period of contribution.

females. The ratios are expected to stabilize at 31 per cent and 36 per cent, respectively, in 2020. Similarly, for invalidity pensions, the ratios were 22 per cent for males and 27 per cent for females in 2010. They are projected to increase at 26 per cent and 29 per cent, respectively, in 2020. The gradual maturing of the pension system will increase the aggregate replacement ratio and decrease poverty in the old-age, assuming all the rest constant.

- The indexation scheme is a weighted average of wage and prices. The basic part of the old-age pension is indexed to wage growth whereas the supplementary part is indexed to inflation. As a whole this feature protects pensioners by inflation. Yet the wedge between income from pensions and income from earnings can be partly attributed to the strong wage growth of the previous decades. Nevertheless, it should be noted that most EU countries index their pensions to prices while few index them to wages or to a combination of wages and prices, Zaidi (2006b).
- The pension system is characterized by inequities between the private and the public sector. According to Simone (2011), the basic differences between the pension schemes for public employees and the General Social Insurance Scheme are: a) lower effective retirement rate by about six and one half years, b) pension is calculated on the basis of final salary (instead of lifetime earnings) which is the highest in the career of the employee, c) a large lump sum gratuity is paid immediately after employee's retirement. Thus, there are not only income disparities between the elderly and the nonelderly, but also inequalities exist within the group of elderly.
- The level of contributions is relatively low. Employed persons contribute 12.6 per cent of their gross insurable earnings, shared equally between the employer and the employee, while an additional 4 per cent is subsidized by the state. The total contribution of self-employed is even lower at 11.6 per cent of their insured earnings, while an additional 4 per cent is paid by the state. Relatively low contribution rates imply that the disposable income of the nonelderly is higher than it would be in other case.
- In 2009 and, later, in 2011, the government implemented pension reforms in order to meet several objectives but mostly urged by the need to cope with the fiscal impact of population ageing. The basic measure taken was the gradual increase in the contribution rate for employees and employers by 1 percentage point every five years. This

reform effectively decreases the net disposable income of nonelderly. *Ceteris paribus*, the phased increase of contribution rates will improve the relative income position of the elderly vis-à-vis the nonelderly, thus exerting a downward pressure in poverty in the old-age. In 2009 the government introduced a targeted scheme for low income pensioners. The scheme provides for a means-tested benefit to poor pensioners. It is a monthly top-up amount calculated as an increase in their pension at a rate of 9%-16%. Most probably the measure would have only a slight impact on the incidence of poverty, but a larger one on the intensity of poverty. The 2011 pension system reforms were part of the austerity programme aiming at containing the public deficit of the country and targeted public sector employees. The main measures were an increase in the permanent contribution rate for public employees, the abolition of access to public sector schemes for new public sector employees and the indexation of their pensions with inflation only. Besides their fiscal impact, these measures cannot be expected to have large distributional consequences but rather they may decrease the inequality of income among the elderly.

8. Conclusions

The paper analyzed several aspects of elderly poverty in Cyprus drawing on comparisons with EU where appropriate. Elderly poverty in Cyprus is very high, notably the second highest in Europe according to our estimates. Almost one-in-two elderly people are at risk of poverty. Our analysis adopted a relative framework of poverty measurement, namely poverty threshold is defined as proportion of the national median income. This approach has dominated the international literature. It is also highly popular among policymakers and official agencies. Certainly the methodology has its own advantages and limitations. Yet what is important to clarify is that within this framework of analysis high elderly poverty indicates that elderly's living standard deviates from others age-groups and does not mean necessarily that they are severely deprived (despite that pockets of extreme poverty do exist). Elderly poverty, at least in Cyprus, is to a certain degree the outcome of low aggregate replacement ratio. According to Eurostat, the ratio is currently at 0.36 in Cyprus while the EU average is at 0.53. However, this may be a transitory element of the Cypriot pension system since the system is expected to fully mature after 2020. The average level of pensions is expected to increase during the next decade resulting to an increase in replacement ratios and a decrease in poverty in the old-age, assuming all the rest constant.

We also examined the effect of homeownership on elderly poverty by adding the monetary value of imputed rents in the income definition. We

found that their relative poverty risk slightly decreased due to imputed rents. This is due to the fact that elderly are more probable to own a house than working-age adults. The same pattern holds for other EU countries, too. It appears that homeownership acts partly as a safety net against the risk of being poor. The consideration of homeownership changed the rankings of countries (according to elderly poverty) but not dramatically. The rank of Cyprus remained unchanged.

Usually poverty in the old-age has a gender dimension since females are more prone to poverty than males. This is the combined outcome of the higher life expectancy of female altogether with the income inadequacy of the survivor benefits. But women's labour market participation has increased over the last decades and, consequently, the share of women who are entitled to pensions related to their own earnings is going to increase. On the long-run we expect that the poverty differential between males and females will decline (but not completely eradicate). This gender-related factor will exert a downward pressure to total elderly poverty.

The recent economic crisis may also have an impact on elderly poverty. The deterioration of the labour market conditions will affect more the working-age population through the channels of increased risk of unemployment and wage cuts. On the other hand the incomes of the elderly are relatively more inelastic to the effects of the recession. Thus it can be expected that the relative income position of the elderly will improve and exactly the opposite will occur when strong economic growth returns (for pensions usually do not grow as fast as wage earnings). In the face of these developments we expect that the relative risk ratio of the elderly will decrease over the next decade. However, it should be made clear that this (if it happens) does not indicate an improvement of the material well-being among elderly but rather a convergence of living standards between generations.

Lastly, the negative economic outlook of the Cypriot economy limits the capacity of the government to promote social policy objectives (such as the eradication of poverty in the old-age) through income support measures. Instead, the government's focus is placed on reforming the pension system so as to preserve its fiscal sustainability. The implications for elderly poverty are vast and difficult to predict. Intergenerational conflicts are likely to arise as inescapable trade-offs between economic and social challenges will emerge. For example, the increase in contribution rates may finance the increasing economic needs of the pension system but this comes at the cost of higher gross unit labour costs at a time that the economy struggles for competitiveness. At the same time, the increase in contribution rates deteriorates the position of the nonelderly in the income distribution. The option of increasing the statutory retirement age will

keep older workers in the labour market but it will induce unwanted effects on youth employment. The elaborate consideration of such ramifications moves beyond the scope of the paper. The policy implications of our analysis are more modest. First, the possibility of expanding income transfers to the elderly is de facto limited. Even the consolidation of social protection at current levels is a challenge more difficult than it may initially seem. Nevertheless the government can remedy underlying inequities of the system. By redistributing resources from the well-off pensioners to the less well-off, equity is promoted without fiscal implications. Furthermore, more emphasis should be given to the provision of in-kind transfers. Health care system appears to be problematic and inefficient, Andreou et al (2010). Given that health needs steeply increase at the later stage of the life-cycle, the government would offer a long-standing service to elderly if the focus is placed on reforming the health care system. Long-term care is also relatively underdeveloped and needs to be improved. In parallel, targeted income transfers (whose financial burden can be expected to be reasonably low) can eradicate pockets of severe deprivation among groups of elderly very vulnerable to poverty and social exclusion.

Appendix

A.1. The FGT Index

The Foster-Thorbecke family of poverty measures, Foster et al (1984), takes the following algebraic form:

$$FGT(\alpha) = \int_0^z G_i^\alpha f(x) dx$$

Where z is the poverty line, $f(x)$ the density function and G is the normalized poverty gap. Obviously when the parameter α is set to zero, then

$$FGT(0) = \int_0^z f(x) dx = F(z) - F(0) = F(z)$$

Namely the index measures the proportion of poor persons in the population. This is the most common poverty measure and sometimes called headcount ratio or at-risk-of-poverty rate. Now define $g_i = \max\{z - x_i, 0\}$ as the absolute distance between the poverty line and the income of the poor. If we normalize this expression by dividing with z then we derive the normalized poverty gap:

$$G_i = \max\left\{1 - \frac{x_i}{z}, 0\right\}$$

Normalized poverty gap, i.e. the relative distance of a person from the poverty line, is the basis of FGT index. It takes the value zero for the nonpoor and a value between 0 and 1 for the poor. Next we set the parameter equal to 1:

$$FGT(1) = \int_0^Z G_i f(x) dx = \int_0^Z (1 - \frac{x_i}{z}) f(x) dx = \int_0^Z f(x) dx - \frac{1}{z} \int_0^Z x f(x) dx =$$

$$Fz(1-\mu\rho z)$$

Thus, FGT1 does not take into account only the incidence of poverty (as the FGT(0) does), but also the relative distance between the income of the poor and the poverty line (intensity of poverty). And finally when we set alpha=2,

$$FGT(2) = \int_0^Z G_i^2 f(x) dx = \int_0^Z (1 - \frac{x_i}{z})^2 f(x) dx = \dots = FGT(1)m^2 + (1 - m^2)C^2$$

Where C^2 is the coefficient of variation among the poor and m is average income shortfall among the poor. Thus FGT2 is not only sensitive to the incidence and intensity of poverty, but also to inequality of income among the poor.

A.2. Algebraic presentation of the Econometric model

Our econometric analysis consists of two models:

(i) A Probit model relating socioeconomic and demographic characteristics to the probability of an older person being poor. The specification of the model is

$$P(y_i = 1|x_i) = \Phi(x_i'\beta) \quad (1)$$

where y_i is binary dependent variable taking the value of 1 if the individual is poor and zero otherwise; x_i is the vector of demographic and socioeconomic characteristics of the individual; while the Greek letter Φ stands for the cumulative density function of the standard normal distribution. Since the interpretation of the coefficients of a bivariate model is usually tricky, it makes sense, instead, to present marginal effects:

$$\text{Marginal effect} = P(y_i = 1|\bar{X}, x_k = 1) - P(y_i = 1|\bar{X}, x_k = 0) \quad (2)$$

Thus marginal effect measures the change in probability of being poor for a discrete change in the dummy variable when all other independent variables are evaluated at their means. Marginal effects are presented in the third column of Table 2.

(ii) An OLS model relating the same factors to the intensity of poverty:

$$\mathbf{d}_i = \boldsymbol{\beta} \mathbf{x}'_i + \varepsilon_i \quad (3)$$

Where $\mathbf{d}_i = (\mathbf{z} - \mathbf{y}_i)/\mathbf{z}$ if $\mathbf{z} \geq \mathbf{y}_i$ is defined as the intensity of poverty for those experiencing it. The parameter estimates are reported in the last column of Table 2.

A. 3. The Cypriot Pension System

The main pension schemes in Cyprus are the General Social Insurance Scheme (GSIS) which covers the entire population and the Government Employees Pension Scheme (GEPS) which provides an occupational pension for central government employees. Other public schemes cover local governments and a variety of public entities. There are also privately provided schemes as well as non contributory schemes (social pension scheme).

The GSIS was introduced in 1957 and provides compulsory insurance to every person employed in Cyprus, both in public and private sector, including all categories of self-employed. In 1980, it was reformed from a flat-rate contributions scheme to a supplementary earnings-related insurance scheme.

The level of the pension benefit depends on the employee's contribution record as well as to the level of gross insurable earnings. Total pension consists of a basic part and a supplementary part. The latter depends on the level of gross insurable earnings. The insurable earnings are determined by a lower band and an upper band. The upper band consists of earnings in excess of the basic level up to a maximum limit of six times the threshold of the lower band. The financing of the scheme is made on a tripartite basis: employed, employer and the state. In the case of employed persons, the contribution is 17.9% of their insurable earnings and 6.8% paid by the employer, 6.8% by the employee and 4.3% paid by the State. In the case of self-employed persons, the total contribution is 16.9% of the insurable income; 12.6% paid by the self-employed and 4.3% by the State.

The GEPS provides supplementary old-age benefits to central government employees. The mandatory retirement age for civil servants is at 63 but the effective retirement age is considerable lower. The scheme covers civil servants, educational staff, the police, and the armed forces. The supplementary part of the GSIS pension is counted as partial payment of the GEPS supplementary pension. The GEPS supplementary pension is mostly financed by general taxation (but this partly changed after the 2011 reforms). Early retirement is allowed from age 45 but the pension is frozen until the age of 55. The pension is calculated on basis of the final salary. A lump sum gratuity is paid immediately when an employee retires and is a multiple of the annual pension. Other schemes that cover the employees of local government and other public entities have similar structure as those of the GEPS.

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