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# Inequalities between retirees and workers: an empirical model to capture the effect of taxation

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## Abstract

French retirees benefit from specific taxation decreases. These tax exemptions imply considerable public tax expenditures that may be unjustifiable in terms of equity. In this article, we examine the adequacy of tax arrangements for French retirees in the current context of public pension systems reforms. The ratio of retired individuals' income per consumption unit to that of workers was approximately 0.89 in 2003 (0.96 including capital income). Moreover, pensioners' incomes are, on average, 102% of the average income of the population. Inter-cohort inequalities do not seem to justify these tax exemptions. Pensions are more equally distributed than income received from employment, and intra-cohort inequality does not seem to be a more convincing explanation. What is the impact of differential taxation on the inequality between retirees and workers? To answer this question, we propose several empirical models.

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# Inequalities between retirees and workers: an empirical model to capture the effect of taxation.

## 1. Introduction

The French pensioners benefit from tax deductions. In a context of pension system reform, and given the impact of the financial and economic crisis on government deficits, tax preference given to seniors raises questions. Lavigne (2006) ask: "Should we give tax benefits to the elderly?". The author explains that the tax arrangements granted to retirees implies considerable public tax expenditures, without justification in terms of equity. Current retirees enjoy an average standard of living almost equivalent to that of active people (El Mekkaoui De Freitas et al. 2008; COR, 2009). According to the French statistical institute (INSEE), the ratio of income per consumption unity between retired and workers is about 0.89 in 2003, and 0.96 including capital income. Pensioners' incomes even represent in average 102% of the average income in the population. Inter-cohort inequalities do not seem to justify these tax exemptions. Pensions are more equally distributed than income from work (Brown and Prus, 2006), and intra-cohort inequality does not seem to be a more convincing explanation.

The justification for preferential tax treatment by the existence of an increased risk of poverty among pensioners may also be questioned. According to the INSEE, the poverty rate is greater among active people than among retirees. Considering a poverty threshold at 60% of the median income, the poverty rate for pensioners amounted to 9.6% in 2006 against 9.8% for active people. With a threshold at 50% of the median income, the Insee estimates the poverty rate, for men aged of 60-74, at 3.6% against 6.4% for 50-59 years old men. However, according to Eurostat, the poverty rate for people aged over 60 years amounted to 6.9% in 2007, while it was only 6.5% among those under the age of 60. Eurostat' results show an increasing poverty trend among retirees since 2009: 7.4% among people aged of 60 and more, against 4.8% for those under 60.

Several phenomena with opposing effects influence the living standards of pensioners. Young people and future retirees have or will have experienced more setbacks during their career (Cloarec, 2000; Colin Iehlé and Mahieu, 2000, Briard et al., 2009). It is therefore more difficult for individuals of these generations to meet all the requirements for a full pension from the age of retirement. Moreover, different reforms have contributed to increase the contributory characteristics of the French pension system:
- Increase of the career duration,
- Increase of the legal age of retirement,
- Establishment of a discount mechanism.

These phenomena have resulted in an increased risk of poverty for future generations of retirees (Franco et al., 2009). However, this risk must be balanced with the greater participation of women from younger generations in the labor market and by raising the average skill level.
We wonder in this preliminary research about the adequacy of tax arrangements for the French retirees. What is the impact of differential taxation on inequality between retirees and workers?

## 2. Taxation in France

The French pensioners benefit from specific tax rules concerning income taxation, social contributions, housing and property taxes. We give the most important examples:

- Elderly people benefit first from a 10% tax relief if they are retired. The age of the taxpayer also justifies the existence of special discounts: for retirees over the age of 65, an allowance of 1138 euros is expected if the overall net income is between 14,010 and 22,590 euros. This allowance can be up to 2276 euros if the total net income is less than or equal to 14,010 euros. This device has no age limit for disabled individuals.
- The taxation of a life annuity depends on the age of first entitlement of its owner. If the holder was under 50 on the winding, 70% of the amount of the annuity is taxable. If the beneficiary waits to be aged of 60, then the taxable portion drops to 40%.
- The exemption from property tax on buildings is planned for retirees older than 75 years, subject to resource. Retirees aged 65 to 75 years are also eligible for a rebate of 100 euros.
- Residents who do not have free use of their housing do not pay the housing tax. People aged over 60 years can be exempted from housing tax, subject to resource. If the 60 years old retirees live with one or more adult children seeking employment, they receive an automatic relief.
- Concerning social contributions, retirees are exempted depending on their income level. When they are taxable, they often benefit from lower tax rates.

According to Ferrand and Lenseigne (2010), some of these tax dispositions are not relevant anymore in France: recent studies show that retired and active households have equivalent standard of living (COR, 2009; Legendre, 2010). But other remains useful when they answer to a precise social objective. For instance, expenses related to disability offer specific tax cuts.

## 3. Survey and empirical model

We use data from the European survey EU-SILC (Community Statistics on Income and Living Conditions) for the time span between 2004 and 2007. We use more precisely the French data SRCV (Statistics on resources and living conditions) included in the European survey and conducted by the National Institute of Statistics and Economic Studies (INSEE).
The French survey SILC (Statistics on resources and living conditions) addresses issues relating to poverty and living conditions of individuals and households. It provides information on different taxes and social security costs incurred by households, as well as social benefits.

We constitute two representative and exhaustive samples of population:

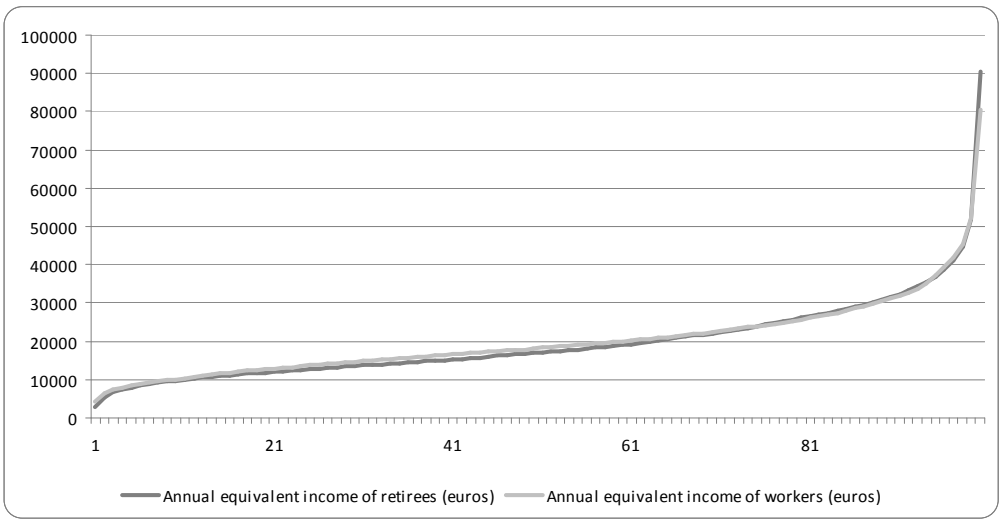
- the retired samples includes individuals declaring they are retired,
- the sample of workers includes the active population: employed and unemployed people seeking a job.

Keeping only individuals from exclusively active household or exclusively retired households, we propose an indicator of inequalities between active people and retirees:

$$y_{c,t} = y_{c,t}^{act} - y_{c,t}^{ret}, \forall c \in [1,100] \qquad (1)$$

where $y_{c,t}^{act}$ is the average equivalent income of active people ranged by percentiles c, and $y_{c,t}^{ret}$ the equivalent income of retirees also ranged by percentiles (See Figure 1). It allows us to compare the retired population and the active one, despite the different sizes of the samples.

**Figure 1 Income distribution: equivalent incomes by percentile, 2007**




Within the households, we assign to each member an equivalent disposable income. The OECD (Organization for Economic Cooperation and Development) equivalence scale is used: one unit of consumption is attributed to the first household adult member, then 0.5 to the other members over the age of 14, and 0.3 to children under 14.

We first propose an OLS specification, using data for the time span between 2004 and 2007. $y_c$ indicates the inequality between retirees and workers, and is the dependant variables in the following specification :

$$y_c = \beta X_c + \varepsilon_c \quad (2)$$

Where $X_c$ includes the explanatory variables. As explained above, the French retirees benefit from specific tax rules. Consequently, we introduce first tax variables:

- social contributions paid by the retirees, in percentage of the equivalent disposable income,
- social contribution paid by the workers,
- income tax and housing tax paid by the retirees,
- income tax and housing tax paid by workers
- property tax paid by retirees,
- property tax paid by workers,
- solidarity tax en wealth (STW) paid by the retirees,
- and STW paid by workers.

Then, we introduce also variables to control the impact of socio-economic phenomena:

- the mean of the age in the samples (retired and active)

- the mean of the age at the end of the studies
- the number of households members in average in the percentiles
- the proportion of women in the percentiles
- the proportion of homeowners
- the proportion of foreign people
- the proportion of executives
- the proportion of farmers
- the proportion of white collars workers
- the proportion of blue collar workers
- the proportion of employees.

Given the presence of outliers in our data, the classical least squares estimator may be distorted. To deal with this bias, we propose different robust-to-outliers methods existing in the literature.
First, we calculate the Cook distances to indicate data points that are particularly worth checking for validity. Data points with large outliers and/or high leverage may distort the outcome and accuracy of the OLS regression. Consequently, observations associated with a Cook distance larger than 1 receive a zero weight. Then we use the loss function of a Tukey biweight.
Cook distances manage to identify isolated outliers, but are inappropriate in case of clusters of outliers. Rousseew and Van Zommeren (1990) show that an outlier can mask the presence of another one. Full robustnesss can be achieved using the Salibian-Barrera and Yohaï (2006) estimator. It consists first in picking randomly N subsets of p observations (p-subsets), with *p* the number of estimated parameters. Each p-subset is defined such that it does not contain outliers. The number of N subsets is generated to garantuee that at least one p-subset without outliers is selected with high probability (Salibian-Barrera and Yohaï, 2006; Verardi and Croux, 2009):

$$N = \left\lceil \frac{\log(1 - P_{clean})}{\log[1 - (1 - \alpha)]^P} \right\rceil \quad (3)$$

where $\alpha$ is the expected proportion of outliers, equal to 0.2, *p* is the number of estimated parameters and *Pclean* is the desired probability of having at least one p-subset without outliers among the N subsets. This probability is fixed to 0.99.

We also propose a model with panel data from 2004 to 2007. Given the short temporal dimension, we prefer a random effects model. The Hausman test confirms us that this specification fits better our data (See table 5 in appendix).

Assuming that the entity's error term is not correlated with the predictors, the empirical model is formulated as follows:

$$y_{c,t} = X_{c,t}\alpha + \varepsilon_{c,t} \quad (4)$$

$$\varepsilon_{c,t} = \tau_c + \rho_{c,t} \quad (5)$$

Where $y_{c,t}$, the dependant variable, represents the difference between the equivalents income of active people and the equivalent income of retirees, crossed by percentiles. $X_{c,t}$ includes the explanatory variables. $\varepsilon_{c,t}$ follows a multivariate normal distribution with a mean 0. $\tau_c$ and $\rho_{c,t}$ are dependant variables having standard normal distribution.

## 4. Results

The different specifications proposed indicate the role of the income tax, social contributions, property tax and housing tax in the constitution of inequality between workers and retirees (See tables 1 to 4 in appendix).
Using linear regressions, robust analysis and panel regressions, we highlight the significant and positive impact of social security contributions paid by active people on inequality. Housing taxes paid by workers have also a significant and positive impact on inequality between workers and retirees. In other words, the correlation between the perception of these taxes and our dependent variable is positive, thus indicating a trend of increasing income gap between active people and retirees.
In contrast, we demonstrate the significant and negative impact of social contributions paid by pensioners, their housing tax and their income tax. When these taxes increase, the gap between the disposable income of working people and retirees tend to decrease.

These results show that the reduction of some specific tax deductions dedicated to retirees could be cut down to reduce the gap in living standards between the active and the retired. While some tax reliefs concerns targeted services (personal services) with a social objective, other do not have any economic or social justifications. For example, the 10% deduction on income tax paid to retirees as well as the 10% allocated to workers for business expenses cannot be justified by any economic reason, especially when the retired household has a high standard of living. Thus when the income tax of retirees increases by one percentage point relative to disposable income, the gap in living standards between workers and pensioners seems to fall by around 0.39 euros.

However, allowing a decrease in housing tax paid by workers or a reduction of the income tax among working households would reduce inequality. The results of the robust estimation by the method of Salibian and Barrera (See table 3 in appendix) show that an increase of one percentage point of the property tax paid by active people would imply an increase of 0.2 euros of the gap in living standards between workers and retirees.

We observe a significant and positive impact on the proportion of homeowners among the active population. Higher the proportion of homeowners among worker is, higher the income gap is. Retirees are more frequently homeowner. It allows them to relieve their budget constraint. On the contrary, the repayment of the mortgage or rent payments constitute a heavy burden for active households. If the average proportion of homeowners among workers increases by one percentage point, the income gap between workers and retirees increases in average by 9 euros (See table 3 in appendix).

## 5. Concluding remarks

Different tax rules are applied to active people and retired people. Yet, the level of inequality and living standards of pensioners do not seem to justify the existence of differential treatment (Legendre, 2009). However, our empirical analysis suggests that the increase in social contribution on the pensioners' incomes and the reduction of some advantages in terms of income tax could reduce the income gap between the active and retired populations.

## References

Briard K, Duc C, El Mekkaoui De Freitas N, Legendre B, Mage S., 2011, Career Interruptions: how do they impact pension rights? The Geneva Papers on risk and insurance, issues and practice, forthcoming.

Cloarec N. (2000) Les passages de l'emploi à la retraite, DARES Premières synthèses

Colin C., Iélhé V. and Mahieu R. (2000) Les trajectoires de fin de carrière des salariés du secteur privé, Dossiers Solidarité et Santé n°3, DREES

El Mekkaoui De Freitas N, Briard K, Duc C, Legendre B, Mage S. (2008), *Aléas de Carrière, inégalités et retraite*, Rapport de Recherche n°47 CEE, 229 pages, Juin.

Ferrand O., & Lenseigne F. (2010), Réformer les retraites: quelles solutions progressistes?, Notes de la Fondation Terra Nova,

Franco D., Marino M., & Tommasino P. (2008) Pension policy and poverty in italy : Recent developments and new priorities, Giornale degli Economisti e Annali di Economia, vol. 67, pp 119-160,

Lavigne A. (2006) Retraite, épargne et fiscalité, Retraite et Société, vol. 47, pp. 10-33, 2006,

Legendre B., 2010, Inégalités de niveaux de vie des actifs et des retraités : une multi-décomposition de l'indice de Gini appliquée au cas Français, working paper DR LEO 2010-17,

Rousseeuw P.J., & van Zomeren B. (1990) Unmasking multivariate outliers and leverage points, Journal of American Statistical Association, vol. 45, pp. 633-639,

Salibian- Barrera M. & Yohaï V. (2006) A fast algorithm for s-regression estimates, Journal of computationnal and Graphical Statistics, vol. 15, pp. 414-427,

Secrétariat général du Conseil d'orientation des retraites (2009) *Niveaux de vie comparés des retraités et des actifs : évolutions récentes,* Document de travail pour la séance plénière du 21 octobre 2009,

Verardi V. & Croux C., (2009) Robust regression in stata, Stata Journal, Stata Corp LP, vol 9(3), pp 439-453,

# Appendix

**Table 1 OLS Model explaining inequalities**

| | Coefficient |
|---|---|
| Social contribution paid by workers | 0.432 |
| Property tax paid by workers | 0.959 |
| Housing tax paid by workers | 0.066** |
| Income tax paid by workers | 0.03 |
| Solidarity tax on wealth (STW) paid by workers | 0.049 |
| Social contribution paid by the retirees | -0.389* |
| Property tax paid by the retirees | 1.108 |
| Housing tax paid by the retirees | 0.017 |
| Income tax paid by the retirees | -0.389* |
| Solidarity tax on wealth (STW) paid by the retirees | 0.056 |
| Number of consumption unities within households of workers percentiles | -126.61 |
| Mean average of the workers by percentile | -83.769 |
| Mean of the age of workers by percentile at the end of the studies | -211.845 |
| Proportion of homeowner within per percentile of workers | 199.572 |
| Proportion of foreign workers by percentile | -85.682 |
| Proportion of women among percentiles of workers | 342.099 |
| Proportion of farmers within the percentiles of workers | 4634.293* |
| Proportion of executives within the percentiles of workers | -2212.559 |
| Proportion of white collar workers within the percentiles of workers | -4.316 |
| Proportion of employees within the percentiles of workers | 3075.964** |
| Proportion of blue collar workers within the percentiles of workers | 2270.289 |
| Number of consumption unities within households of retirees percentiles | -127.312 |
| Mean average of the retirees by percentile | 27.771 |
| Mean of the age of retirees by percentile at the end of the studies | 82.948 |
| Proportion of homeowner within per percentile of retirees | -200.495 |
| Proportion of foreign retirees by percentile | -3749.488 |
| Proportion of women among percentiles of retirees | -1357.144 |
| Proportion of farmers within the percentiles of retirees | -1385.968 |
| Proportion of executives within the percentiles of retirees | 2380.52 |
| Proportion of white collar workers within the percentiles of retirees | -1156.945 |

| | |
|---|---|
| Proportion of employees within the percentiles of retirees | 804.443 |
| Proportion of blue collar workers within the percentiles of retirees | 899.711 |
| Intercept | 2979.751 |
| N | 400 |
| $R^2$ | 0.246 |
| F(32,367) | 59.511 |
| Legend: * : 10%, ** : 5%, *** : 1% | |

**Table 2 Robust estimation, Tukey biweight**

| | Coefficient |
|---|---|
| Social contribution paid by workers | 0.09 |
| Property tax paid by workers | 0.018 |
| Housing tax paid by workers | 0.053* |
| Income tax paid by workers | 0.016 |
| Solidarity tax on wealth (STW) paid by workers | 0.014 |
| Social contribution paid by the retirees | -0.02 |
| Property tax paid by the retirees | 0.582* |
| Housing tax paid by the retirees | -1.542** |
| Income tax paid by the retirees | -0.03 |
| Solidarity tax on wealth (STW) paid by the retirees | 0.022 |
| Number of consumption unities within households of workers percentiles | -16.989 |
| Mean average of the workers by percentile | -29.593* |
| Mean of the age of workers by percentile at the end of the studies | -13.353 |
| Proportion of homeowner within per percentile of workers | 1437.369*** |
| Proportion of foreign workers by percentile | -1879.87*** |
| Proportion of women among percentiles of workers | -285.7 |
| Proportion of farmers within the percentiles of workers | 134.88 |
| Proportion of executives within the percentiles of workers | -2085.71*** |
| Proportion of white collar workers within the percentiles of workers | 887.31 |
| Proportion of employees within the percentiles of workers | 1400.054 |
| Proportion of blue collar workers within the percentiles of workers | 616.72 |
| Number of consumption unities within households of retirees percentiles | 57.37 |
| Mean average of the retirees by percentile | -22.658 |
| Mean of the age of retirees by percentile at the end of the studies | -15.175 |

| | |
|---|---|
| Proportion of homeowner within per percentile of retirees | -303.759 |
| Proportion of foreign retirees by percentile | 243.69 |
| Proportion of women among percentiles of retirees | -276.628 |
| Proportion of farmers within the percentiles of retirees | -1407.41*** |
| Proportion of executives within the percentiles of retirees | -1983.31*** |
| Proportion of white collar workers within the percentiles of retirees | -436.278 |
| Proportion of employees within the percentiles of retirees | 482.848 |
| Proportion of blue collar workers within the percentiles of retirees | 681.148 |
| Intercept | 3658.153* |
| N | 396 |
| $R^2$ | 0.851 |
| F(32,367) | 64.78 |
| Legend: * : 10%, ** : 5%, *** : 1% | |

**Tableau 3 Robust regression: Salibian & Barrera**

| | Coefficient |
|---|---|
| Social contribution paid by workers | 0.196*** |
| Property tax paid by workers | -0.506 |
| Housing tax paid by workers | 0.055*** |
| Income tax paid by workers | 0.13*** |
| Solidarity tax on wealth (STW) paid by workers | 0.113 |
| Social contribution paid by the retirees | -0.186*** |
| Property tax paid by the retirees | 0.276 |
| Housing tax paid by the retirees | -1.088* |
| Income tax paid by the retirees | -0.159*** |
| Solidarity tax on wealth (STW) paid by the retirees | 0.027 |
| Number of consumption unities within households of workers percentiles | 10.081 |
| Mean average of the workers by percentile | -2.684 |
| Mean of the age of workers by percentile at the end of the studies | 14.152 |
| Proportion of homeowner within per percentile of workers | 901.407*** |
| Proportion of foreign workers by percentile | -1754.446 |
| Proportion of women among percentiles of workers | 19.069 |
| Proportion of farmers within the percentiles of workers | -796.103 |
| Proportion of executives within the percentiles of workers | -2339.7*** |
| Proportion of white collar workers within the percentiles of workers | 574.822 |

| | |
|---|---|
| Proportion of employees within the percentiles of workers | 1212.276 |
| Proportion of blue collar workers within the percentiles of workers | 1132.483 |
| Number of consumption unities within households of retirees percentiles | 57.456 |
| Mean average of the retirees by percentile | -16.91 |
| Mean of the age of retirees by percentile at the end of the studies | -47.439 |
| Proportion of homeowner within per percentile of retirees | -272.979 |
| Proportion of foreign retirees by percentile | 220.488 |
| Proportion of women among percentiles of retirees | -588.5* |
| Proportion of farmers within the percentiles of retirees | -1346.7*** |
| Proportion of executives within the percentiles of retirees | -2031.8*** |
| Proportion of white collar workers within the percentiles of retirees | -97.263 |
| Proportion of employees within the percentiles of retirees | 491.064 |
| Proportion of blue collar workers within the percentiles of retirees | 163.218 |
| Intercept | 2152.824 |
| N | 400 |
| Legend: * : 10%, ** : 5%, *** : 1% | |

**Table 4 Model with panel data**

| | Coefficient |
|---|---|
| Social contribution paid by workers | 0.432*** |
| Property tax paid by workers | 0.959 |
| Housing tax paid by workers | 0.066 |
| Income tax paid by workers | 0.003 |
| Solidarity tax on wealth (STW) paid by workers | 0.049 |
| Social contribution paid by the retirees | -0.389*** |
| Property tax paid by the retirees | 1.108 |
| Housing tax paid by the retirees | 0.017 |
| Income tax paid by the retirees | -0.389*** |
| Solidarity tax on wealth (STW) paid by the retirees | 0.056 |
| Number of consumption unities within households of workers percentiles | -126.616 |
| Mean average of the workers by percentile | -83.769 |
| Mean of the age of workers by percentile at the end of the studies | -211.845 |
| Proportion of homeowner within per percentile of workers | 199.572 |
| Proportion of foreign workers by percentile | -85.682 |
| Proportion of women among percentiles of workers | 342.099 |

| | |
|---|---|
| Proportion of farmers within the percentiles of workers | 4634.293 |
| Proportion of executives within the percentiles of workers | -2212.559 |
| Proportion of white collar workers within the percentiles of workers | -4.316 |
| Proportion of employees within the percentiles of workers | 3075.96* |
| Proportion of blue collar workers within the percentiles of workers | 2270.289 |
| Number of consumption unities within households of retirees percentiles | -127.312 |
| Mean average of the retirees by percentile | 27.771 |
| Mean of the age of retirees by percentile at the end of the studies | 82.948 |
| Proportion of homeowner within per percentile of retirees | -200.485 |
| Proportion of foreign retirees by percentile | -3749.488 |
| Proportion of women among percentiles of retirees | -1357.144 |
| Proportion of farmers within the percentiles of retirees | -1385.968 |
| Proportion of executives within the percentiles of retirees | 2380.591 |
| Proportion of white collar workers within the percentiles of retirees | -1156.945 |
| Proportion of employees within the percentiles of retirees | 804.443 |
| Proportion of blue collar workers within the percentiles of retirees | 899.711 |
| Intercept | 2979.751 |
| N | 400 |
| Chi2(32) | 119.782 |
| Legend: * : 10%, ** : 5%, *** : 1% | |

**Table 5 Tests**

| | |
|---|---|
| Hausman test | Chi2(32)=13.36 |
| | Prob>Chi2=0.94 |
| Breusch Pagan test | Chi2(1)=36.12 |
| | Prob>Chi2=0.00 |