TAX EVASION AND RELATIVE CONTRIBUTION (*)

Autora: *Judith Panadés i Martí* (a)
Unitat de Fonaments de l'Anàlisi Econòmica
Universitat Autònoma de Barcelona

P. T. N.º 18/02

(*) Financial support from the Spanish Ministry of Science and Technology through grant SEC2000-0684, and from the Generalitat of Catalonia through grant SGR2000-00054 is gratefully acknowledged. I want to thank Jordi Caballé for his valuable suggestions and comments. Of course, all errors that remain are entirely my own.

(a) Correspondence address: Judith Panadés. Universitat Autónoma de Barcelona. Departament d'Economia i d'Història Econòmica. Edifici B. 08193 Bellaterra (Barcelona). Spain. Phone: (34) 935 811 802. Fax: (34) 935 812 012. E-mail: Judith.Panades@uab.es.

Edita: Instituto de Estudios Fiscales
N.I.P.O.: 111-02-004-2
I.S.S.N.: 1578-0252
Depósito Legal: M-23772-2001

INDEX

ABSTRACT

This paper analyzes the relationship between tax rate levels and tax evasion in a context where the utility of a taxpayer depends on both his own consumption and his relative position with respect to the average declared income of the economy. In this framework, if the taxpayer declares an amount of his income greater (smaller) than the average of the economy, his utility will decrease (increase). I show that if the externality from the others' declared income is large enough, then an increase in the tax rate leads to more evasion.

Key words: Tax evasion, relative tax contribution.

JEL classification number: E62, H26.

1. INTRODUCTION

The sign of the relationship between the tax rate level and the amount of income declared by taxpayers is one of the questions that still is not resolved nowadays. Allingham and Sandmo (1972) introduced the portfolio approach to solve the individual tax evasion problem and showed that, under decreasing absolute risk aversion, the sign of the relationship between the amount of voluntarily declared income and the tax rate is ambiguous when the fine imposed on caught evaders is proportional to the amount of income concealed from the tax authority. However, Yitzhaki (1974) found that a rise in the tax rate increases the amount of reported income under decreasing absolute risk aversion when the fine paid by an audited evader is proportional to the amount of evaded taxes. This modification makes the original model more realistic but generates an unambiguous result which has not been supported by the empirical evidence, since several studies have documented that higher tax rates tend to stimulate tax evasion.[1] Many authors, such as Gordon (1989), Clapper, Nagging and Spur (1991), Lee (2001), and Pandas (2001), among others, have searched for alternative models aimed at explaining this evident contradiction between the empirical findings and the theoretical ones.[2]

The objective of this paper is to present another framework where it is possible to obtain a negative relationship between declared income and tax rate levels in equilibrium. To this end, I modify the basic portfolio model of tax evasion by assuming that the utility of a taxpayer depends on both his consumption and his relative position with respect to the average declared income of the economy. I am thus introducing an externality arising from the amount of income reported by the other taxpayers. The question I address in this paper is whether the assumption that taxpayers dislike to pay more taxes than the others help us in obtaining a result more consistent with the empirical evidence. In particular, I will investigate if a sufficiently strong externality would allow us to generate a positive relationship between the tax rate level and the amount of income concealed from the tax authority in equilibrium.

Several economic models have used the assumption that the relative position of an individual in his community affects his felicity. The most relevant example can be found in the theory of asset pricing where some authors have assumed that one of the arguments of the utility function of an agent is the ratio between

[1] Clotfelter (1983) and Poterba (1987) report a positive relation between tax rate and undeclared income using a real income data base.

[2] Slemrod (1985) and Feinstein (1991) cast some doubts on the results obtained by some of these authors, since they argue that it is not possible to distinguish between the effect of the tax rate on evaded income and the overall effect of other variables that are also relevant for the problem under consideration.

his private consumption and the average consumption of the economy [see Gail (1994) and Abel (1999)]. This departure from the traditional formulation of the utility function allows these authors to obtain a possible resolution of the equity premium puzzle posed by Mara and Prescott (1985).[3] This kind of "keeping up with the Joneses" feature is also present in our tax evasion problem since individuals will care about their relative tax contribution. More precisely, I will assume that a taxpayer derives negative utility from paying more taxes than the average taxpayer.

In this context, when a taxpayer declares an amount of his income greater (smaller) than the average of the economy, his utility will decrease (increase). The introduction of this externality from the others' declared income generates an additional negative effect on a taxpayer's willingness to report his true income. This new effect could offset the positive income effect associated with an increase in the tax rate. In this case, I will show that, when the tax rate increases, taxpayers could end up reporting less income under decreasing absolute risk aversion in equilibrium.

The next section presents a model of tax evasion where the relative tax contribution affects the utility of taxpayers. Section 3 performs the corresponding comparative statics exercise. The final section offers some concluding remarks.

2. THE MODEL

Let us consider the standard Allingham and Sandmo (1972) model of tax evasion. There is a continuum of agents who are identical ex-ante. Each individual has an exogenously true income *y* which is subjected to a flat tax rate $\tau \in (0,1)$. Let be x the amount of income declared by the taxpayer. The tax authorities audit the tax reports with an exogenous probability $p \in (0,1)$ and, if such an investigation takes place, the true income *y* is always discovered. In this case, the taxpayer has to pay a proportional fine $\pi > 1$ on the amount of evaded taxes. This specification of the tax evasion problem is thus the same as that of Yitzhaki (1974).

I assume that taxpayer's utility depends on both his contingent consumption and his relative position with respect to the average declared income in the economy. In particular, I assume that the utility of a taxpayer diminishes when

[3] Several recent papers in macroeconomics have analyzed the dynamic effects of introducing relative consumption as an argument in the utility function (see Ljungqvist and Uhlig (2000), Carroll, Overland, and Weil (1997) and de la Croix (1998)).

he is declaring an amount greater than the average of the other taxpayers. This kind of externality accruing from the others' reported income captures the idea that taxpayers care about their relative position in the economy. Note that, since tax rates are flat, we could replace the assumption that individuals care about their relative report with the equivalent assumption that they care about their relative position in terms of voluntary tax contributions.

The preferences of a taxpayer are represented by an additive expected utility function

$$E\left[U\left(\tilde{C},\frac{x}{\bar{x}}\right)\right]=(1-p)u\left(C^N\right)+pu\left(C^Y\right)+V\left(\frac{x}{\bar{x}}\right),$$

where $C^N = y-\tau x$ denotes the consumption in the case that the taxpayer is not audited, $C^Y = y-\tau x-\pi\tau(y-x)$ is the consumption when the taxpayer is audited, and $\bar{x}$ is the average declared income of the economy.

I assume that the Bernouilli utility u satisfies $u'>0$ and $u''<0$. Moreover, for tractability, I will also assume a linear functional form for the function $V\left(\frac{x}{\bar{x}}\right)=-\gamma\left(\frac{x}{\bar{x}}\right)$, where the parameter $\gamma>0$ measures the importance of the relative tax contribution.[4] Taking as given the average report $\bar{x}$, each individual chooses the amount *x* of declared income in order to maximize

$$(1-p)u\left(C^N\right)+pu\left(C^Y\right)-\gamma\left(\frac{x}{\bar{x}}\right). \qquad (2.1)$$

The first-order condition for the maximization of (2.1) is

$$-\tau(1-p)\,u'\left(C^N\right)+\tau\,(\pi-1)pu'\left(C^Y\right)-\gamma\left(\frac{1}{\bar{x}}\right)=0 \qquad (2.2)$$

The second-order condition,

$$D\equiv(-\tau)^2\,(1-p)u''\left(C^N\right)+\tau^2\,(\pi-1)^2\,pu''\left(C^Y\right)<0,$$

is clearly satisfied since $u''<0$.

To obtain the restrictions on the parameter values of the model yielding an interior solution, I evaluate the first order condition at $x=0$ and $x=y$. Since (2.1) is a concave function of x, the following two conditions should be met in order to obtain an optimal report such that $x\in(0,y)$:

$$\tau\,(\pi-1)pu'\left[y(1-\tau\pi)\right]>\tau(1-p)u'(y)+\gamma\left(\frac{1}{\bar{x}}\right),$$

[4] The results obtained in this paper would also hold under a concave specification of the function V, like $\left(\frac{x}{\bar{x}}\right)=-\gamma\left(\frac{x}{\bar{x}}\right)^{\alpha}$, with $\alpha\in(0,1)$ under a restriction on the value of the parameter α.

and

$$p\pi < 1.$$

I restrict thus my analysis to a parameter configuration where the previous two inequalities are satisfied.[5]

3. EFFECTS ON TAX EVASION OF CHANGES IN THE TAX RATE

As a first step towards examining the sign of the relation between reported income and tax rates, we need to find the equilibrium of this economy. As all taxpayers are identical, in equilibrium it holds that $\bar{x} = x$. As a consequence, the first-order condition (2.2) becomes in equilibrium

$$-\tau(1-p)u'\left(C^N\right) + \tau(\pi-1)pu'\left(C^Y\right) - \gamma\left(\frac{1}{x}\right) = 0,$$

which can be rewritten as

$$-\tau(1-p)xu'\left(C^N\right) + \tau(\pi-1)pxu'\left(C^Y\right) - \gamma = 0. \qquad (3.1)$$

Therefore, when the externality on average declared income is present, the effect of an increase in the tax rate on reported income is given by the following expression, which is obtained from implicitly differentiating (3.1):

$$\frac{\partial x}{\partial \tau} = \frac{(1-p)xu'\left(C^N\right) - \tau(1-p)x^2u''\left(C^N\right) - (\pi-1)pxu'\left(C^Y\right) + \tau(\pi-1)px(x+\pi(y-x))u''\left(C^Y\right)}{Dx - \tau(1-p)u'\left(C^N\right) + \tau(\pi-1)pu'\left(C^Y\right)} \qquad (3.2)$$

The following proposition gives us the sign of the previous derivative:

Proposition 1. Assume that the utility function exhibits decreasing absolute risk aversion (DARA) and $\pi\tau < 1$. Then, there exists a real number $\gamma^* > 0$ such that $\frac{\partial x}{\partial \tau} < 0$ for all $\gamma \geq \gamma^*$.

Proof. See the Appendix.

This result tells us that an increase in the tax rate leads to less reported income in equilibrium when the external effect from the others' report is large enough. The intuition behind Proposition 1 lies in the combination of two opposite effects. First, we have the effect associated with an increase in the tax rate. When the fine is imposed on the amount of evaded taxes, the penalty rate in-

---

5 Note that if we assume $\lim_{C\to 0} u'(C) = \infty$, then $\pi\tau > 1$ becomes a sufficient condition for reporting a strictly positive income.

creases proportionally with τ and, therefore, there is no incentive to substitute evasion for honesty. Thus, we are left with a pure income effect, and the sign of this effect depends on the behavior of the taxpayer's index of absolute risk aversion. In particular, this income effect is positive under DARA since, when the wealth diminishes as a consequence of an increase in the tax rate, the absolute risk aversion goes up and, thus, the taxpayer tends to evade less in order to reduce his risk exposure.

Second, we have the effect associated with the variation of the relative declared income. An increase in the amount of his declared income places a taxpayer in a worse relative position with respect to the other taxpayers and, thus, his utility diminishes. Therefore, the externality from the others' reports makes taxpayers to reduce the amount of their reported income.

The sign of expression (3.2) depends on the importance of the two effects discussed above. In particular, Proposition 1 tells us that if the externality effect, as measured by the value of the parameter γ is large enough, it will offset the income effect and, therefore, an increase in the tax rate will result in more tax evasion. Note that this negative relation between x and τ agrees with the aforementioned empirical findings. Notice that in Yitzhaki (1974) the sign of the derivative (3.2) was unambiguously positive under DARA, while I have obtained the opposite result under sufficiently strong externalities.

It is important to remark the relevance of the assumption $\pi\tau < 1$. The fee paid by an audited taxpayer is implausibly large when $\pi\tau > 1$ and, in this case, it can be shown that, under the assumptions of DARA and relative risk aversion larger than one, the income effect always offsets the externality effect. Therefore, we would recover the original result of Yitzhaki in this scenario.

The see whether the effect of an increase in the tax rate on tax evasion is sensitive to the penalty structure, let us consider the case in which the penalty rate $\hat{\pi}$ is imposed on the amount of unreported income, as in Allingham and Sandmo (1972). Needless to say, most of the real tax systems around the world impose fines on the amount of evaded taxes rather than on the amount of income concealed from the tax authority. In what follows, I will carry out the same analysis as I did under the (much more realistic) penalty specification of Yitzhaki. Note that the two penalty structures are directly related since $\hat{\pi} = \pi\tau$.

The consumption when the taxpayer is not audited is again $C^N = y - \tau x$, but the consumption if the inspection takes place will be

$$C^Y = y - \tau x - \hat{\pi}(y - x),$$

where $\hat{\pi} > \tau$.[6] The first-order condition (2.2) becomes now

[6] This penalty formulation requires that $\hat{\pi} > \tau$ since, otherwise, tax evasion would not be punished.

$$-\tau(1-p)u'\left(C^N\right)+(\hat{\pi}-\tau)pu'\left(C^Y\right)-\gamma\left(\frac{1}{\overline{x}}\right)=0. \qquad (3.3)$$

The second-order condition

$$\hat{D} \equiv (-\tau)^2\,(1-p)u''\left(C^N\right)+(\hat{\pi}-\tau)^2\,pu''(C^Y)<0,$$

is also satisfied by the assumption of concavity of u.

In this case the conditions on parameter values required for an interior solution of the previous problem are

$$(\hat{\pi}-\tau)pu'\left[y(1-\hat{\pi})\right]>\tau(1-p)u'(y)+\gamma\left(\frac{1}{\overline{x}}\right)$$

and

$$p\hat{\pi}<\tau.$$

I restrict again my analysis to a parameter configuration where the previous two inequalities hold.

Applying the equilibrium condition $x=\overline{x}$ on (3.3), we get

$$-\tau(1-p)xu'\left(C^N\right)+(\hat{\pi}-\tau)pxu'\left(C^Y\right)-\gamma=0. \qquad (3.4)$$

The impact of a tax increase on declared income is given by the sign of the following derivative obtained from implicit differentiation of (3.4):

$$\frac{\partial x}{\partial \tau}=\frac{(1-p)xu'(C^N)-\tau(1-p)x^2u''(C^N)+pxu'(C^Y)+(\hat{\pi}-\tau)px^2u''(C^Y)}{\hat{D}x-\tau(1-p)u'(C^N)+(\hat{\pi}-\tau)pu'(C^Y)}. \qquad (3.5)$$

The following proposition provides the sign of expression (3.5):

Proposition 2. Assume that the utility function exhibits decreasing absolute risk aversion (DARA) and $\hat{\pi}<1$. Then, there exists a real number $\gamma^{**}>0$ such that $\frac{\partial x}{\partial \tau}<0$ for all $\gamma\geq\gamma^{**}$.

Proof. See the Appendix.

We also obtain in this case that, if the importance for taxpayers' utility of the relative tax contribution is sufficiently large, then an increase in the tax rate results in less reported income in equilibrium. It should be noticed that in this context there exists a substitution effect, since fines do not longer depend on the tax rate and, hence, an increase in the later generates incentives to substitute evasion for honesty. This effect strengthens those already present for the case where fines were proportional to the amount of evaded taxes. Therefore, it should not be surprising that the kind of result of Proposition 1 survives to this alternative modelization of the penalty structure.

4. CONCLUDING REMARKS

In this paper I have made a new attempt to explain the apparent contradiction between the results obtained by the traditional models of tax evasion and the empirical evidence about the reaction of taxpayers to changes in tax rate levels. While the theory predicts that reported income increases with tax rates, the empirical evidence runs in the opposite direction. An obvious strategy to resolve this contradiction is to endow the basic model with new elements aimed to better capture some features of taxpayer behavior. Along this line of research, I have considered an equilibrium model where the utility function of a taxpayer depends both on the amount of his own consumption and on his relative tax contribution. My analysis shows that an increase in the tax rate could induce taxpayers to raise the amount of unreported income provided this taxpayer attaches sufficiently high marginal disutility to paying an amount of taxes larger than the average contribution of the other taxpayers.

APPENDIX

Proof Proposition 1. Substituting (3.1) into (3.2), we have that

$$\frac{\partial x}{\partial \tau}=\frac{-\gamma\left[\frac{1}{\tau}+(x+\pi(y-x))R_A(C^Y)\right]-\tau(1-p)\,xu'(C^N)\left[(x+\pi(y-x))R_A(C^Y)-xR_A(C^N)\right]}{Dx+\gamma\left(\frac{1}{x}\right)}, \qquad (A.1)$$

Where $R_A(C)=\frac{-u''(C)}{u'(C)}$ is the Arrow-Pratt index of absolute risk aversion. The numerator of (A.1) is unambiguously negative under DARA since, $x+\pi(y-x)>x$. The denominator of (A.1) will be positive if

$$\gamma > -Dx^2. \qquad (A.2)$$

Since DARA implies that $u'''>0$, it is immediate to see that a sufficient condition for (A.2) is

$$\gamma \geq \gamma^*,$$

where $\gamma^* = y^2[-u''(y(1-\tau\pi))]\left[(1-p)+p(\pi-1)^2\right]$.

Proof of Proposition 2. Substituting (3.4) into (3.5), we get

$$\frac{\partial x}{\partial \tau}=\frac{-\gamma xR_A(C^Y)+(1-p)\,xu'(C^N)+pxu'(C^Y)-\tau(1-p)\,x^2u'(C^N)\left[R_A(C^Y)-xR_A(C^N)\right]}{\hat{D}x+\gamma\left(\frac{1}{x}\right)}. \qquad (A.3)$$

Under DARA, the numerator of (A.3) will be negative if

$$\gamma > \frac{(1-p)\,xu'\,(C^N)+pxu'(C^Y)}{x\,R_A(C^Y)}. \qquad (A.4)$$

A sufficient condition for (A.4) is

$$\gamma \geq \frac{u'(y(1-\hat{\pi}))}{R_A(y)}, \qquad (A.5)$$

since I have assumed that the index of absolute risk aversion is decreasing and $u''<0$. The denominator is positive if

$$\gamma > -\hat{D}x^2.$$

Since the assumption of DARA implies that $u'''>0$, it is easy to check that a sufficient condition for obtaining a positive denominator in expression (A.3) is

$$\gamma \geq y^2\left[-u''(y(1-\hat{\pi}))\right]\left[\tau^2(1-p)+p(\hat{\pi}-\tau)^2\right].$$

Note that, using the fact that $p\hat{\pi} < \tau < \hat{\pi}$, it is straightforward to see that

$$\tau^2(1-p)+p\,(\hat{\pi}-\tau)^2 < \hat{\pi}^2(1+p-2p^2).$$

Then, the condition

$$\gamma \geq \mathrm{Max}\left\{\frac{u'(y(1-\hat{\pi}))}{R_A(y)},\ y^2\ \left[-u''(y(1-\hat{\pi}))\right]\hat{\pi}^2\ (1+p-2p^2)\right\} \equiv \gamma^{**}$$

implies that $\frac{\partial x}{\partial \tau} < 0$.

REFERENCES

ABEL, A. (1999). “Risk Premia and Term Premia in General Equilibrium”. *Journal of Monetary Economics* 43, 3-33.

ALLINGHAM, M., and SANDMO, A. (1972). "Income Tax Evasion: A Theoretical Analysis”. *Journal of Public Economics* 1, 323-338.

CARROLL, C.; OVERLAND, J., and WEIL, D. (1997). “Comparison Utility in a Growth Model”. *Journal of Economic Growth 2*, 339-367.

CLOTFELTER, C. (1983). “Tax Evasion and Tax Rates: An Analysis of Individual Returns”. *Review of Economics and Statistics* 65, 363-373.

DE LA CROIX, D. (1998). “Growth and the Relativity of Satisfaction”. *Mathematical Social Sciences* 36, 105-125.

FEINSTEIN, J. (1991). “An Econometric Analysis of Income Tax Evasion and its Detection”. *RAND Journal of Economics* 22(1), 14-35.

GALÍ, J. (1994). “Keeping Up with the Joneses: Consumption Externalities, Portfolio Choice, and Asset Prices”. *Journal of Money Credit and Banking* 26, 1-8.

GORDON, J. (1989). “Individual Morality and Reputation Cost as Deterrents to Tax Evasion”. *European Economic Review* 33, 797-805.

KLEPPER, S.; NAGIN, D., and SPURR, S. (1991). “Tax Rates, Tax Compliance, and the Reporting of Long-Term Capital Gains”. *Public Finance/Finances Publiques* 46, 236-251.

LEE, K. (2001). "Tax Evasion and Self-Insurance." *Journal of Public Economics* 81, 73-81.

LJUNGQVIST, L., and UHLIG, H. (2000). “Tax Policy and Aggregate Demand Management Under Catching Up with the Joneses”. *American Economic Review* 90, 356-366.

MEHRA, R., and PRESCOTT, E. C. (1985). “The Equity Premium: A Puzzle”. *Journal of Monetary Economics* 15, 145-162.

PANADÉS, J. (2001). “Tax Evasion and Ricardian Equivalence”. *European Journal of Political Economy* (forthcoming).

POTERBA, J. (1987). “Tax Evasion and Capital Gains Taxation”. *American Economic Revi}ew* 77, 234-239.

SLEMROD, J. (1985). “An Empirical Test for Tax Evasion”. *Review of Economics and Statistics* 67, 232-238.

YITZHAKI, S. (1974). “A Note on Income Tax Evasion: A Theoretical Analysis”. *Journal of Public Economics* 3, 201-202.

NORMAS DE PUBLICACIÓN DE PAPELES DE TRABAJO DEL INSTITUTO DE ESTUDIOS FISCALES

Esta colección de *Papeles de Trabajo* tiene como objetivo ofrecer un vehículo de expresión a todas aquellas personas interasadas en los temas de Economía Pública. Las normas para la presentación y selección de originales son las siguientes:

1. Todos los originales que se presenten estarán sometidos a evaluación y podrán ser directamente aceptados para su publicación, aceptados sujetos a revisión, o rechazados.

2. Los trabajos deberán enviarse por duplicado a la Subdirección de Estudios Tributarios. Instituto de Estudios Fiscales. Avda. Cardenal Herrera Oria, 378. 28035 Madrid.

3. La extensión máxima de texto escrito, incluidos apéndices y referencias bibliográfícas será de 7000 palabras.

4. Los originales deberán presentarse mecanografiados a doble espacio. En la primera página deberá aparecer el título del trabajo, el nombre del autor(es) y la institución a la que pertenece, así como su dirección postal y electrónica. Además, en la primera página aparecerá también un abstract de no más de 125 palabras, los códigos JEL y las palabras clave.

5. Los epígrafes irán numerados secuencialmente siguiendo la numeración arábiga. Las notas al texto irán numeradas correlativamente y aparecerán al pie de la correspondiente página. Las fórmulas matemáticas se numerarán secuencialmente ajustadas al margen derecho de las mismas. La bibliografía aparecerá al final del trabajo, bajo la inscripción "Referencias" por orden alfabético de autores y, en cada una, ajustándose al siguiente orden: autor(es), año de publicación (distinguiendo a, b, c si hay varias correspondientes al mismo autor(es) y año), título del artículo o libro, título de la revista en cursiva, número de la revista y páginas.

6. En caso de que aparezcan tablas y gráficos, éstos podrán incorporarse directamente al texto o, alternativamente, presentarse todos juntos y debidamente numerados al final del trabajo, antes de la bibliografía.

7. En cualquier caso, se deberá adjuntar un disquete con el trabajo en formato word. Siempre que el documento presente tablas y/o gráficos, éstos deberán aparecer en ficheros independientes. Asimismo, en caso de que los gráficos procedan de tablas creadas en excel, estas deberán incorporarse en el disquete debidamente identificadas.

Junto al original del Papel de Trabajo se entregará también un resumen de un máximo de dos folios que contenga las principales implicaciones de política económica que se deriven de la investigación realizada.

PUBLISHING GUIDELINES OF WORKING PAPERS AT THE INSTITUTE FOR FISCAL STUDIES

This serie of *Papeles de Trabajo* (working papers) aims to provide those having an interest in Public Economics with a vehicle to publicize their ideas. The rules governing submission and selection of papers are the following:

1. The manuscripts submitted will all be assessed and may be directly accepted for publication, accepted with subjections for revision or rejected.

2. The papers shall be sent in duplicate to Subdirección General de Estudios Tributarios (The Deputy Direction of Tax Studies), Instituto de Estudios Fiscales (Institute for Fiscal Studies), Avenida del Cardenal Herrera Oria, nº 378, Madrid 28035.

3. The maximum length of the text including appendices and bibliography will be no more than 7000 words.

4. The originals should be double spaced. The first page of the manuscript should contain the following information: (1) the title; (2) the name and the institutional affiliation of the author(s); (3) an abstract of no more than 125 words; (4) JEL codes and keywords; (5) the postal and e-mail address of the corresponding author.

5. Sections will be numbered in sequence with arabic numerals. Footnotes will be numbered correlatively and will appear at the foot of the corresponding page. Mathematical formulae will be numbered on the right margin of the page in sequence. Bibliographical references will appear at the end of the paper under the heading "References" in alphabetical order of authors. Each reference will have to include in this order the following terms of references: author(s), publishing date (with an a, b or c in case there are several references to the same author(s) and year), title of the article or book, name of the journal in italics, number of the issue and pages.

6. If tables and graphs are necessary, they may be included directly in the text or alternatively presented altogether and duly numbered at the end of the paper, before the bibliography.

7. In any case, a floppy disk will be enclosed in Word format. Whenever the document provides tables and/or graphs, they must be contained in separate files. Furthermore, if graphs are drawn from tables within the Excell package, these must be included in the floppy disk and duly identified.

Together with the original copy of the working paper a brief two-page summary highlighting the main policy implications derived from the research is also requested.

ÚLTIMOS PAPELES DE TRABAJO EDITADOS POR EL INSTITUTO DE ESTUDIOS FISCALES

2000

1/00 Crédito fiscal a la inversión en el impuesto de sociedades y neutralidad impositiva: Más evidencia para un viejo debate.
Autor: Desiderio Romero Jordán.
Páginas: 40.

2/00 Estudio del consumo familiar de bienes y servicios públicos a partir de la encuesta de presupuestos familiares.
Autores: Ernesto Carrilllo y Manuel Tamayo.
Páginas: 40.

3/00 Evidencia empírica de la convergencia real.
Autores: Lorenzo Escot y Miguel Ángel Galindo.
Páginas: 58.

Nueva Época

4/00 The effects of human capital depreciation on experience-earnings profiles: Evidence salaried spanish men.
Autores: M. Arrazola, J. de Hevia, M. Risueño y J. F. Sanz.
Páginas: 24.

5/00 Las ayudas fiscales a la adquisición de inmuebles residenciales en la nueva Ley del IRPF: Un análisis comparado a través del concepto de coste de uso.
Autor: José Félix Sanz Sanz.
Páginas: 44.

6/00 Las medidas fiscales de estímulo del ahorro contenidas en el Real Decreto-Ley 3/2000: análisis de sus efectos a través del tipo marginal efectivo.
Autores: José Manuel González Páramo y Nuria Badenes Plá.
Páginas: 28.

7/00 Análisis de las ganancias de bienestar asociadas a los efectos de la Reforma del IRPF sobre la oferta laboral de la familia española.
Autores: Juan Prieto Rodríguez y Santiago Álvarez García.
Páginas 32.

8/00 Un marco para la discusión de los efectos de la política impositiva sobre los precios y el *stock* de vivienda.
Autor: Miguel Ángel López García.
Páginas 36.

9/00 Descomposición de los efectos redistributivos de la Reforma del IRPF.
Autores: Jorge Onrubia Fernández y María del Carmen Rodado Ruiz.
Páginas 24.

10/00 Aspectos teóricos de la convergencia real, integración y política fiscal.
Autores: Lorenzo Escot y Miguel Ángel Galindo.
Páginas 28.

2001

1/01 Notas sobre desagregación temporal de series económicas.
Autor: Enrique M. Quilis.
Páginas 38.

2/01 Estimación y comparación de tasas de rendimiento de la educación en España.
Autores: M. Arrazola, J. de Hevia, M. Risueño y J. F. Sanz.
Páginas 28.

3/01 Doble imposición, "efecto clientela" y aversión al riesgo.
Autores: Antonio Bustos Gisbert y Francisco Pedraja Chaparro.
Páginas 34.

4/01 Non-Institutional Federalism in Spain.
Autor: Joan Rosselló Villalonga.
Páginas 32.

5/01 Estimating utilisation of Health care: A groupe data regression approach.
Autora: Mabel Amaya Amaya.
Páginas 30.

6/01 Shapley inequality descomposition by factor components.
Autores: Mercedes Sastre y Alain Trannoy.
Páginas 40.

7/01 An empirical analysis of the demand for physician services across the European Union.
Autores: Sergi Jiménez Martín, José M. Labeaga y Maite Martínez-Granado.
Páginas 40.

8/01 Demand, childbirth and the costs of babies: evidence from spanish panel data.
Autores: José M.ª Labeaga, Ian Preston y Juan A. Sanchis-Llopis.
Páginas 56.

9/01 Imposición marginal efectiva sobre el factor trabajo: Breve nota metodológica y comparación internacional.
Autores: Desiderio Romero Jordán y José Félix Sanz Sanz.
Páginas 40.

10/01 A non-parametric decomposition of redistribution into vertical and horizontal components.
Autores: Irene Perrote, Juan Gabriel Rodríguez y Rafael Salas.
Páginas 28.

11/01 Efectos sobre la renta disponible y el bienestar de la deducción por rentas ganadas en el IRPF.
Autora: Nuria Badenes Plá.
Páginas 28.

12/01 Seguros sanitarios y gasto público en España. Un modelo de microsimulación para las políticas de gastos fiscales en sanidad.
Autor: Ángel López Nicolás.
Páginas 40.

13/01 A complete parametrical class of redistribution and progressivity measures.
Autores: Isabel Rabadán y Rafael Salas.
Páginas 20.

14/01 La medición de la desigualdad económica.
Autor: Rafael Salas.
Páginas 40.

15/01 Crecimiento económico y dinámica de distribución de la renta en las regiones de la UE: un análisis no paramétrico.
Autores: Julián Ramajo Hernández y María del Mar Salinas Jiménez.
Páginas 32.

16/01 La descentralización territorial de las prestaciones asistenciales: efectos sobre la igualdad.
Autores: Luis Ayala Cañón, Rosa Martínez López y Jesus Ruiz-Huerta.
Páginas 48.

17/01 Redistribution and labour supply.
Autores: Jorge Onrubia, Rafael Salas y José Félix Sanz.
Páginas 24.

18/01 Medición de la eficiencia técnica en la economía española: El papel de las infraestructuras productivas.
Autoras: M.ª Jesús Delgado Rodríguez e Inmaculada Álvarez Ayuso.
Páginas 32.

19/01 Inversión pública eficiente e impuestos distorsionantes en un contexto de equilibrio general.
Autores: José Manuel González-Páramo y Diego Martínez López.
Páginas 28.

20/01 La incidencia distributiva del gasto público social. Análisis general y tratamiento específico de la incidencia distributiva entre grupos sociales y entre grupos de edad.
Autor: Jorge Calero Martínez.
Páginas 36.

21/01 Crisis cambiarias: Teoría y evidencia.
Autor: Óscar Bajo Rubio.
Páginas 32.

22/01 Distributive impact and evaluation of devolution proposals in Japanese local public finance.
Autores: Kazuyuki Nakamura, Minoru Kunizaki y Masanori Tahira.
Páginas 36.

23/01 El funcionamiento de los sistemas de garantía en el modelo de financiación autonómica.
Autor: Alfonso Utrilla de la Hoz.
Páginas 48.

24/01 Rendimiento de la educación en España: Nueva evidencia de las diferencias entre Hombres y Mujeres.
Autores: M. Arrazola y J. de Hevia.
Páginas 36.

25/01 Fecundidad y beneficios fiscales y sociales por descendientes.
Autora: Anabel Zárate Marco.
Páginas 52.

26/01 Estimación de precios sombra a partir del análisis Input-Output: Aplicación a la economía española.
Autora: Guadalupe Souto Nieves.
Páginas 56.

27/01 Análisis empírico de la depreciación del capital humano para el caso de las Mujeres y los Hombres en España.
Autores: M. Arrazola y J. de Hevia.
Páginas 28.

28/01 Equivalence scales in tax and transfer policies.
Autores: Luis Ayala, Rosa Martínez y Jesús Ruiz-Huerta.
Páginas 44.

29/01 Un modelo de crecimiento con restricciones de demanda: el gasto público como amortiguador del desequilibrio externo.
Autora: Belén Fernández Castro.
Páginas 44.

30/01 A bi-stochastic nonparametric estimator.
Autores: Juan G. Rodríguez y Rafael Salas.
Páginas 24.

2002

1/02 Las cestas autonómicas.
Autores: Alejandro Esteller, Jorge Navas y Pilar Sorribas.
Páginas 72.

2/02 Evolución del endeudamiento autonómico entre 1985 y 1997: la incidencia de los Escenarios de Consolidación Presupuestaria y de los límites de la LOFCA.
Autores: Julio López Laborda y Jaime Vallés Giménez.
Páginas 60.

3/02 Optimal Pricing and Grant Policies for Museums.
Autores: Juan Prieto Rodríguez y Víctor Fernández Blanco.
Páginas 28.

4/02 El mercado financiero y el racionamiento del endeudamiento autonómico.
Autores: Nuria Alcalde Fradejas y Jaime Vallés Giménez.
Páginas 36.

5/02 Experimentos secuenciales en la gestión de los recursos comunes.
Autores: Lluis Bru, Susana Cabrera, C. Mónica Capra y Rosario Gómez.
Páginas 32.

6/02 La eficiencia de la universidad medida a través de la función de distancia: Un análisis de las relaciones entre la docencia y la investigación.
Autores: Alfredo Moreno Sáez y David Trillo del Pozo.
Páginas 40.

7/02 Movilidad social y desigualdad económica.
Autores: Juan Prieto-Rodríguez, Rafael Salas y Santiago Álvarez-García.
Páginas 32.

8/02 Modelos BVAR: Especificación, estimación e inferencia.
Autor: Enrique M. Quilis.
Páginas 44.

9/02 Imposición lineal sobre la renta y equivalencia distributiva: Un ejercicio de microsimulación.
Autores: Juan Manuel Castañer Carrasco y José Félix Sanz Sanz.
Páginas 44.

10/02 The evolution of income inequality in the European Union during the period 1993-1996.
Autores: Santiago Álvarez García, Juan Prieto-Rodríguez y Rafael Salas.
Páginas 36.

11/02 Una descomposición de la redistribución en sus componentes vertical y horizontal: Una aplicación al IRPF.
Autora: Irene Perrote.
Páginas 32.

12/02 Análisis de las políticas públicas de fomento de la innovación tecnológica en las regiones españolas.
Autor: Antonio Fonfría Mesa.
Páginas 40.

13/02 Los efectos de la política fiscal sobre el consumo privado: nueva evidencia para el caso español.
Autores: Agustín García y Julián Ramajo.
Páginas 52.

14/02 Micro-Modelling of retirement behavior in Spain.
Autores: Michele Boldrin, Sergi Jiménez-Martín y Franco Peracchi.
Páginas 96.

15/02 Estado de salud y participación laboral de las personas mayores.
Autores: Juan Prieto Rodríguez, Desiderio Romero Jordán y Santiago Álvarez García.
Páginas 40.

16/02 Technological change, efficiency gains and capital accumulation in labour productivity growth and convergence: an application to the Spanish regions.
Autora: M.ª del Mar Salinas Jiménez.
Páginas 40.

17/02 Déficit público, masa monetaria e inflación. Evidencia empírica en la Unión Europea.
Autor: César Pérez López.
Páginas 40.

18/02 Tax evasion and relative contribution.
Autora: Judith Panadés i Martí.
Páginas 28.