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The Individual Laffer Curve: Evidence from the Spanish Income Tax

Ana Gamarra Rondinel, José Félix Sanz-Sanz, and María Arrazola

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Outline:

1. Introduction
2. The Laffer Curve updated
3. A key ingredient: the Elasticity of Taxable Income
4. An illustrative case study: the Spanish PIT
5. Conclusion

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1. Introduction

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Biden's $6.8 Trillion Budget Proposes New Social Programs and Higher Taxes

The president requested trillions in new spending that has no chance of passing a Republican House, even as he sought to reduce deficits by raising taxes on businesses and the rich.

Give this article

President Biden's budget contains some $5 trillion in proposed tax increases on high earners and corporations over a decade, much of which would offset new spending programs aimed at the middle class and the poor. Doug Mills/The New York Times

Source: The New York Times, March 9 (2023)

Corporation tax: Jeremy Hunt confirms rise to 25% from April

15 March

Budget 2023

By Sean Seddon

BBC News

The rate of corporation tax, paid on company profits, will rise next month, the chancellor has confirmed.

It will go up from 19% to 25% for companies with over £250,000 in profits, Jeremy Hunt told the Commons.

Source: BBC, March 15 (2023)

Stage-three tax cuts cost blowout predicted, with men and the wealthy to benefit most

Adam Bandt decries 'massive black hole' after Parliamentary Budget Office analysis puts cost at $313bn over a decade

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The stage-three tax cuts were not addressed in the federal budget and the Albanese government insists it has no plans to revisit them. Photograph: Mike Bowers/The Guardian

Source: The Guardian, May 16 (2023)

The Laffer Curve

- A rigorous tool to monitor revenue maximization
- Arthur Laffer (1970s)
- The inverted U-form of the curve reflects the potential inverse relationship between tax rates and revenue
- A microeconomic–oriented analysis of the Laffer Curve: each taxpayer faces his/her own curve (Sanz-Sanz 2016, 2022; Creedy and Gemmell 2013, 2014, 2015)

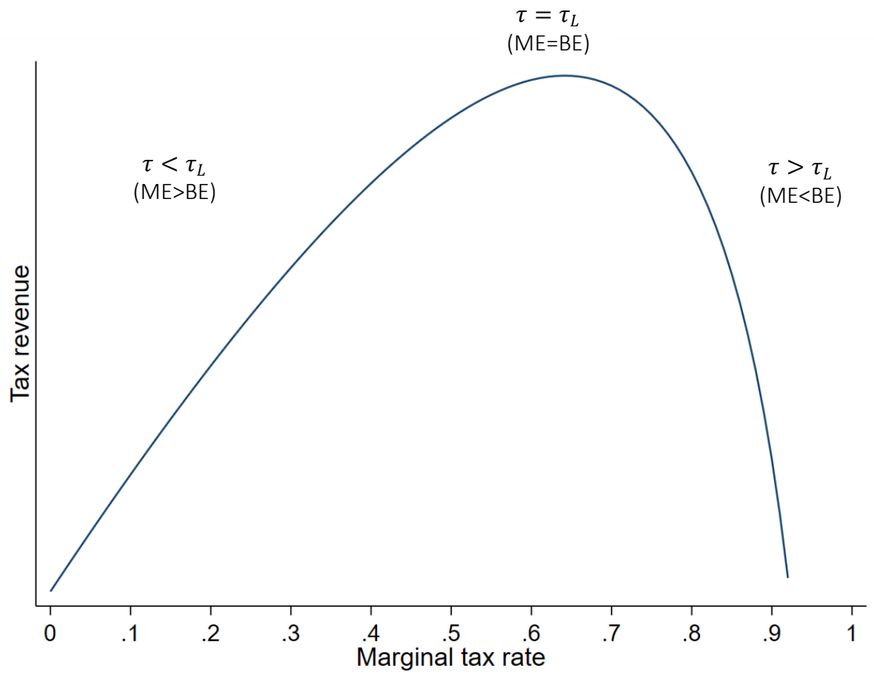

Fig. 1. Laffer Curve

This paper

1. Characterization of the individual Laffer Curve
    - Derive analytical expressions for the revenue-maximizing tax rate and the revenue-maximizing elasticity*
    - Setting: A schedular multi-rate income tax with income shifting
    - Characterization of the aggregate Laffer Curve*

2. Application to the Spanish PIT
    - Calculate the total revenue impact of the 2012 tax reform, the RMT of each taxpayer, and its location on the Laffer curve.
    - Estimate the ETI

Main findings

- ETI estimates = 0.546 - 0.823. These estimates are especially high for women and individual tax filers.
- 49.46% of the taxpaying population was on the “decreasing" side of the Laffer curve.
- On average, taxpayers were 6.59 points above the maximum of the Laffer curve.
- The 2012 tax reform resulted in a revenue loss for half of the taxpaying population.
- The fraction of total tax revenue lost through behavioural responses amounts to 53.77%.
- These results vary by population subgroup and when we account for income-shifting responses.

2. The Laffer Curve updated

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Relevant factors to consider in the characterization of the *individual* Laffer curve:

- The stepwise schedule of the income tax
- The implications of behavioural responses to taxation on the Laffer Curve, e.g., IS.

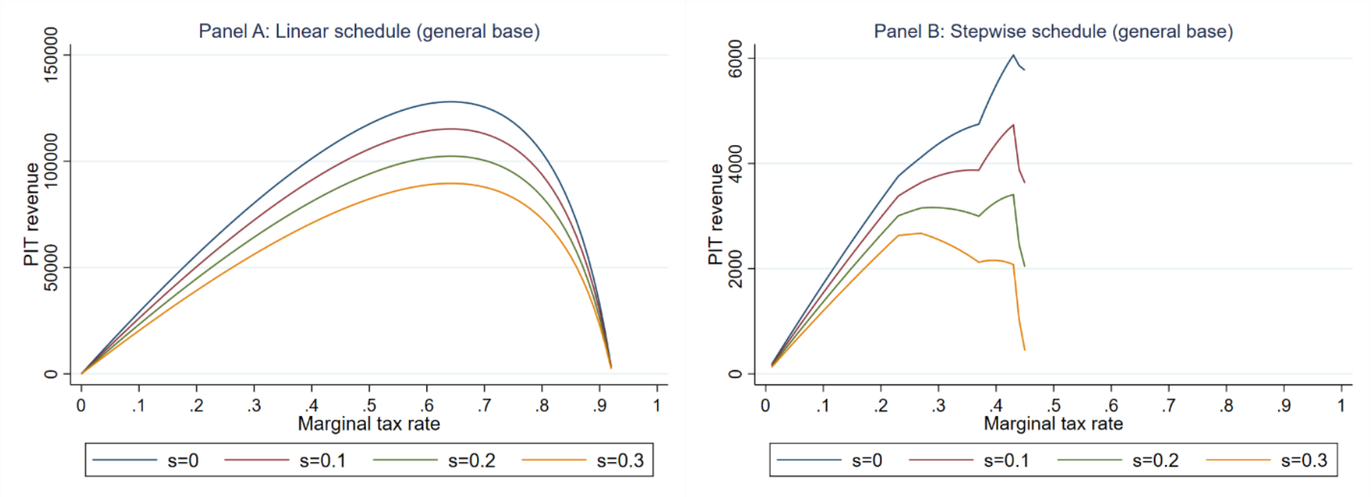

Fig. 2. Simulated Laffer Curves, linear schedule vs stepwise schedule

Characterization of the *individual* Laffer curve

The tax bill of an individual taxpayer i is: $R_i = \sum_{b=1}^{B} T_i^b - \sum_{b=1}^{B} \theta_i^b$ (1)

Where, T_i^b = tax due, θ_i^b = tax savings, b = tax base.

Following Creedy and Gemmell (2006), we express T_i^b and θ_i^b as follows:

$$T_i^b = \tau_k^b \cdot \left[\left(y_i^b - s \cdot y_i^b\right) - \hat{a}_k^b\right] \quad (2)$$

$$\theta_i^b = \min\left\{\tau_k^b \cdot \left(m_i^b - \hat{a}_k^b\right), T_i^b\right\} \quad (3)$$

Where, τ_k^b = MTR, y_i^b = taxable income, $\hat{a}_k^b$ = effective threshold, m_i^b = family allowances, $s = 0, 0.1, 0.2, 0.3$ (intra-IS).

Using Eq. (1), a tax rate modification will induce a change in the tax bill of the individual taxpayer as follows:

$$\underbrace{\frac{dR_i}{d\tau_h^b}}_{\text{Total Revenue Effect}} = \underbrace{\left(\frac{\partial T_i^b}{\partial \tau_h^b} - \frac{\partial \theta_i^b}{\partial \tau_h^b}\right)}_{\text{Mechanical Effect } (\boldsymbol{ME_i^b})} + \underbrace{\left(\frac{\partial T_i^b}{\partial y_i^b} \cdot \frac{\partial y_i^b}{\partial \tau_h^b}\right)}_{\text{Behavioural Effect } (\boldsymbol{BE_i^b})} \tag{4}$$

From $dR_i/d\tau_h^b = 0$ (see, Fig.1), we obtain the following expression for the revenue-maximizing tax rate (RMT):

$$\tau_i^{b^*} = \frac{1}{1 + \left(\frac{e_k^b \cdot y_i^b \cdot (1-s)}{ME_i^b}\right)} \tag{5}$$

Revenue-maximizing elasticity (RME)

Characterization of the aggregate Laffer curve

3. A key ingredient: the Elasticity of Taxable Income

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- Data: Balanced panel (2007-2016) from the Spanish IFS
- Sample selection:
    1. Exclude individuals under 16 and above 65 years old
    2. Exclude taxpayers with a negative taxable income
    3. Final sample: 1,729,522 observations (on average, 288,000 individual-year)
- IV method:
    1. Endogeneity of the marginal tax rate
    2. Mean reversion and heterogeneous income trends

$$\Delta \log y_{i,t}^{b} = \beta_0 + \beta_1 \Delta \log\left(1 - \tau_{k_{i,t}}^{b}\right) + \beta_2 f\left(y_{i,t}^{b}\right) + \beta_3 X'_{it} + u_{it} \qquad (6)$$

- Tax reforms: 2007-2016 (2012*)

Bracket	Tax rate	Bracket	Tax rate	Bracket	Tax rate	Bracket	Tax rate
Panel A: General tax base							
2007-2010		2011		2012-2014		2015-2016	
€ 0	0.24	€ 0	0.24	€ 0	0.25	€ 0	0.19
€ 17,707	0.28	€ 17,707	0.28	€ 17,707	0.30	€ 12,450	0.24
€ 33,007	0.37	€ 33,007	0.37	€ 33,007	0.40	€ 20,200	0.3
€ 53,407	0.43	€ 53,407	0.43	€ 53,407	0.47	€ 35,200	0.37
		€ 120,000	0.44	€ 120,000	0.49	€ 60,000	0.45
		€ 175,000	0.45	€ 175,000	0.51		
				€ 300,000	0.52		
Panel B: Savings tax base							
2007-2009		2010-2011		2012-2014		2015-2016	
€ 0	0.18	€ 0	0.19	€ 0	0.21	€ 0	0.19
		€ 6,000	0.21	€ 6,000	0.25	€ 6,000	0.21
				€ 24,000	0.27	€ 50,000	0.23

ETI estimates

	All population	Men	Women	Married	Single	Separate	Joint
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: General base							
Δ(1-t)	0.546***	0.539***	0.773***	0.459***	0.757***	0.952***	0.571***
	(0.103)	(0.092)	(0.053)	(0.078)	(0.056)	(0.033)	(0.164)
N	1,132,819	747,123	385,696	780,865	351,954	878,253	254,566
Panel B: Savings base							
Δ(1-t)	0.823***	0.759**	0.848*	1.313***	0.753	1.312***	0.176
	(0.288)	(0.347)	(0.480)	(0.329)	(0.949)	(0.317)	(0.692)
N	596,703	388,871	207,832	425,228	171,475	471,602	125,101
Partial R^2							
General base	0.0140	0.021	0.146	0.023	0.132	0.126	0.023
Savings	0.293	0.288	0.304	0.289	0.200	0.305	0.249
F on excluded instruments							
General base	5838	8027	14644	11340	29458	70115	2623
Savings	76004	53122	22672	56642	5647	64605	12452

Note: In the general base, we apply a 5-piece cubic spline of the lagged values of the dependent variable, a base-year income control and demographic controls. In the savings base, we apply no lags in the instrument and a 5-piece spline of base year-income. All specifications include regional and year-fixed effects, and two-year differences (j =2). Standard errors clustered by the taxpayer are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4. An illustrative case study: the Spanish PIT

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1. Evaluation of the impact on revenue of the tax reform

Tax bracket	Mechanical Effect (ME) (1)	(2)	Behavioural Effect (BE) (1)	(2)	Net Effect (1)	(2)	BE/ME (3)
Panel A: Income shifting (0%)							
General tax base							
1	€ 875,870,814	20.22	€ 122,817,062	4.77	€ 753,053,752	42.92	14.02
2	€ 1,427,642,512	32.97	€ 517,608,396	20.09	€ 910,034,116	51.87	36.26
3	€ 838,994,060	19.37	€ 689,615,162	26.77	€ 149,378,898	8.51	82.20
4	€ 706,734,557	16.32	€ 785,318,173	30.48	-€ 78,583,616	-4.48	111.12
5	€ 146,130,540	3.37	€ 153,261,001	5.95	-€ 7,130,462	-0.41	104.88
6	€ 335,403,893	7.74	€ 307,585,516	11.94	€ 27,818,377	1.59	91.71
All brackets	€ 4,330,776,375		€ 2,576,205,310		€ 1,754,571,065		59.49
Savings tax base							
1	€ 211,228,379	24.07	€ 34,828,770	15.54	€ 176,399,609	26.99	16.49
2	€ 666,313,963	75.93	€ 189,229,805	84.46	€ 477,084,158	73.01	28.40
All brackets	€ 877,542,341		€ 224,058,575		€ 653,483,766		25.53
Total taxable income	€ 5,208,318,716		€ 2,800,263,885		€ 2,408,054,831		53.77

Note: Column (1) reports the absolute revenue gain (in euros) derived from each tax bracket, column (2) reports the percentage of revenue gain as a proportion of the revenue gain in the whole population and column (3) reports the fraction of tax revenue lost through behavioural responses. A positive behavioural effect indicates a decrease in tax revenue.

Heterogeneity and Income shifting

- Men (1.650 billion euros), joint tax filers (457 million euros), and married couples (1.813 billion euros) provide more tax revenue than women (468 million euros), separate tax filers (336 million euros) and single taxpayers (557 million euros).

  The fraction of total net revenue lost due to behavioural responses is higher for women (71.65%), separate tax filers (91.97%), and single taxpayers (66.21%), than for men (53.58%), joint tax filers (54.92%) and married taxpayers (49.03%).

- Total tax revenue: 2.408 billion euros (s = 0), 2.689 billion euros (s = 0.1), 2.708 billion euros (s = 0.2), and 2.846 billion euros (s = 0.3).

  BE: 2.576 billion euros (s = 0), 2.082 billion euros (s = 0.1), 1.649 billion euros (s = 0.2) and 1.271 billion euros (s = 0.3)

Results

2. Revenue–maximizing tax rates

Tax bracket	$\bar{\tau}$	$\bar{\tau}_L$	$\bar{\tau} - \bar{\tau}_L$
Panel A: General tax base			
1	0.24	0.35	-11.16
2	0.28	0.31	-2.91
3	0.37	0.23	14.38
4	0.43	0.29	14.05
5	0.44	0.20	23.79
6	0.45	0.42	3.05
All brackets	0.37	0.30	6.59
Panel B: Savings tax base			
1	0.19	0.41	-22.23
2	0.21	0.46	-25.19
All brackets	0.20	0.45	-24.73

Note: Column (2) reports the mean value of the actual marginal tax rates, column (3) reports the mean value of the RMTs, and column (4) reports their difference.

Heterogeneity

3. Distribution of the RMTs within the Laffer Curve

Tax bracket	Tax returns (%)		Taxable income (%)		Tax due (%)	
	(1)	(2)	(1)	(2)	(1)	(2)
Panel A: ME<BE						
General tax base						
1	44.31	27.07	26.82	7.18	9.93	1.21
2	41.88	10.84	34.58	11.88	29.70	9.08
3	89.46	8.22	86.64	17.50	84.93	20.48
4	86.17	2.95	80.12	10.76	77.36	16.69
5	100.00	0.26	100.00	2.01	100.00	4.05
6	73.31	0.13	47.59	1.54	45.06	3.39
All brackets		49.46		50.88		54.89
Savings tax base						
1	19.56	18.76	23.22	6.83	0.01	0.00
2	27.30	1.12	7.19	5.07	11.97	2.01
All brackets		19.88		11.91		2.01

Note: (1) In the bracket, (2) in the total.

Heterogeneity

5. Conclusion

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1. This paper
    - A microeconomic model of the Laffer curve in the context of a stepwise schedule with IS.
    - ETI estimates = 0.546 - 0.823. These estimates are especially high for women and individual tax filers.
    - 49.46% of the taxpaying population was on the “decreasing" side of the Laffer curve.

2. Implications
    - For policy: Factors to be included in the characterization of the Laffer Curve
        i. The stepwise schedule of the income tax
        ii. The implications of behavioural responses

    - For future research
        i. Robust estimations of the ETI (revenue forecasting)
        ii. How changes in income tax rates affect revenue collection from other taxes/costs? E.g., consumption taxes, SSCs, administrative and compliance costs.

Thank you!

Contact:
ana.gamarrarondinel@unimelb.edu.au
www.anagamarra.com

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