

A Work Project, presented as part of the requirement for the Award of a Masters Degree in Economics from the Faculdade de Economia da Universidade Nova de Lisboa.

THE IMPACTS OF THE CAPE VERDE SELF-EMPLOYED  
SOCIAL SECURITY SCHEME

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## **Abstract**

Cape Verde, as many developing countries, is attempting to extend the social protection toward the independent workers, which represent about 32% of the country employed force. This work project analysis the impacts of the Cape Verde self-employed social security framework, under both individual and scheme perspectives. Based on overlapping generations projections that allows for life-cycle behavior, we find that the returns on the pension contributions are negative for men, and that the scheme might not be financially sustainable, over a sixty year horizon.

Keywords: self-employed, social security, individuals return on pension contributions, scheme financial sustainability

## 1. Introduction

Half of the world's population (workers and their families) is excluded from any type of statutory security protection against the so-called social risks.<sup>1</sup> The lack of social protection affects primarily the growing vulnerable populations of developing countries, the workers outside of the formal economy.<sup>2</sup> In most of the cases, this poorest and unskilled population (self-employed in small businesses and their recruits) is averse to compromise a relatively high proportion of their low and variable earnings to finance insurance that does not meet their priority needs (immediate consumption, health care and primary education for their child), as stated by van Ginneken (2003)<sup>3</sup>. In other cases, administrative bottleneck and problems with compliance restrict the informal workers access to the statutory schemes. Lack of confidence on the public schemes (due to poor management), also, leads many of this work force to rely on informal safety nets to cope with idiosyncratic shocks (van Ginneken 1999)<sup>4</sup>. However, these family and community base supports are limited in addressing common shocks and situations of extreme poverty. Moreover, they are falling apart, in many countries, with the increasing urbanization (Murdoch, 1999).

Hence, the growing vulnerability of a relevant share of population is justifying major reforms on the developing countries statutory schemes, in attempt to both, properly, expand the coverage of the contributory pension (for those who can afford

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<sup>1</sup> According to ILO (2010). Furthermore, it is stated that only 20% of the world population is covered properly against unemployment, sickness and old age poverty risks.

<sup>2</sup> The lack of social protection specially affects Sub-Saharan Africa and South Asia, where the statutory scheme are estimated to reach only 5 to 10% of the working population (those who have qualified and stable jobs). Nonetheless, most of the social security schemes in those countries are open to the informal workers participation (on a voluntary basis), as stated by van Ginneken (1999).

The informal (but legal) economy can be defined as the "market-based production of goods and services that escapes detection in the official estimates of GDP" Smith (1985). Both, OIT (2005) and Schneider (2002) find that governance and institutions issues are the main determinants of the weight of the informal economy in developing countries. At the global level the informal economy employs about 50% of the labor force, while in Sub-Saharan Africa these vulnerable employment reaches 75,5% of the working force, according to the International Labor Organization estimates (ILO, 2010).

<sup>3</sup> In addition, they seek protection in case of death and disability rather than against old age poverty (van Ginneken, 1999).

<sup>4</sup> By structuring savings club, providing reciprocal needs-based gift exchange, among others solidarity mechanisms.

it) and to extend the tax financed protection (non-contributory), for the financially constrained individuals.

Though, the policy is challenging. On one hand, absence of official records of the informal sector earnings makes it difficult to enforce contributions, for the universal benefits program. On the other hand, little fiscal space (given the size of the informal economy) restraints the public provision of the tax base pension. Thus, efforts to integrate the self-employed workers into the statutory schemes have mixed success (van Ginneken, 2003), most of them involving government subsidizing part of the contributions.<sup>5</sup>

The aim of this work project is to provide an assessment of the Cape Verde's case, in particular of the self-employed social security scheme. In Cape Verde the very first experience to extend social security protection started in 2001, with the introduction of a law establishing the framework for a multipillar scheme, followed by a specific law for the self-employed social protection, in 2003. However, the National Insurance Institute (INPS) reports that, by the end of 2009, only 8 independent workers (in a universe of close to 50 thousand) were part of the system. The low adherence motivated the revision of the 2003's law in late 2009. In the same period, another law, targeted to the domestic servants was published.

In order to evaluate the self-employed social security program we undertook two different exercises. The first one consisted in computing the expected return on the pension contributions for several representative workers, with the objectives of

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<sup>5</sup> One of the successful experiences comes from Tunisia. According to Chabane (2002) the statutory scheme was able to affiliated almost 70.000 new members on a two years period. The enforcement framework and the accurate estimation of the needs and financial capacity of the targeted groups were found to be crucial for the accomplishments. Moreover, the existing social security program was adapted to meet the needs of each target group, and both contributions and benefits were set on a flat rate basis. India, China and Egypt are other successful cases. As reported by van Ginneken (2003), the India scheme reached 400.000 home-based beedi workers under the Employees' Provident Fund Act. China also facilitated the entry of the self-employed and informal economy workers on the statutory scheme, by adapting the benefit and the contribution structures to the particular features of the urban and rural workers. Egypt has prescribed minimum insurable earnings levels for different occupations, so as to meet the contributory capacity of the self-employed.

uncover the reasons behind the low responsiveness of the 2003 law, estimate if the required contribution is within the financial capacity of individuals and assess if the program is proficient in providing reliable means to smooth life time consumption. The second exercise entailed a projection of the system revenues and expenditures for a sixty years horizon. Apart from appraising if the scheme is financially sound, we also tested its resilience to shocks from economic and demographic volatility.

According to our estimates, the revised program is affordable by the targeted population; however, the returns on the pension contribution are negative for men, who retire later and have shorter life expectancy. This result may explain, among other reasons, the observed low adherence. In line with our baseline assumptions, the program is not financially sound, suggesting some inter-generations redistribution.

The report proceeds as follows. Section 2 provides a brief theoretical introduction to social security programs. Section 3 presents some information about the Cape Verde economy and describes the self-employed framework. Section 4 describes the data and the empirical strategy. Section 5 computes the individuals' returns on the pension contribution. Section 6 provides the budgetary impacts of the scheme, and section 7 concludes.

## **2. Social Security – A Brief Theoretical Introduction**

Public old age pension schemes, part of the social insurance systems, are one of the main programs run by government across the world.<sup>6</sup> The social insurance programs are linked to the major objectives of the welfare state, namely efficiency and equity promotion, and aim at minimizing the disutility that risk averse workers have when faced with uncertainties (regarding, e.g., the contingencies and length of sickness and unemployment episodes, and old age poverty).

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<sup>6</sup> According to ILO (2006) the public transfers to finance social protection represents 15% to 30% of the GDP in Europe, and hovers 20% of the GDP in North America. Whereas, this kind of public spending represents less than 5% of GDP, in both Sub-Saharan Africa and South-East Asia.

The public provision of old age pensions through Pay-as-you-go (PAYG) schemes is perceived to be important to counter for individuals life cycle myopia (which leads them to under-save against old age poverty), to prevent free-riding behavior in the presence of altruism, and to assure vertical income redistribution, based on life time earnings (Feldstein and Liebman, 2002).<sup>7</sup> As opposed of funded schemes, which provides retirement pension based on individuals assets accumulation during the working life, PAYG (defined benefits) are contributory unfunded universal benefit programs, where the pension provision does not necessarily meet the individual's prior contributions.<sup>8</sup> In such system, the pension of a current retired population is financed through an income tax (payroll tax) levied on the current workforce.<sup>9</sup> Thus, the pension of the retired population is determined as follow:

$$P_t = N_t * w_t * \tau_t$$

Where  $P_t$ ,  $N_t$ ,  $w_t$  and  $\tau_t$  stand, respectively, for the period t pension, working force, wages and payroll tax. Accordingly, and assuming that the payroll tax is kept unchanged from period t to period t+1, the current working population pension contribution return, is:

$$\frac{P_{t+1}}{P_t} = (N_{t+1} * w_{t+1} * \tau_t) / (N_t * w_t * \tau_t) = (1 + n) * (1 + g)$$

where  $n$  and  $g$  stand for the population and wage growth rates, respectively.<sup>10</sup> In turn, the government faces in each period the following budget constraint:<sup>11</sup>

$$B_{t+1} = rB_t + G_t + P_t - T_t$$

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<sup>7</sup>Roughly, the same efficiency arguments justify the appropriate regulation of the private pension schemes. In many countries, Chile for instance, instead of actually *supply* the pension insurance government makes compulsory the workers participation in the private schemes (funded schemes). However, the PAYG schemes are viewed to be superior than funded schemes in handling inflation shocks and others common shocks, such as unfavorable business cycle (Barr, 2004).

<sup>8</sup> In the defined benefits scheme the worker is promised an annuity at retirement, generally based on some average of the last working life income.

<sup>9</sup> In this overlapping generations representation we are assuming that (i) individuals have finite lives, which evolve in two distinct stages, working life and retirement; (ii) they only face idiosyncratic risks, the workers face potential income loss (e.g. due to sudden sickness), while the retirees face the longevity risk.

<sup>10</sup> The wages are supposed to follow the economy (technological) progress.

<sup>11</sup> Notice that we are neglecting the monetary funding, in this case.

Where  $B_{t+1}$ ,  $rB_t$ ,  $P_t$ ,  $G_t$  and  $T_t$  are, respectively, the government funding need in period  $t+1$ ; the outstanding debt service in period  $t$ ; the expenditures with the social security; others government expenditures and the income tax levied on the working force, including the payroll tax. Moreover, in the long run, the sovereign solvency requires that the government primary budget surplus (excluding the expenditure with the debt services) is sufficient to repay (all) the accumulated debt.

Thus, the (defined benefits social) security programs redistributes from the retired generation to the working generation, whenever the working force and the economy grows, as well as from rich to poor (given that the pension is a lump sum expenditure, whereas the contribution is income related).

### **3. The Self-Employed Social Security Framework**

#### **3.1. Cape Verde Economy - A Brief Overview**

Cape Verde is a small middle income African economy, essentially driven by the services sector (which represented 67% of the GDP, in 2008, according to the Central Bank estimates), and in particular by tourism activity (19% of GDP). Since the late 90's, the country is experiencing a steady economic growth (6,8% on average, in the last decade), relatively low inflation (2,5% on average), and generally a quite favorable macroeconomic conditions.<sup>12</sup> The macroeconomic policy pursuit (fiscal consolidation and tight monetary policy) in order to support the exchange rate regime (currency peg to the Euro), in place since 1998, by contributing to strength the economy fundamentals, is the main responsible for this positive performance.<sup>13</sup>

However, the country is still very dependent on exogenous foreign capital inflows, such as emigrant remittances and official grants, which represented

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<sup>12</sup>Some selected country's economic and financial indicators are presented in Appendix 2.

<sup>13</sup> The currency peg was firstly established with the Portuguese the escudos. One of the conditions imposed to the country, in the sequence of the exchange rate agreement signed with the Portuguese government, was the adoption of the Maastricht criteria as benchmark. This allowed to strength the economy fundamentals, and enhanced the country's ability to attract foreign investments.

respectively 8,5% and 6,7% of GDP in 2008.<sup>14</sup> The unemployment rate is, also, high (17,8% in 2008, as reported by the survey conducted jointly by the National Statistics and Employment Institutes). In addition, the economy stands largely reliant on informal activities. Self-employment represented 31,4% of the working force in 2008, according to IEF-INE (2008), and 13,7% of employed force were unpaid family and others recruits of the own account business.<sup>15</sup> The informal entrepreneurship is the key driver of the extractive industry, agriculture and retail activities, employing, respectively, 96%, 92% and 64% of the total working force of these sectors.

### **3.2. Social Security Protection in Cape Verde**

Social security protection is a Constitutional right in Cape Verde.<sup>16</sup> Accordingly, the social insurance law (Law No 131/V/2001) establishes a multipillar pension system, comprising a means tested, non-contributory pillar, targeted to individuals living below the poverty line (defined by the National Statistics Institute as 1,25 Euro per day); a contributory and compulsory scheme run by the National Insurance Institute (INPS); and a fully-funded private pillar, designed as a complement of the contributory scheme.

The INPS scheme, which provides comprehensive social protection (pensions, family benefits and health care) covers approximately 38% of the country's total employed force, in both private and public sectors (new employed force from 2005).<sup>17</sup> INPS is relatively young organization, both chronologically (operating from 1982) and

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<sup>14</sup> According to the Central Bank statistics, available at [www.bcv.cv](http://www.bcv.cv).

<sup>15</sup> The employment survey conducted jointly by the Employment Institute (IEFP) and the National Statistics Institute (INE) is targeted to a randomized sample of families of all the country regions. The survey is carried out since 2006, on a two-year basis, in both rural and urban areas. It aims at evaluating the family life conditions, as well. The methodology used is direct interviews, consistent with the International Labor Organization's recommendations. Detailed information about the methodology and results are provided by [www.ine.cv](http://www.ine.cv) and [www.iefp.cv](http://www.iefp.cv).

<sup>16</sup> As defined in the article 69<sup>th</sup> of the Constitutional Law of the Republic of Cape Verde.

<sup>17</sup> The scheme covers about 28% of the country's population (workers and families).

The Central Bank and the government run their own special schemes, which are being progressively integrated in INPS.

demographically (with the dependency ratio hovering 18).<sup>18</sup> Thus the youth, besides a parametric reform approved in 2005 (Decree Law No 51/2005) is responsible for its favorable financial situation (with a trust fund that amounts 15% of GDP).<sup>19</sup>

### **3.3. The Self-Employed Social Insurance Framework**

The first self-employed insurance framework (Decree Law No 28/2003) was targeted to specific professional categories (services rendered), whose contribution was compulsory for old age pensions and optional for other contingencies. For old age pensions only, they were required to contribute 11,5% of income; whereas for all the social insurance protection the payroll tax rate was 19,5%.

In 2009, the independent workers social insurance law was extended to all self-employed with a minimum monthly income of 8.800 Cape-Verdean Escudos (CVE), the public servant's minimum wage (Decree Law No 48/2009). The contribution rate of the self-employed (and spouse) was set at 19,5%, and included all the social protection, without possibility of opting out of specific categories, as under the precedent law. Accordingly, the law established as mandatory the enrollment of all independent workers, female under 45 years old and male younger than 50 years old. The gender discrimination is consistent with the retirement age (60 years old for women, and 65 years old for men) and aim at meeting the old age pension minimum required contribution length (15 years of contributions).

## **4. Data Availability and Empirical Strategy**

The available records of self-employment in Cape Verde are sparse and aggregated. The information refers to the number, gender structure, average worker age and average income per sector of activity, as presented in Table 1.

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<sup>18</sup> The dependency ratio is the number of contributors over the number of beneficiaries.

<sup>19</sup> The reform was designed to cope with the worsening demographic condition, due to both the scheme natural maturing and population ageing. With the reform, the size of the promised pension for a full career worker was lowered from 86% of the average 3 best yearly earnings of the last 5 years of contribution, to 80% of the average 10 best incomes of the last 15 years of contribution.

**Table 1: A Snapshot of the Self-Employment in Cape Verde**

	Total Workers	Female (%)	Male (%)	Age (Average)	Wage <sup>1</sup> (Average, CVE <sup>2</sup> )
Agriculture and Fishing	26.139	40	60	38	32.639
Extractive Industry	2.554	67	33	31	54.657
Manufactures	4.266	34	66	39	24.665
Construction	8.949	9	91	33	63.553
Retails	15.572	65	35	39	35.567
Hotels and Restaurants	887	63	37	32	27.728
Transports and Communication	1.969	17	83	39	35.090
Other Services	544	64	37	40	29.523

Notes: The data on number of workers, gender and average age are from the 2008 employment survey (IEFP-INE, 2008). The wage distribution data is from the 2002 Business Census (INE, 2002).

<sup>1</sup> Monthly average wage.

<sup>2</sup> 1 EUR=110,3 CVE

On the other hand, quite detailed data on the current beneficiaries of the statutory scheme is available, with individual records that include age, wage and gender, from 1982 to 2008. Thus, our strategy is to complement the available information of the self-employment with these detailed records on salaried workers, assuming that the two groups of workers are not significantly different. In this sense, we decided to exclude agriculture, fishing and extractive industry from our analysis. The very high proportion of self-employment in those sectors precludes us from using the formal sector information as a benchmark.<sup>20</sup>

As shown in Table 2, the most relevant difference between the two groups relates to the wage, with the salaried workers enjoying relatively higher wages, on average, unless for the first quartile. The wage differential is consistent with the estimated schooling gap between the two groups. According to Ministério de Emprego e Qualificação Profissional (2008) records, more than 60% of the self-employed only have the primary school degree or are illiterate, whereas 67% of the salaried force has at least secondary schooling.<sup>21</sup>

<sup>20</sup> Notice that more than 90% of the employed force of these sectors is informal workers.

<sup>21</sup> In an attempt to further validate our strategy, we interviewed 10 informal workers from different activity sectors. While it is hard to argue that the conclusions from this survey are representative of the self-employed population, it is worthwhile to remark that (i) the reported characteristics regarding age and schooling are quite similar to the available data on the self-employed and (ii) 4 persons reported

**Table 2: The Main Characteristics of the Employed Force**

	Self-Employed <sup>1</sup>	Salaried Workers <sup>2</sup>	Relative Difference <sup>3</sup>
Number	32.186,0	35.217,0	-8,6
Gender			
Female (%)	42,3	39,2	7,9
Male (%)	57,7	60,8	-5,1
Age			
Mean	37,1	38,5	-3,7
Median	39,0	38,5	1,2
Standard Deviation	3,6	9,8	
Wage (CVE)			
Quartile I	28.176,5	20.000,0	40,9
Quartile II	32.306,7	38.455,0	-16,0
Quartile III	35.448,0	64.121,5	-44,7
Quartile IV	63.552,7	989.443,0	-93,6
Mean	36.020,9	49.596,0	-27,4
Standard Deviation	14.135,3	43.358,0	

Notes:

<sup>1</sup> Based on the employment survey of 2008 (INE-IEFP, 2008) excluding agriculture, fishing and extractive industry. The wage distribution is in line with the Business Census of 2002 (INE, 2002).

<sup>2</sup> Sample of the current contributors of INPS with monthly wage  $\geq$  8.800 CVE, based on 2008 records.

<sup>3</sup> [(Self-Employed - Salaried Workers) / Salaried Workers] \*100

## 5. The Individual Return on the Self-Employed Pension Scheme

The expected rate of return of the pension scheme is calculated, for several representative workers, according to the formula:

$$\frac{\text{Present value of retirement pensions}}{\text{Present value of contributions}} - 1$$

With the purpose of evaluating the cost of contributing for the old age pension in its best alternative use, we choose, for the computations, the individual marginal rate of time preference (rate at which individuals make the trade-off between current and future consumptions) as the best return on savings, i.e. the highest annual return on term deposits (3,5% in real terms, based on the Central Bank's data).<sup>22</sup>

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some mobility between the formal and the informal jobs, while 1 complements the business with a formal job. The main results are presented in appendix 3.

<sup>22</sup> Note that this critical assumption implies that our targeted population has access to the financial market, face the same interest rate and are willing to trade the current for the future consumption at the same rate. Furthermore, this assumption rules out transactions costs and uncertainty. Notice, also,

In order to project the contributions and the retirement pension flows we estimate the life cycle income in line with the human capital earnings function proposed by Mincer in 1974 (Willis, 1986) of the form:

$$\ln y_i = \beta_0 + \beta_1 s_i + \beta_2 x_i + \beta_3 x_i^2 + u_i$$

Where  $y_i$ ,  $s_i$  and  $x_i$ , stand for income, schooling level, and age of the individual  $i$ , respectively, while  $u_i$  is an error term. The coefficient  $\beta_1$  provides an estimate of the constant rate of returns to education, whilst the coefficients of  $x_i$  and  $x_i^2$ , with expected opposite signs, yield the return of the experience term, and confer the concave shape to the earnings profile.<sup>23</sup> In our case, since the INPS sample lack both reliable data on experience and schooling information, we approximated the life cycle income of the independent workers by the following cross sectional quartiles regressions, to account for the skill premium and activity sector earnings differentials:<sup>24</sup>

$$\text{Quartile 1: } \ln wage_i = 8,186858 + 0,077296age_i - 0,000833age_i^2 + 0,133126gender$$

$$\text{Quartile 2: } \ln wage_i = 7,889445 + 0,129724age_i - 0,001423age_i^2 - 0,032816gender$$

$$\text{Quartile 3: } \ln wage_i = 9,222000 + 0,077472age_i - 0,000728age_i^2 - 0,003535gender$$

$$\text{Quartile 4: } \ln wage_i = 9,593364 + 0,107496age_i - 0,001044age_i^2 + 0,135020gender$$

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that IEF (1997) reports that 67% of the informal businesses have access to formal financial market, which makes our assumption not completely unrealistic.

Given the nominal rate (from the Central Bank statistics), the savings real rate was calculated considering the twelve month inflation rate of 2009 (1%, according to the National Statistics Institute). The highest market savings rate is the 2 years term deposits rate. Though, the individuals can enjoy higher returns with some stock market products. Thus, aiming at control some market imperfection, in particular, regarding this special population, we are being conservative.

<sup>23</sup> In the absence of reliable data on experience, a transformation of the workers age is commonly used as proxy (Willis, 1986). Hence,  $x_i$  is determined by subtracting the worker age to his years of schooling, supposing that he is full-time employed, immediately after completing his education.

<sup>24</sup> These regressions allow us to make a more robust inference about the evolution of the wages, under the assumption that the individuals do not change the respective quartiles along their life cycle.

The regressions results are presented in appendix 1. Gender is a dummy variable (male 1 and female 0), included to account for the wage discrimination among men and women. All the coefficients are significantly different than 0 at 1%. Notice that we used robust standard errors to account for heteroskedasticity. According to these estimates, the wage of an individual in the second year of contribution, is for instance =  $[1 + (\ln w_{26} - \ln w_{25})] * w_{25}$ , where  $w_{25}$  and  $w_{26}$  are the individual wages at ages 25 and 26, respectively.

The remaining baseline assumptions for the computations are: 1) the payroll tax rate, which is 19,5% of yearly income, from which 10% are allocated to pension provision; 2) the length of contribution (40 years for men and 35 years for women, according to the law); 3) the life expectancy which is 75 years old for women and 70 years old for men, according to the INE demographics projections, based on the population census of 2000; 4) the retirement pension which is equal to 80% of the average of the 10 best incomes of the last 15 years of contribution. We also use alternative assumptions on discount rate and life cycle income, as a means to test for the robustness of our results.

As shown in Table 3, at the baseline scenario the expected rate of return on pensions are negatives for men, whilst positives for women, who retire earlier and live longer.<sup>25</sup> The women expected returns decline, although remaining positives, when we simulate an income shock, setting the wages growth rate equal to 0. On the other hand, even doubling the incomes growth rate the men expected returns remain negatives.

Relaxing further the *perfect* financial market assumption and considering that due to credit rationing people will under invest, a sensitivity analysis dropping the discount rate below the savings rate by two percentage points, increases the men returns, but not enough to make them positive.<sup>26</sup> In turn, halving the pensions'

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<sup>25</sup> Notice that for the income projections, we are using the average wages, as reported by INE (2002), as the starting career earnings. Since the self-employed framework law targets the business owner of a sole proprietorship and spouse, we suppose that on aggregated their earnings are equal to their business cash flow (i.e. close to the activity highest wages). However, we are considering some tendency to under report.

It is important to highlight that even the poorest individual (according to Decree Law N<sup>o</sup>48/2009 the one who earns 8.800 CVE per month) does not qualify for the minimum pension (4.260 CVE per month).

<sup>26</sup> This analysis is similar to a case aiming at evaluate the individuals opportunity cost of contributing at a one year Euribor trend. Given the exchange rate regime and being a small open economy, we are considering the Euribor rates as the closest analogue to the country's *world interest rate*.

Notice that the men internal rate of returns on pension contribution (i.e. the rate at which the individuals net benefits is 0) is less than 1%, which is smaller than any market rate. Moreover, the men are required to live on average more 8 years, so as to their returns become positives. In appendix 1 are provided some illustrations of the sensitivity of the men returns to discount rate and life expectancy.

discount rate, in order to place higher weight on benefits that occurs far in the future, yield positive returns for the men enjoying the highest wages (at quartiles 3 and 4).

**Table 3: Baseline Expected Returns on the Pension Contribution and Sensitivity Analysis**

	Incomes (yearly, CVE)			
	Quartile I 338.118	Quartile II 387.684	Quartile III 425.376	Quartile IV 762.632
<b>Baseline Case</b>				
	<i>Female</i>			
Present Value of Pension Contribution ( <i>Cf</i> )	902.898	1.203.103	1.269.667	2.542.127
Present Value of Retirement Pensions ( <i>Pf</i> )	1.389.303	1.937.870	2.142.036	4.434.829
<b>Expected Rate of Return on Pension Contribution</b>	53,9%	61,1%	68,7%	74,5%
	<i>Male</i>			
Present Value of Pension Contribution ( <i>Cm</i> )	959.253	1.269.759	940.187	2.737.435
Present Value of Retirement Pensions ( <i>Pm</i> )	437.809	584.458	401.654	1.451.657
<b>Expected Rate of Return on Pension Contribution</b>	-54,4%	-54,0%	-48,4%	-47,0%
<b>Sensitivity Analysis</b>				
<b>1. Income shock (income growth rate = 0)</b>				
<i>Female Expected Rate of Return</i>	38,2%	38,2%	38,2%	38,2%
<i>Male Expected Rate of Return</i>	-57,3%	-57,3%	-57,3%	-57,3%
<b>2. Doubling Income Growth rate</b>				
<i>Female Expected Rate of Return</i>	68,9%	82,0%	98,9%	109,0%
<i>Male Expected Rate of Return</i>	-51,9%	-51,8%	-39,7%	-37,3%
<b>3. Discount rate below the savings rate by 2 p.p.</b>				
<i>Female Expected Rate of Return</i>	156,5%	166,9%	176,7%	184,3%
<i>Male Expected Rate of Return</i>	-25,6%	-25,1%	-17,6%	-15,8%
<b>4. Halving the Pension Discount Rate</b>				
<i>Female Expected Rate of Return</i>	212,3%	227,0%	242,5%	254,1%
<i>Male Expected Rate of Return</i>	-6,7%	-5,9%	5,6%	8,4%

Notes: Contribution in period t ( $C_t$ ) = 10%\*wages in period t.

Pension (P) =10%\*average of 10 best wages of last 15 years of contribution.

$$Cf = \sum_{t=0}^{34} \frac{(C_t)}{(1+r)^t}; \quad Cm = \sum_{t=0}^{39} \frac{(C_t)}{(1+r)^t}; \quad Pf = \sum_{t=35}^{49} \frac{P}{(1+r)^t}; \quad Pm = \sum_{t=40}^{44} \frac{P}{(1+r)^t}$$

Thus, considering these consistent results, negative expected returns are likely to prevent the forward looking rational men to join the statutory scheme and therefore might, partially, explain the low responsiveness to the 2003 law.<sup>27</sup> On the other hand, an analysis to the closed list of the professional categories, the Decree Law No 28/2003 target, suggests a negative selection bias. The list only includes services rendered, which represents only 0,9% of total self-employed force (see other services

<sup>27</sup> Notice that men are 58% of the self-employed force, according to INE records (see Table 2).

in Table 1). Furthermore, the minimum income level of each professional category defined in the list seems excessively high (see appendix 4). Indeed, according to the business census records (see Table 1), the other services earnings were on average 69% below the lowest income considered in the referred list, suggesting that the law was requiring prohibitive contributions. In turn, assessing the role of hyperbolic discounting and myopia on the low adherence requires a more detailed investigation. The savings rate reported by the Central Bank (on average 13,5% and 9,8%, in nominal and real terms, respectively) only captures the formal financial system. The weight of the savings accumulated in the informal sector is not known. Besides, the financial market is still underdeveloped and incomplete. The stock market started functioning only as from 2005; microcredit institutions that care for the ones who do not have collateral to qualify for bank loans are recent in the country and there is no pension fund yet. Furthermore, difficulties with enforcement and public awareness can, also, explain the reduced number of self-employed in the statutory scheme.

In general, although the expected returns are negative for men, the program provides reliable means to smooth consumption. However, in order to maintain the pre-retirement living standards, both men and women are required to save. Moreover, according to our baseline assumptions, the savings gap, given by the ratio of the pension benefit to pre-retirement earnings, is on average close to 10% for women and 20% for men.

## **6. The Budgetary Impacts of the Self-Employed Social Security Scheme**

The financial sustainability of the self-employed program is assessed by subtracting the present value of the pension expenditures (P) from the present value of the contributions revenues (C), for a time range of 60 years. Let us know detail the assumptions we made in order to perform this projection exercise:

1. Ten percent of the current population of self-employed will join the scheme in the next 10 years (3.219 individuals).<sup>28</sup>

2. Based on the medium run trend of self-employment (average yearly increase of 1,7%, from 1997 to 2008), we assume that the informal economy will create on average 1,5% new jobs per year. This 0,2 percentage point differential aim at capturing the observed fall in the self-employment weight on total labor force.<sup>29</sup> Ten percent of this work force is estimated to join the system in 2011. From 2011 onwards, the statutory scheme will gradually improve its attractiveness for the new self-employed population, reaching 20% by 2016. This increase in adherence is likely to result from the INPS strategy of (i) enhance program's awareness and (ii) open branches in geographical areas where the informal sector is pervasive.<sup>30</sup> We expect that this new cohort will reach 6.491 individuals by the end of 2070.

3. Women will join the program in a higher proportion than men.<sup>31</sup> For the current employed force we take the existing gender distribution (see Table 2). However, in the first four years (2011-2014) we set the women's adherence rate equal to 60% of the total adherence per year. From 2015 onwards, we assume that men adherence will catch up and overcome the women participation rate, gradually. For the new contributors the women share is 55% against 45% of men share.

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<sup>28</sup> Notice that we are being conservative, given the results of the 2003 self-employment social security framework.

<sup>29</sup> According to IEF-INE (2008), between 2008 and 2006 the total self-employed weight on the total employed force decreased by 1 percentage point. However, we cannot tell for sure if this behavior is structural or it is an effect of some short run business's environmental change.

<sup>30</sup> The INPS strategy is close to the Tunisia case. According to Chaabane (2002) the Social Security Fund displacement, setting up itinerant centres where the informal activities were carried out, was crucial for the program's success.

<sup>31</sup> Considering all the benefits offered (health care, family support, besides pension), this assumption is consistent with some evidence showing that in developing countries women are more proactive than men and respond more to programs benefiting their child (Buvinic and Gupta, 1997; Behrman and Wolfe, 2002). The assumption is also consistent with the fact that since the 80's the world labor force growth is substantially higher for women than for men (Lim, 2002). Furthermore, in our case the women, rather than men, enjoy positive returns on contributing for the old age pension.

4. To take into account the technological progress, the baseline earnings for each new self-employed cohort are increased by the half of the long run real GDP growth (2,5%).<sup>32</sup>
5. The age at which the independent worker starts full time work is 26 years old, consistent with the fact that 92% of the salaried employed force (men and women) from the INPS sample is more than 25 years old. We assume further, that the current cohort is older, and therefore starts to contribute at age 37 (the average self-employed age) and with higher base earnings.<sup>33</sup> This assumption relies on the hypothesis that they are on the business for longer and that the more educated ones (with higher wages) will be more responsive to the policy.
6. The retirement age for women and men are, respectively, 60 and 65 years. Accordingly, the length of contribution of the current cohort is 23 years for women and 28 years for men, whilst for the new employed groups it is 35 and 40 years, respectively, for women and men. The life expectancy is 75 years old for women and 70 years old for men.
7. The individual incomes evolve according to the life-cycle paths, estimated on the previous section.
8. Finally, the discount rate ( $r$ ) that we use to discount the program future costs and benefits is the riskless market interest rate (the real rate of the 10 years Treasury bond's, 4,5%, according to Banco de Cabo Verde).<sup>34</sup> Table 4 summarizes the income distribution, as considered on the projections

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<sup>32</sup> According to Banco de Cabo Verde (2006), that estimates the long run GPD ranging between 5% and 7%. Here the objective is to be conservative, incorporating the likely decrease in the weight of the informal economy, given the country potential path toward a more developed economy.

<sup>33</sup> Baseline incomes plus a standard deviation (see Table 2).

<sup>34</sup> In line with Getler (1997), we are using the government marginal return on capital as the social discount rate.

**Table 4: Baseline Income Distribution<sup>35</sup>**

	Income Distribution (yearly, CVE)			
	Quartile I	Quartile II	Quartile III	Quartile IV
Current Employed Force	507.744	557.304	594.996	932.256
New Cohorts of Employed	338.124	387.684	425.376	762.636
Female	50,6%	6,2%	3,0%	40,3%
Male	48,3%	7,3%	4,6%	39,7%

Notes: Baseline incomes according to the Business Census (INE, 2002). The Baseline incomes for the current cohort force are increased by one standard deviation. The gender distribution is according to our sample on salaried workers (INPS).

Due to the impact on the system of the first cohort, the scheme is not financially sound on the time horizon 2011-2070, according to our results. Under the baseline scenario, the program's net benefits amount to -2,3 billion CVE (approximately -2% of the 2010 GDP).<sup>36</sup> Our results are, however, sensitive to both gender distribution and to the INPS enforcement capacity. Indeed, decreasing the impact of the new cohort of women on the system, by setting equal adherence rate for men and women, or halving the current cohort adherence rate, makes the scheme net present benefit positive. This latter assumption lowers the impact of the oldest and wealthier force on the system (the current cohort) that is estimated to leave the scheme completely by the end of 2052.<sup>37</sup>

The program becomes financially sound, with a positive net present benefit of 2,4 billion CVE, if we withdraw the current cohort from the system. However, even excluding the current cohort the program is still vulnerable to ageing. In fact reducing the length of the contribution to 15 years for women and 20 years for men and raising the life expectancy by 3 and 2 years for women and men, respectively, decreases the scheme revenues to expenditures ratio from 2,72 to 0,69,

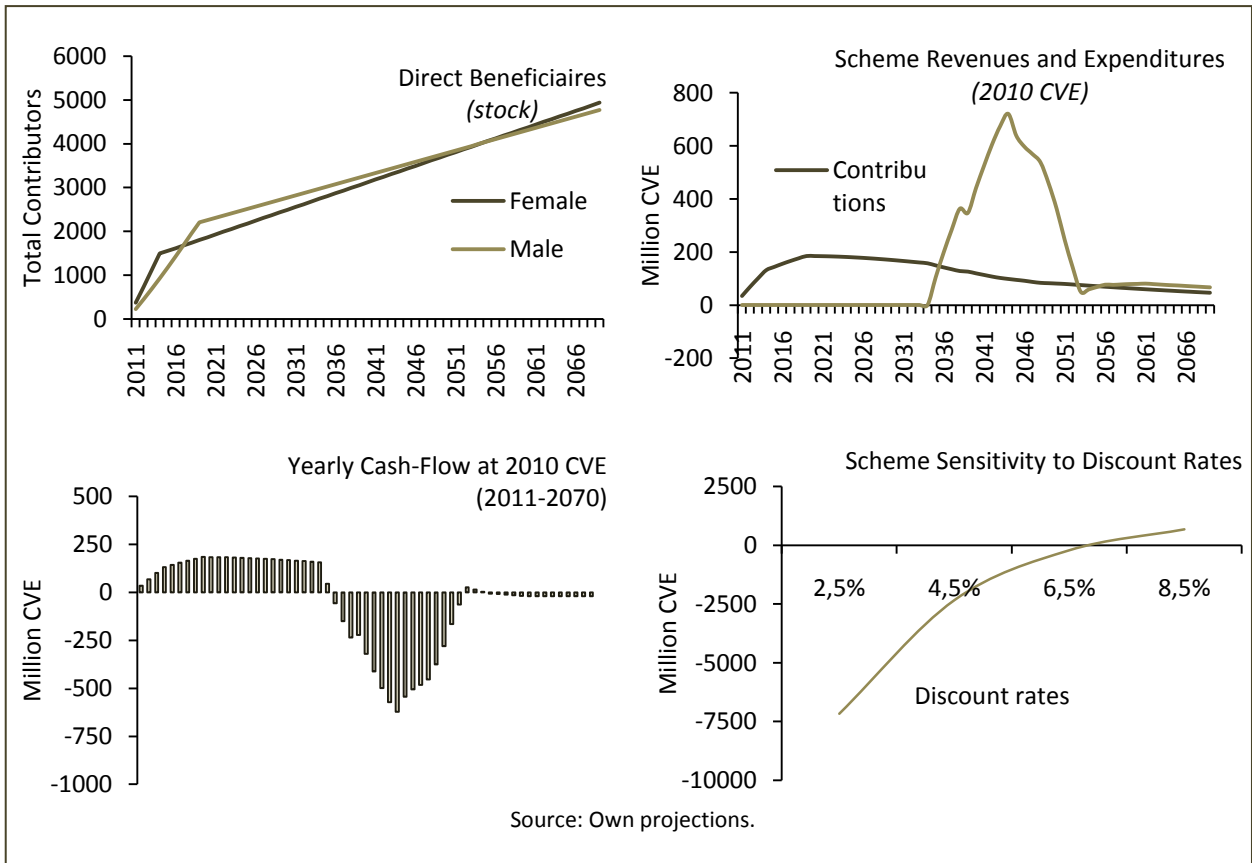
<sup>35</sup> According to our assumptions on the current employed side, the total women and men joining the system in 2011 are respectively 340 and 206. Thus, for instance, the program total revenues with the female current employed force in 2011 is computed as follow:

$10\% * [(50,6\% * (340 * 507.744) + 6,2\% * (340 * 557.304) + 3,0\% * (340 * 594.996) + 40,3\% * (932.256 * 340)]$

<sup>36</sup> According to the Central Bank GDP projections (BCV, 2010). Notice that all the figures from now on are in 2010 CVE, unless otherwise stated.

<sup>37</sup> Notice that the system internal rate of return (the rate at which the scheme breaks even) hovers 6,85%.

**Figure 1: Policy Main Impacts**



Nonetheless, the new cohort's case is resilient to a positive income shock (doubling the individuals' earnings). Also, decreasing (halving) the discount rate, to put small weight on benefits and costs occurring far in the future, does not invert the sign of the scheme net benefit. In turn, halving the pension discount rate (to account for a future decrease on the country's risk premium, for instance) make the new entrants case unsustainable, as shown in Table 5. Table 5 distinguishes the results for the total self-employed work force from the case considering only the new cohorts, as from 2011.

**Table 5: The Budgetary Impacts of the Self-Employed Social Security Framework (2011-2070)**

	Including Current Cohort (million CVE)				
	Baseline Scenario	Sensitivity Analysis			
		Equal Gender proportion	Halving Adherence Rate	Discount rate =6,5%	Income Growth rate = 0
Present Value of Contributions (C)	6.699,3	10.542,6	5.255,9	4.373,1	5.380,2
Present Value of Expenditures with Pensions (P)	9.038,7	9.517,6	5.220,7	4.587,0	7.524,2
<b>Scheme Net Benefits (C-P)</b>	-2.339,4	1.025,0	35,2	-213,9	-2.144,0
<b>Revenues to Expenditures ratio</b>	0,74	1,11	1,01	0,95	0,72
	Excluding Current Cohort (million CVE)				
	Baseline Scenario	Sensitivity Analysis			
		Halving Pension Discount Rate	Doubling Income	Ageing <sup>1</sup>	Halving Discount Rate
Present Value of Contributions (C)	3.812,6	3.812,6	5.454,5	3.842	7.250,6
Present Value of Expenditures with Pensions (P)	1.402,7	4.166,2	3.797,3	5.540,6	4.166,2
<b>Scheme Net Benefits (C-P)</b>	2.409,8	-353,7	1.657,2	-1.698,7	3.084,4
<b>Revenues to Expenditures ratio</b>	2,72	0,92	1,44	0,69	1,74

Notes: Contribution in period t (Ct) = 10% \*wage of period t; Pension=80%\*10 best wages of last 15 years of contribution.

<sup>1</sup> Pension of women=52,5%\*10 best wages; pension of men=70%\*10 best wages of last 15 years of contribution, according to the law.

$$C = \sum_{t=0}^T \frac{C_t}{(1+r)^t}; P = \sum_{t=T+1}^U \frac{P_t}{(1+r)^t}$$

Hence, our results strongly suggest that the self-employed social security framework is redistributive across generations, benefiting the first group of contributors. The program is, as well as, redistributive for men to women. Accordingly, being the Cape Verdean women, in general, poorer and more vulnerable than men, we are compelled to state that vertical equity goals, within this target population, are, also, part of the direct objectives of the policy.

## 7. Conclusions

The Cape Verde public policy that we analyzed in this work project can benefit an important share of the country's population. The policy benefits especially the poorest self-employed, those who are in an unfavorable position to access a yet underdeveloped financial market; the myopic business owners, who do not save properly, and have to rely on social pension when retired (and potentially face a higher income drop); and the independent female workers, in general.

According to our results and in the light of the data limitation, the scheme might face a period of budget imbalance, however. The effects of this imbalance on the Cape Verde economy will depend on how it will be financed. We believe that increasing the payroll tax for this special labor force can rise political (for being an unpopular measure) and administrative issues. As every kind of arrangement that relies on tax collection, we expect the self-employed program to generate deadweight loss, by encouraging individuals to adjust their behavior in order to avoid being taxed. Therefore, we presume that enforcement will be challenging for the INPS, which has to estimate as accurately as possible the informal businesses cash-flows, in order to cope with potential under reporting. Hence, a reform that lowers the individuals' pension expectations is likely to increase the INPS burden in integrating the independent workers.

Considering the case for debt financing (of a temporary shock), provided that the government faces no payment problem (i.e. is not at insolvency risk) and can issue bonds in, relatively, favorable terms, the macroeconomic effects of this debt, given the country exchange rate regime, might be not extremely distressing.<sup>38</sup> Though, the opportunity cost of this funding need, to support social security, can be quite high for a developing country, yet in big need of public investment.<sup>39</sup>

As a final remark, we believe that success of this *welfare state* intervention rely significantly on the INPS enforcement capacity, on the soundness of the scheme management and on its proficiency in addressing potential moral hazard problems. Furthermore, we consider that the achievements on the efficiency grounds are important to foster the implicit policy equity goals (namely gender inequality reduction and informal workers social integration).

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<sup>38</sup> Provided that foreign capital inflows are able to reverse the increasing tendency of the domestic interest rate, or that the central bank has to accommodate the government interventions, so as to prevent the currency nominal appreciation.

<sup>39</sup> Notice that given its trust fund (that amounts 15% of GDP), the INPS may be able to fund a probable budget imbalance, without requiring a more active government intervention.

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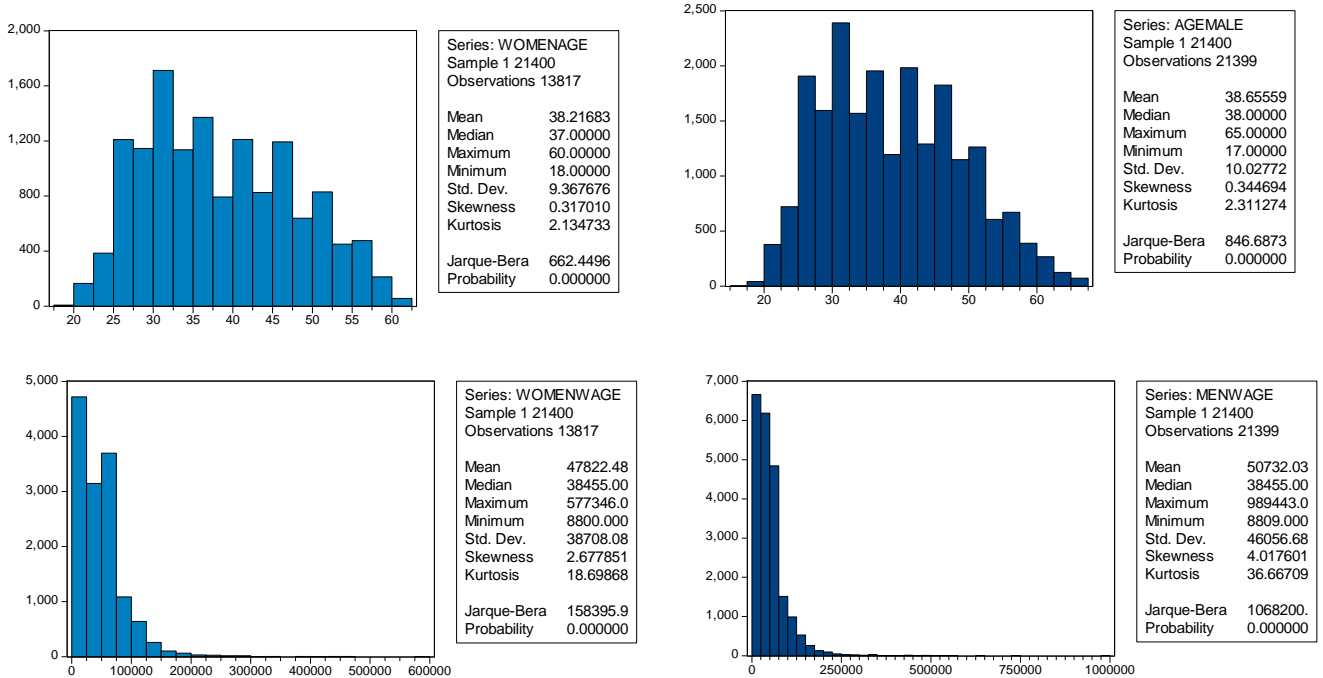
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## Appendix 1. Data Characteristics and Estimation Results

### 1. Sample Descriptive Statistics



Source: INPS

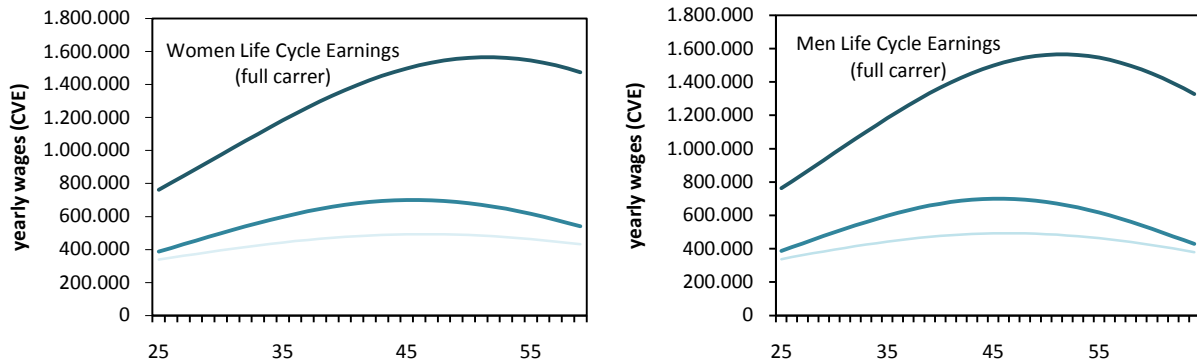
### 2. Estimation results of the life –cycle wages

$$\text{Equation: } \ln wage_i = \beta_0 + \beta_1 age_i + \beta_2 age_i^2 + \beta_3 gender$$

Parameter	Quartile I				Quartile II				Quartile III				Quartile IV			
	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$
Estimate	8,187	0,077	-0,001	0,133	7,890	0,130	-0,001	-0,033	9,222	0,077	-0,001	-0,004	9,593	0,107	-0,001	0,135
Std Error	0,073	0,004	0,000	0,013	0,089	0,005	0,000	0,013	0,084	0,004	0,000	0,009	0,26	0,014	2E-04	0,034
t-statistics	112,60	18,76	-15,18	10,27	88,17	28,49	-25,04	-2,53	109,7	17,60	-13,19	-0,41	36,23	7,79	-6,07	4,00
p-value	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Pseudo R square	0,021				0,024				0,039				0,048			

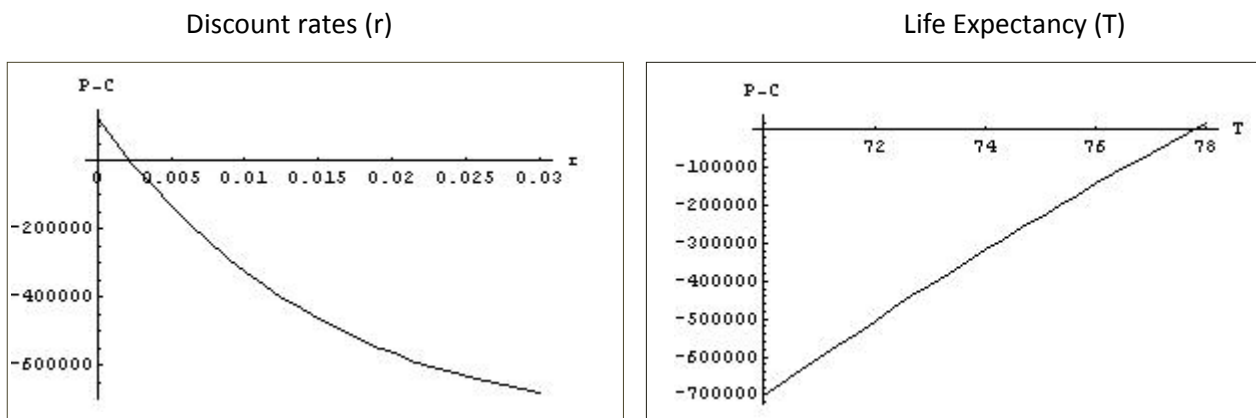
Notes: Regressions run in E-views 6, on the sample of the INPS current contributors with monthly income  $\geq 8.800$  CVE. Number of observations = 35.218  
Robust standard errors were used (Huber Sandwich standard errors & covariance).

### 3. The self-employed life cycle income path (for the low, median and high incomes)



Source: Own Estimations

### 4. Men return on pension contribution: sensitivity analysis for the median income case



Source: Own Estimations

#### Notes:

1.  $P$ =present value of pension ( $P$ ).  $P = \text{Pension} * \sum_{t=41}^{T-25} \frac{1}{(1+r)^t}$ , where

$$\text{Pension} = \frac{w\rho}{10} \sum_{j=25}^{34} \prod_{i=1}^j (1 + \beta_1 + \beta_2((25 + i)^2 - (24 + i)^2)), \text{ and } \rho=0,8$$

2.  $C$ =present value of contributions.

$$C = w\tau (1 + \sum_{j=1}^{39} \prod_{i=1}^j (1 + \beta_1 + \beta_2((25 + i)^2 - (24 + i)^2))), \text{ where } \tau=0,1$$

3.  $r$ =discount rate, the baseline case discount rate = 3,5%
4.  $T$ = men life expectancy. At baseline scenario  $T=70$

## Appendix 2. Cape Verde' Selected Economic and Financial Indicators

GDP per capita (USD-PPP; 2009) 3.445

Gini Index (2007) 0,47

Population Under Poverty Line 27%

Population Illiterate (2006) 25%

	Real GDP		Inflation		Unemployment		Current Account		Government		Disposable		Real Savings		Private Credit		Private Capital		Stock Mkt	
	growth	Rate (%) <sup>1</sup>	Rate (%) <sup>2</sup>	Rate (%) <sup>3</sup>	(% of GDP) <sup>4</sup>	Budget	Income real	growth rate <sup>4</sup>	Rate	Creation (%) <sup>4</sup>	Openess	Capitalization	Rate	(%) <sup>4</sup>	Creation (%) <sup>4</sup>	(% GDP) <sup>4</sup>	(% GDP) <sup>6</sup>			
1998	8,4	4,4	4,4	26,0	-11,0	4,4	6,9	4,6	11,7	n.a										
1999	11,9	4,4	4,4	25,0	-13,7	7,3	16,3	11,6	15,7	12,2										
2000	7,3	-2,4	-2,4	21,0	-10,9	9,3	9,3	18,7	4,5	9,7										
2001	3,3	3,7	3,7	19,3	-10,6	5,3	1,5	10,1	14,7	11,9										
2002	5,3	1,8	1,8	16,2	-11,1	1,8	3,4	11,5	13,0	8,0										
2003	4,7	1,2	1,2	n.a	-11,2	3,9	5,4	12,2	15,4	5,5										
2004	5,0	-1,9	-1,9	n.a	-14,4	0,9	3,8	17,0	9,4	14,5										
2005	3,6	0,4	0,4	n.a	-4,1	2,9	6,9	14,7	8,3	10,5										
2006	10,1	4,8	4,8	18,3	-7,4	3,7	4,3	6,1	29,9	16,3										
2007	8,6	4,4	4,4	n.a	-14,7	1,5	1,9	8,2	16,0	17,0										
2008	6,1	6,8	6,8	17,8	-12,9	-1,0	-1,0	4,0	29,5	14,1										
2009	4,0	1,0	1,0	n.a	-10,4	-6,0	-2,4	10,0	12,0	9,5										

Sources:

1 National Statistics Institute from 1998-2007; Central Bank estimates from 2008.

2 National Statistics Institute ([www.ine.cv](http://www.ine.cv))

3 Employment Institute ([www.iefp.cv](http://www.iefp.cv))

4 Central Bank ([www.bcv.cv](http://www.bcv.cv))

5 Ministry of Finance ([www.gov.cv](http://www.gov.cv))

6 Cape Verde Stock Market ([www.bvcv.cv](http://www.bvcv.cv))

Note: n.a. means not available.

### Appendix 3. Survey to Informal Workers Results

The survey was carried out in Praia (the Cape Verde's capital), between April 19 and April 24. The methodology used was direct interviews. Notice that the survey aim at validating the empirical strategy used, only. Thus, merely few concerns with the randomization were considered and no major tests were performed in order to validate the results.

<b>Sample Size</b>	10
<b>Gender Distribution</b>	
Male	6
Female	4
<b>Activity Sectors</b>	
Transport Communications	20%
Construction	20%
Retails	20%
Small Manufacturies	20%
Other Services	20%
<b>Average AGE</b>	39
<b>Average Years of the Business</b>	13
<b>Education Levels</b>	
Illiterate	10%
Primary School	30%
Lower Secondary school	40%
Vocational Education	10%
College Degree	10%
<b>Reasons for running the Business</b>	
Became unemployed	30%
Never found a formal job	10%
Choose to run the business	50%
Other	10%
<b>Wage (monthly, CVE)</b>	
20000-40000	50%
40000-60000	30%
60000-80000	10%
>80000	10%
<b>How often substitute the own business activity for a formal job</b>	
Complement the business with a formal Job	10%
Frequently, but not in a regular fashion	40%
Never	50%
<b>Social Insurance Protection</b>	
INPS Contributors	10%
Knew the 2003's Self-Employed Law	0%
Want to Join INPS	90%
<b>Total Respondent</b>	100%

#### Appendix 4. List of Professional Category, as required by the 2003's

##### Self-Employed Framework

Profession	Yearly Income (CVE)
Engineers agronomists	1.620
Agrarian engineers-technician	1.620
Architects	1.920
Engineers and engineer-technician	1.920
Civil designers , topographers and constructors	1.500
Painters, sculptors, decorators and others	1.000
Singers, musicians and artists of television	800
Journalists and reporters	800
Economists, auditors and consultants	1.800
Accountants, technician of accounts and keep-books	1.500
Technician and specialists in management of human resources and organization	1.800
Nurses, physiotherapists and massagistas	1.500
Obstetricians, dentists and others	800
Lawyers	1.800
Legal advisors	1.800
Solicitors	800
Dentists, doctors of general clinic	1.800
Doctors of specialty	2.100
Medical veterinarians	1.500
Psychologists	1.350
College Professors	1.200
Teachers	800
Master of sport or crafts	800
Technician of computer science, telecommunications or of information systems	2.100
Official dispatcher	2.100
Commission agents	2.100
Administrators	1.200
Typists and operators of computer science	600
Others with superior, average course or technician	1.200

Source: Government Budget Law of 2003 (Law No 18/VI/2003)

Notes: This list of professional category is for tax purposes. The yearly incomes refer to the minimum that government takes into account when taxing the services rendered.