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Complementarities between Finance and Leisure

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Abstract: *Purpose:* Optimality of consumption taxes as Value Added Tax (VAT) may be conditioned by the reduction of working time respect to leisure. Nonetheless, could we tax a good or service in a complementary way to leisure? In this case, by applying the tax, the good itself would be discouraged, but also leisure at the same time.

Design/methodology/approach: This paper theoretically discusses and analyzes the potential complementarity or neutrality of financial services regarding leisure time. A reduced general equilibrium model is developed, suggesting their complementarity. This is confirmed in the empirical section, where data from 30 OECD countries for the last available year is employed.

Findings: The results show that some financial indicators are usually complements of leisure, specifically for women, who are also sensitive in their leisure time to other fiscal and commercial variables.

Originality: This is the first paper suggesting that the elimination of the exemption of financial services under VAT may discourage leisure hours, offsetting the discouragement of working hours by the general VAT.

JEL Codes: J22, H21, H25, G21

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1. Introduction

The topic on whether finance affect leisure or the opposite direction and what is that degree of influence—positive, negative or zero—is very relevant taking into account the possible impact of taxes on labor and the potential distortion on labor. Indeed, taxes can also affect the financial sector, but it has been recently found that indirect taxes on financial services are neutral to the financial sector size (López-Laborda, 2016, 2017) but it is not necessarily the case for taxes on financial transactions (López-Laborda, 2016). This paper tries to see, empirically but also with a proposed theoretical framework, what are the relationships among financial services, their taxes and leisure.

The rest of the paper is divided as follows. Section 2 provides a brief literature review on the issue. Section 3 formulates the theoretical expectations of the paper by discussing the potential complementarity or neutrality of financial services and leisure. Section 4 develops a reduced model of general equilibrium illustrating this. Section 5 proposes the empirical methodology and data used for confirming the relationship or not. Section 6 shows the empirical results and discusses them. Finally, Section 7 concludes.

2. Basic Concepts

2.1. Literature Review

Regarding the measure of financial sector, in this paper the size of the financial sector will be taken into account. Additionally, further indicators that are going to be next briefly explained are employed as explanatory variables, jointly with commercial trading indicators because of the strong links between commerce and finance. First, the financial indicator is explained. This paper is based on the seminal work of Lopez-Laborda and Peña (2018), where the value added of financial services is enclosed in the following equations, reflecting the value added of two usual financial products:

$$\begin{aligned} \rho \cdot IR &= IR - \varepsilon \\ \rho \cdot IP &= \varepsilon - IP \end{aligned} \tag{1}$$

Where rho is the marginal productivity of financial services in the business—modified Quoted Spread according to Peña (2021) or mobile-ratio according to the authors—, the capital for both kinds of services is the same, *IP* represents the interest payments and *IR* the interest receipts. Additionally, a gravitational equation is derived as explanatory under some conditions of the free of charge and risk ("pure") interest (ε), as a function linking interest receipts and payments according to next equation (2):

$$\varepsilon = \frac{2 \cdot IR \cdot IP}{IR + IP} \tag{2}$$

This expression is employed in Peña (2021) as a proportion of total interest as it is with the modified Quoted Spread, in order to improve comparability, so both expressions are:

$$\delta = \frac{2 \cdot IR \cdot IP}{\left(IR + IP\right)^2}, \rho = \frac{IR - IP}{IR + IP} \tag{3}$$

The second equation of expression (3) is employed by Peña (2020) applying a non-relative value—i.e. multiplied by total interests—and concerning commercial—instead of financial—payments and receipts for algorithmic trading with financial

services due to the similarities of trade and finance with respect to these ratios (Lopez-Laborda and Peña, 2022). The second equation of the same expression, but applied to commercial variables—exports and imports—will be also used in this paper but in relative value as in (3). The first equation is also used in the empirical section, but in this case with financial variables.

2.2. Theoretical expectations

There are two main impacts of the size of financial services on leisure time. The first one is complementary to leisure, since leisure time is employed to seek information and transport for the financial services. The second one is neutral to leisure since only the mere pass of the physical fourth dimension, time—for both labor and leisure hours—, produces banking interests. If both effects are true, and mainly when the first one is predominant, then levying financial services could be an alternative to the taxation of leisure. Thus, if financial services are taxed, then we would be discouraging leisure time. An efficient uniform commodity tax could be found that levies labor, but it also levies leisure time thanks to financial services, being non-distortionary for the leisure/labor relationship. First, it is worth to highlight that interest income of financial services have incorporated two main sources: a part that is financial consumption—considered as complementary to leisure and has to be taxed as any other general goods or services—, but additionally, there is a capital benefit part—which, in this case, should be levied only as a good neutral to leisure.

3. A Reduced Model of General Equilibrium

A general equilibrium model is developed in this section for theoretically checking the complementarities between financial services and leisure. Only two agents are considered: consumers and banks. Consumers maximize their utility, which depends on leisure time and financial services amount, subject to the labor income that is fully spent in buying financial services—deposits and loans. Thereby, the optimization program for the consumer is:

$$\begin{aligned} &\underset{o,f}{Max}\ U = o^{\beta} f^{1-\beta} \\ &s.t.: w(1-o) = (r-R) f \end{aligned} \tag{4}$$

where $0 < \alpha, \beta < 1$ are parameters, U is the utility, o is the leisure time in unitary hours and f the quantity of financial services. The optimization program of the bank consists on maximizing the profits, which are equal to the income minus expenses—i.e. the loans income minus the deposit income and wages. This is subject to the production function of financial services—which is a function of labor:

$$\begin{aligned} &\underset{1-o,f}{Max}\ \Pi = (r-R)f - w(1-o) \\ &s.t.: (1-o)^{\alpha} = f \end{aligned} \tag{5}$$

where w is the labor wage and r and R are, respectively, the loan and deposit interest rates. The first order conditions for the consumer are:

$$\begin{aligned} &Max\ L_C = o^{\beta} f^{1-\beta} + \lambda_C \left(w(1-o) - (r-R)f \right) \\ &\frac{\partial L_C}{\partial o} = \beta o^{\beta-1} f^{1-\beta} - \lambda_C w = 0 \Rightarrow \lambda_C = \frac{\beta o^{\beta-1} f^{1-\beta}}{w} \\ &\frac{\partial L_C}{\partial f} = (1-\beta) o^{\beta} f^{-\beta} - \lambda_C (r-R) = 0 \Rightarrow \lambda_C = \frac{(1-\beta) o^{\beta} f^{-\beta}}{(r-R)} \end{aligned}, \tag{6}$$

with the previous conditions being given from the maximization of the Lagrangian function corresponding to the program of expression (4). Therefore, the condition of equilibrium for the consumer is:

$$w = \frac{\beta (r-R) f}{(1-\beta) o} \tag{7}$$

where the labor wage is positively related with the financial margin and amount but negatively associated with the leisure hours. The first order conditions for the banks are:

$$\begin{aligned} &Max\ L_B = (r-R)f - w(1-o) + \lambda_B \left(f - (1-o)^{\alpha} \right) \\ &\frac{\partial L_B}{\partial (1-o)} = -w + \lambda_B \alpha (1-o)^{\alpha-1} = 0 \Rightarrow \lambda_B = \frac{w}{\alpha (1-o)^{\alpha-1}}, \\ &\frac{\partial L_B}{\partial f} = (r-R) - \lambda_B = 0 \Rightarrow \lambda_B = r - R \end{aligned} \tag{8}$$

Which are obtained by maximizing the Lagrangian function associated to the program of the banks that appears in expression (6). Then, after solving for the labor wages, the condition of equilibrium for the financial entity is:

$$w = \alpha (r-R)(1-o)^{\alpha-1}. \tag{9}$$

Clearing the markets with the wages from equations (7) and (9), it leads to the following expression that is equal to the function of production of financial services:

$$f = \frac{(1-\beta) o (1-o)^{\alpha-1} \alpha}{\beta} \overset{(5)}{\rightarrow} \frac{1-o}{o} = \frac{(1-\beta)\alpha}{\beta} \tag{10}$$

The reason for deriving the second equation of expression (10) is that in the bank's maximization program of (5) we find the specification for the production of financial services. This specification leads to the second equation of the previous expression by substituting it therein and solving the ratio of leisure and working unitary hours with respect to the parameters. The result provides an initial perspective of the relationship between working/leisure hours and the preferences regarding leisure or financial services by the consumers and the scaling parameter of labor in the function of production of the banks. For observing the first relationship between financial services and leisure of expression (10) in a more rigorous way, the next derivative is performed applied to the first equation:

$$\frac{\partial f}{\partial o}=\frac{(1-\beta)(1-o)^{\alpha-1}\alpha}{\beta}-\frac{(1-\beta)o(1-o)^{\alpha-2}\alpha(\alpha-1)}{\beta}>0\cdot \tag{11}$$

Which is always positive because $0<\alpha<1\Rightarrow\alpha-1<0$. As the derivative is positive, this means that the relationship between leisure and finance is positive, hence higher leisure time would also lead to higher amount of financial services and *viceversa*, theoretically confirming the complementarity between leisure and finance. Furthermore, if a commodity tax is applied to the financial services, we have that:

$$(1+\tau)f=F(o)\xrightarrow{\frac{\partial o}{\partial f}>0}\frac{\partial o}{\partial \tau}=\frac{\partial o}{\partial f}\cdot\frac{\partial f}{\partial \tau}=\frac{\partial o}{\partial f}\cdot\left(\frac{-F(o)}{(1+\tau)^2}\right)<0\cdot \tag{12}$$

Therefore, the taxation of financial services would also reduce the leisure time, not only the amount of financial services, emphasizing the complementarity of both alternatives for the consumer and highlighting the proportional indirect taxes as potential deterrent effect for both leisure and finance.

4. Empirical Strategy and Data

The empirical exercise is performed in the following sections to check whether and what theoretical—descriptive and analytical—expectations are confirmed. The econometric methodology is a simple OLS regression because it is used a cross-sectional sample of 30 OECD countries for the last year available, literally "the latest year", which is the latest available year in the data of time-use of the OECD. The dependent variables are those regarding the time employed on labor and leisure: the variable leisure is, according to the OECD source, "time spent socialising; attending cultural, entertainment and sports events; in hobbies, games and other pastime activities; participating in sports and outdoor activities; using mass media; performing other leisure activities". The variable *totalleisure* includes leisure time but also unpaid work, personal care and also

other leisure time as going to the religious services. The variable *woleisure* is the leisure time for women and *menleisure* the same but for men. The "time spent in paid work or learning activities includes: paid work (all jobs); job search; attendance of classes at all levels of instruction (pre-primary, primary, secondary, technical and vocational, higher education, extra or make up classes); research/homework; travel to and from work/study; other paid work or study-related activities" is the variable *paidwork*. For the explanatory variables some fiscal, commercial and financial variables have been included. Concretely, the variable *ftaxrate* is the tax rate applied to indirect taxation of financial services, *fvat* is the binary dummy that takes the value "1" if the exemption of financial services on VAT has been eliminated or "0" otherwise. The variable *septax* is also a dummy variable and takes the value "1" if there is an indirect taxation of financial services by taxes different than VAT and "0" in another case. These three variables are taken from López-Laborda and Peña's (2022) database. A variable collecting the size of the financial sector over the economy is collected by *fssize*, which is the credit supply as percentage of GDP, taken from the World Bank database. The variable *rhoc* uses an adaptation of the second equation of expression (3) where exports are *IR* and imports *IP*, from the World Bank database, whilst the *delta* variable employs the first equation of the same expression but with the financial interest incomes and expenses as, respectively, *IR* and *IP*—so, with no adaptations to trade—from the OECD database.

To summarize, the data employed for this exercise is the OECD database for the dependent variables regarding leisure and work hours and the World Bank, OECD and López-Laborda and Peña's (2022) databases. The data sample is summarized in Table 1 and the main descriptive statistics are provided in Table 2.

Table 1: Countries of the Sample

30 OECD countries, latest year available				
Australia	Finland	Italy	Mexico	Slovenia
Austria	France	Japan	Netherlands	Spain
Belgium	Germany	Korea	New Zealand	Sweden
Canada	Greece	Latvia	Norway	Turkey
Denmark	Hungary	Lithuania	Poland	United Kingdom
Estonia	Ireland	Luxembourg	Portugal	United States

The empirical strategy consists on assessing the impact of the explanatory variables on the dependent ones as follows. First, the individual impacts of each explanatory variable on each dependent variable (*leisure*, *totalleisure*, *woleisure* and *menleisure*) are performed. For the variable *paidwork* the analysis is only performed with the main key

Table 2: Main Descriptive Statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
leisure	30	295.9663	37.34203	171.9274	368.2433
totalleisure		1174.032	45.09986	1077.455	1263.291
woleisure		274.8649	38.90846	159.1109	365.8482
menleisure		318.2754	37.77041	186.6022	375.3903
paidwork		266.9597	45.27739	176.7091	362.6546
ftaxrate		0.0585667	0.0906276	0	0.25
fvat		0.3	0.4660916	0	1
septax		0.1	0.3051286	0	1
fssize	29	95.69212	46.80773	33.4699	190.756
rhoc	30	-0.0219739	0.1054383	-0.245008	0.254591
delta	22	0.4751846	0.0294855	0.379849	0.4984608

variable of interest, *delta*. Next, there is a multivariate explanation of the dependent variables by estimating OLS regressions with and without constant.

5. Empirical Results and Discussion

This section provides the results of the regressions obtained by applying the previous methodology and discusses their implications. The main results are provided in Table 3, and are more in detail in the Tables A.1-4 of the Appendix.

Table 3: Main Empirical Results

Dependent variable:	*Model VIIa* *leisure*	*Model VIIb* *totalleisure*	*Model VIIc* *woleisure*	*Model VIId* *menleisure*
ftaxrate	148.068	149.091	154.035	152.629
p-value	0.264	0.428	0.185	0.321
fvat	**-46.533***	-44.572	**-41.702***	-51.684
p-value	0.099	0.258	0.089	0.114
septax	-42.837	-1.035	**-51.638****	-34.341
p-value	0.125	0.978	0.040	0.281
fssize	**0.358***	-0.092	**0.533*****	0.179
p-value	0.074	0.734	0.005	0.421
rhoc	135.426	-74.404	**183.068****	87.054
p-value	0.141	0.560	0.029	0.404
delta	686.679**	841.797**	686.631**	671.701*
p-value	0.024	0.048	0.011	0.052
Constant	-49.854	791.127	-88.594	-3.465
p-value	0.713	0.001	0.455	0.982
R squared	0.500	0.327	0.629	0.381
Adj. R Sq.	0.285	0.038	0.470	0.116

Note: significance below 1% (***), 1-5% (**), 5-10%(*) and in **bold**.

In Tables A.1-4 the results for the univariate OLS model and the multivariate ones with and without constant are provided for the following dependent variables: *leisure*, *totalleisure*, *woleisure* and *menleisure*, respectively for each table. There are eight models in each table, from I to VI the univariates estimated respect to each explanatory variable, models VII use multivariate models with constant and models VIII show models without it. Models from Tables A.1 to A.4 are denoted with the final letter *a-d*. The main results are shown in Table 3, which correspond with the models *VIIa-VIId*.

The results of the models shown in the Appendix are mainly robust with and without constant when they are multivariate, but in the univariate models—all of them with constant—, there is only a very strongly robust explanatory variable: *delta*, which is positively related with high statistical and economic significance in all the models. Additionally, there is another explanatory variable that is also statistical and economic significative at least once in the univariate models: it is *fssize*, in the IVc model of Table 6 when *woleisure* is the dependent variable. This suggests that leisure is positively associated with the size of the financial sector, not only with the used alternative of financial indicator, which is a robustness of the positive relationship between leisure and finance. Furthermore, the coefficient in the univariate OLS estimation of delta impacting *paidwork* with constant reaches -886.9 and a p-value of 0.009 and an adjusted R^2 of 0.2598. This means that, at the same time finance could be considered a complement of leisure, it may also be interpreted as a substitute of labor. This relationship is also kept for both men and women, but overall for men, where the adjusted R2 is 0.2783, almost three times higher than with women, and the significance reaches 0.007, while it is of 0.076 for women.

The most interesting results are provided in Table 3, where there is again a strongly robust association between *delta* and the dependent variables, in addition to a robust significant effect of the size of the financial sector, taking into account the univariate models. Furthemore, the presence of financial VAT (*fvat*) is significatively related with leisure in general, but concretely for women in particular. In fact, women, rather than men, present a higher sensibility of taxes, finance and commerce on leisure, with two additional statistical significant relationships: the presence of indirect financial taxes separated from VAT, *septax*, and the indicator of trading, *rhoc*, with negative and positive impacts, respectively. When total leisure time is considered or if only men are taken into account, only delta maintains with statistical significance.

So, the theoretical discussion of Section 3 is confirmed according to Section 4, finance may be considered a complement of leisure. Therefore, it is true that, when a financial service is bought, a trip in non-working hours has to be made, in addition to the seeking and understanding costs which are performed in part of the leisure time.

Taxing financial sector by eliminating the exemption of financial services under VAT, for instance, may induce to a reduction on leisure time.

These results are in line with Hek (2006), who also considers that taxation of capital income can increase the total non-leisure time, and as this paper finds, it may be more pronounced on women. The reason for why women may be more sensitive to finance in their leisure-work time allocation may be because women have traditionally been those who, in general, have mainly stopped to work in a couple if the circumstances encouraged it. So, in this case, if in a couple there is a new source of capital income, the first that traditionally would consider to leave the job would be the women. Other authors, as previously pointed, also highlight differences between men and women regarding leisure, as Mocan (2019) who obtains that leisure culture only influences on women, not on men.

Regarding the price of leisure, finance may be considered a complement of leisure as well as the preferences of time, the pure interest, may be considered also a price of leisure. First, the relationship between the impact of income on the indicator of pure interest employed in the estimation, the pure interest as a proportion of total interest, is as follows, knowing that $\delta = \varepsilon / Y$:

$$\frac{\partial \delta}{\partial Y} = \frac{-\varepsilon}{Y^2} < 0 \Rightarrow \frac{\partial \delta / \partial Y}{\varepsilon} = \frac{-1}{Y^2} < 0 \tag{13}$$

which is negatively related, because there is a negative sign before a fraction of positive elements, considering traditional non-negative interests and $Y = IR + IP$. So, time preferences are the price of money and finance but can also be the price of leisure time. This can lead to potential further research for estimating the remuneration of unpaid work and other kinds of subsidies.

6. Concluding Remarks, Policy Implications and Further Research

Up to the author's knowledge, the present paper is the first one that both theoretically and empirically analyzes financial services as complementary of spare and leisure time, helping to solve labor-leisure interferences with public policies based on taxes. The empirical section provides evidence that confirms the sensibility of leisure time to financial variables as the size of the financial sector or the proposed indicator of financial performance. In addition, this sensibility is even higher in women, where there is also a sensibility to the presence of indirect taxes on financial services and commercial variables. The elimination of the exemption of financial services on VAT and the presence of indirect taxes different form VAT on these services discourages the leisure hours spent by women in a statistical significant way. Further research includes to disaggregate the leisure by ways of spending it (e.g. sport, events, friends, etc.).

Concerning the policy implications of this paper, it is worth to take into account that, as well as taxation applied to financial services could also discourage leisure time, and even fomenting a higher amount of working hours, other fiscal and monetary policies may have similar effects. For instance, regulatory policies or raising interest rates could also have a close impact. Another way for seeing the effects is to take into account the opposite direction of the causality. In the environmental field, there is a deterrent effect of central environmental protection supervision and inspection on the financial returns (Wei and Zhao, 2024), maybe the labor inspection can also have detrimental effects on leisure, and so, on finance. A further research would include to consider a larger dataset, a panel or pool data with possibility of checking the Granger-causality between finance and leisure.

APPENDIX: Additional empirical results

Table A.1. Results for *leisure* as dependent variable.

Dependent variable:	*Model Ia*	*Model IIa*	*Model IIIa*	*Model IVa*	***Model Va***	***Model VIa***	***Model VIIa***	***Model VIIIa***
leisure	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
ftaxrate	-17.73						148.068	150.536
p-value	0.821						0.264	0.241
fvat		-15.604					**-46.533**	**-45.882**
p-value		0.302					0.099	0.092
septax			8.320				-42.837	-42.101
p-value			0.721				0.125	0.118
fssize				0.179			**0.358**	**0.335**
p-value				0.248			0.074	0.067
rhoc					70.702		135.426	139.386
p-value					0.290		0.141	0.116
delta						**556.476**	**686.679**	**586.111**
p-value						0.047	0.024	0.000
Constant	**297.01**	**300.65**	**295.134**	**279.417**	**297.520**	36.829	-49.854	
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.713	
R squared	0.002	0.038	0.005	0.049	0.040	0.183	0.500	0.992
Adj. R Sq.	-0.034	0.004	-0.031	0.014	0.006	0.142	0.285	0.989

Table A.2: Results for *totalleisure* as dependent variable.

Dependent variable:	*Model Ib*	*Model IIb*	*Model IIIb*	*Model IVb*	*Model Vb*	*Model VIb*	*Model VIIb*	*Model VIIIb*
totalleisure	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
ftaxrate	41.352						149.091	109.939
p-value	0.662						0.428	0.682
fvat		-4.453					-44.572	-54.907
p-value		0.809					0.258	0.329
septax			19.231				-1.035	-12.708
p-value			0.493				0.978	0.818
fssize				-0.024			-0.092	0.276
p-value				0.897			0.734	0.457
rhoc					34.519		-74.404	-137.236
p-value					0.672		0.560	0.454
delta						**788.514**	**841.797**	**2437.703**
p-value						0.022	0.048	0.000
Constant	**1171.6**	**1175.4**	**1172.109**	**1177.683**	**1174.79**	800.456	791.127	
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
R squared	0.007	0.002	0.017	0.001	0.007	0.236	0.327	0.998
Adj. R Sq.	-0.029	-0.034	-0.018	-0.036	-0.029	0.198	0.038	0.997

Table A.3: Results for *woleisure* as dependent variable.

Dependent variable:	*Model Ic*	*Model IIc*	*Model IIIc*	*Model IVc*	*Model Vc*	*Model VIc*	*Model VIIc*	*Model VIIIc*
woleisure	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
ftaxrate	-13.294						154.035	158.419
p-value	0.871						0.185	0.166
fvat		-12.868					**-41.702**	**-40.544**
p-value		0.416					0.089	0.092
septax			7.375				-51.638	-50.331
p-value			0.761				0.040	0.040
fssize				**0.282**			**0.533**	**0.491**
p-value				0.076			0.005	0.005
rhoc					94.604		**183.068**	**190.104**
p-value					0.171		0.029	0.021
delta						**530.876**	**686.631**	**507.914**
p-value						0.062	0.011	0.000
Constant	**275.644**	**278.725**	**274.127**	**248.403**	**276.944**	29.102	-88.594	
p-value	0.000	0.000	0.000	0.000	0.000	0.822	0.455	
R squared	0.001	0.024	0.003	0.112	0.066	0.164	0.629	0.993
Adj. R Sq.	-0.035	-0.011	-0.032	0.079	0.032	0.122	0.470	0.990

Table A.4. Results for *menleisure* as dependent variable.

Dependent variable:	*Model Id*	*Model IId*	*Model IIId*	*Model IVd*	*Model Vd*	*Model VId*	*Model VIId*	*Model VIIId*
menleisure	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
ftaxrate	-15.321						152.629	152.800
p-value	0.847						0.321	0.302
fvat		-17.252					-51.684	-51.638
p-value		0.259					0.114	0.101
septax			8.615				-34.341	-34.290
p-value			0.715				0.281	0.263
fssize				0.067			0.179	0.177
p-value				0.673			0.421	0.381
rhoc					43.086		87.054	87.329
p-value					0.527		0.404	0.382
delta						**577.021**	**671.701**	**664.711**
p-value						0.050	0.052	0.000
Constant	**319.173**	**323.451**	**317.414**	**312.579**	**319.222**	47.554	-3.465	
p-value	0.000	0.000	0.000	0.000	0.000	0.722	0.982	
R squared	0.001	0.045	0.005	0.007	0.015	0.179	0.381	0.991
Adj. R Sq.	-0.034	0.011	-0.031	-0.030	-0.021	0.138	0.116	0.987

References

Hek, P.A. (2006), "On taxation in a two-sector endogenous growth model with endogenous labor supply", *Journal of Economic Dynamics and Control*, Vol. 30 No. 4, pp.655-685.

López-Laborda, J., and Peña, G. (2016), "Is Financial VAT Neutral to Financial Sector Size?" Economics Discussion Papers, No 2016-31, pp.1-27, Kiel Institute for the World Economy. (ISSN 1867-8009).

López-Laborda, J. and Peña, G. (2017), "Does financial VAT affect the size of the financial sector?" Economics: The Open-Access, Open-Assessment E-Journal, Vol.11 No.7, pp.1-28. http://dx.doi.org/10.5018/economics-ejournal.ja.2017-7 (ISSN: 1864-6042).

López-Laborda, J. and Peña, G. (2018), "A New Method for Applying VAT to Financial Services". *National Tax Journal*, Vol. 71 No. 1, pp.155-182.

López-Laborda, J., and Peña, G. (2022), "Financial VAT may improve trade openness", *Applied Economics*, Vol. 54 No. 19, pp.2148-2160.

Mocan, N. (2019), "Taxes and culture of leisure: Impact on labor supply in Europe" *Journal of Comparative Economics*, Vol. 47 No.3, pp.618-639.

Peña, G. (2020), "A new trading algorithm with financial applications", *Quantitative Finance and Economics*, Vol. 4 No. 4, pp.596-607.

Peña, G. (2021), "Role of quoted spreads in financial services", *Economics and Business Letters*, Vol. 10 No. 3, pp.208-216.

Wei, X., & Zhao, C. (2024). The deterrent effect of central environmental protection inspection: evidence from Chinese listed companies. China Finance Review International, 14(1), 122-145.