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Job search theory and the *slippery slope* framework: an attempt to integration

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ABSTRACT Recently, attempts have been made to formalize the assumptions of the 'slippery slope' framework about the effects of trust (in) and power (of) tax authorities on tax compliance. In this sense, the proposed theoretical work introduces the basic insights of the 'slippery slope' framework into the benchmark macroeconomic model of the labour market with tax evasion. The key result of this integration is the following: with the right mix of policy tools of deterrence and trust in tax authorities, a reduction in tax evasion may increase labour market tightness and decrease unemployment.

JEL CLASSIFICATION H26, J64, K42
KEYWORDS tax evasion, tax compliance, power and trust, job search theory

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1. Introduction

The 'slippery slope' framework (Kirchler, 2007; Kirchler *et al*., 2008a) was developed to address the puzzling findings in tax compliance decisions.[1] Indeed, traditional economic models of income tax evasion *à la* Allingham and Sandmo's (1972) (for a review see Sandmo, 2005), based above all on monitoring probability and expected penalty, predict far too little compliance and far too much tax evasion (Feld and Frey, 2002). Furthermore, the empirical support for the deterrent effect of audits and fines is weak and unstable (Kirchler *et al*., 2008b). Hence, besides the well-studied instruments of deterrence, the interaction of power (of) and trust (in) tax authorities is necessary to foster and stabilize the voluntary cooperation of honest taxpayers (Kirchler, 2007; Kirchler *et al*., 2008a; Muehlbacher and Kirchler, 2010).

The 'slippery slope' framework distinguishes two forms of tax compliance: voluntary and enforced compliance. Voluntary compliance depends on trust in tax authorities, whereas enforced compliance depends on the power of tax authorities to clamp down on tax evaders. Hence, trust (in) and power (of) tax authorities are the major determinants for each form of compliance. Furthermore, the 'slippery slope' framework stresses the crucial interaction of power and trust (Kirchler *et al*., 2008a; Muehlbacher and Kirchler, 2010). In short, this framework assumes that power has influence on trust and vice versa. More precisely, trust increases and power decreases voluntary compliance, whereas power increases and trust decreases enforced compliance.

Recently attempts have been made to formalize the assumptions from the 'slippery slope' framework about the effects of trust (in) and power (of) tax authorities on tax compliance (Prinz *et al*., 2010). This paper develops an equilibrium model of the labour market with income tax evasion in order to study the relation between tax compliance (both voluntary and enforced) and unemployment. In particular, we find that with the right mix of policy tools of deterrence and trust in tax authorities, a reduction in tax evasion may increase labour market tightness and decrease unemployment.

The effect of trust and power on tax compliance can be shown by simple scatter diagrams concerning 29 European countries, in which shadow economy is used as proxy for tax evasion, government effectiveness as proxy for trust in tax authorities, and rule of law as

[1] Another important strand of tax compliance literature concentrates on tax morale. The concept of tax morale was introduced in the tax compliance literature to explain both the high degree of tax compliance in many countries where the level of deterrence is too low (Torgler, 2007; Slemrod, 2007) and the huge differences in tax compliance between countries or regions despite the same tax and punishment policies, the so-called "Palermo-Milano puzzle" (Rothstein, 2000).

proxy for power of tax authorities (see Figs. 1-2). The correlation in both cases is strong and negative.

========== *Figs. 1-2 about here (now at the end with related data)* =========

The rest of the paper is organised as follows: section 2 presents the matching framework with company income tax evasion; section 3 extends the model to the interaction of voluntary and enforced tax compliance; while section 4 concludes.

2. Model with tax evasion and unemployment

We consider a basic matching framework *à la* Pissarides (2000) with a continuum of homogeneous workers of measure one. The creation of employment occurs in a labour market characterized by trading frictions due to costly and time-consuming matching of workers and firms. As usual (see Pissarides, 2000; Petrongolo and Pissarides, 2001), an aggregate matching function is used to summarize these frictions. Precisely, the number of job matches formed per unit of time is $m = m(u,v)$, where u is the number of unemployed workers and v is the number of vacancies. The matching function is strictly increasing but concave in both arguments and displays constant returns to scale. It follows that the labour market tightness is given by $\theta = v/u$. Hence, $q(\theta) \equiv m\{v,u\}/v = m\{1,\theta^{-1}\}$ and $g(\theta) \equiv m\{v,u\}/u = m\{\theta,1\}$ are the probability of filling a vacancy and of finding a job, respectively.[2] To ensure that unemployment exists in steady state, it is assumed that job destruction occurs at the exogenous rate δ. Therefore, in steady state the matching and job destruction rates allow us to obtain the steady state unemployment rate:

$$\dot{u} = \delta \cdot (1-u) - g(\theta) \cdot u \qquad \Rightarrow \quad u = \delta/(\delta + g(\theta)) \tag{1}$$

which depends positively on the separation rate δ, and negatively on labour market tightness θ. The Bellman equations specified to find infinite horizon steady-state solutions are:

value of a vacancy	$rV = -c + q(\theta) \cdot (J - V)$
value of a filled job	$rJ = y - \tau \cdot (y^D - w) - \rho(\varphi \cdot e + mc(e)) - w - c(e) + \delta \cdot (V - J)$
value of searching for a job	$rU = b + g(\theta) \cdot (W - U)$
value of being employed	$rW = w + \delta \cdot (U - W)$

[2] Standard technical assumptions are assumed, i.e. $\lim_{\theta \to 0} q(\theta) = \lim_{\theta \to \infty} g(\theta) = \infty$, and $\lim_{\theta \to 0} g(\theta) = \lim_{\theta \to \infty} q(\theta) = 0$.

where r is the exogenous discounted rate; c is the vacant job cost; y is the true productivity, while y^D is the declared one; τ is the company (corporate) income tax;[3] $e \equiv y - y^D$ is the evaded income; w is the wage rate (tax-deductible);[4] b is the benefit of being unemployed; ρ is the rate whereby tax authorities detect tax evasion and levy the penalty φ, with $\varphi > \tau$; $c(e)$ is the concealment cost, with $c'(e) > 0$; and $mc(e)$, with $mc'(e) > 0$, is the reputation cost which captures the non-pecuniary cost associated with tax evasion.[5] Intuitively, the higher the evaded income, the greater the penalty, concealment cost and reputation cost.

The optimum amount of income tax evasion is obtained by the value of y^D which maximizes the present value of a filled job, i.e.:

$$\tau = \rho(\varphi + m'(e)) + c'(e) \tag{2}$$

unsurprisingly, at the optimum, the marginal tax saving has to equal the sum of the expected risk of tax evasion and the marginal concealment cost. It follows that there is no tax evasion if the expected risk is greater than or equal to the tax rate, i.e. if $\tau \leq \rho(\varphi + m'(e))$, whereas, on the other hand, with $\tau > \rho(\varphi + m'(e))$ it is always optimal for firms to under-report income. We will concentrate on the non-trivial case where there is tax evasion ($y^D < y$), but it is not optimal for the firm to evade all of the income ($y^D > 0$). This implies that $\tau > \rho(\varphi + m'(e))$ and the concealment cost is convex. These assumptions enable us to obtain an interior solution with positive evaded income.[6]

As usual (see Pissarides, 2000), the equilibrium value of labour market tightness is given by the *free-entry condition* or *zero profit condition* (i.e. $V = 0$):

$$(q(\theta))^{-1} = \frac{y - \tau \cdot y^D - \rho(\varphi \cdot e + m(e)) - w - c(e)}{c \cdot (r + \delta)} \Rightarrow \theta^* \tag{3}$$

[3] We consider only the company income tax evasion. Kolm and Nielsen (2008) develop a matching model in which firm and worker agree together on the amount of labour income to report to the tax authorities.
[4] In fact, if the remuneration of labour is paid out as official wage, then this part can be deducted from the firm's revenue in computing its taxable income.
[5] As in Kim (2003), the reputation cost depends on whether evasion is detected or not.
[6] Note that the optimal level of y^D is independent of labour market tightness.

Hence, an increase in tax evasion (i.e. a reduction in y^D), reduces labour market tightness, i.e. $\frac{\partial \theta}{\partial y^D} > 0$, if $-\tau + \rho(\varphi + m'(e)) + c'(e) > 0$, otherwise it increases θ. Intuitively, if the overall costs of tax evasion are higher than taxes, then to under-report income is not profitable for firms.

Finally, wage is the outcome of a bilateral matching problem described by the *Nash bargaining solution*,

$$w = argmax\left\{(W-U)^{\beta}\cdot(J-V)^{1-\beta}\right\} \Rightarrow (W-U) = \frac{\beta}{(1-\beta)}\cdot(J-V) \tag{4}$$

where $\beta \in (0,1)$ is the bargaining power of workers. Therefore, equations (1) – (4) together define a steady state equilibrium with income tax evasion.

3. Extension to the interaction of voluntary and enforced compliance

The 'slippery slope' framework emphasizes the importance of trust and a fair interaction between tax authorities and their clients, so as to shift from "*a cops-and-robbers climate towards a service–client relationship*" (Muehlbacher and Kirchler, 2010).

In this extension of the basic matching framework developed in the second section, we try to capture the importance of the interaction of power and trust for "overall" tax compliance. Recall that in the basic model 'voluntary tax compliance' is caught by the income declared by firms, y^D; whereas 'enforced tax compliance' is caught by the policy tools of deterrence, ρ and φ (monitoring and penalty).

Following Muehlbacher and Kirchler's (2010) insight, we assume that too frequent tax audits and rigorous penalties may corrode the trust of honest taxpayers in tax authorities, but at the same time, no audits at all may bring up doubts about power of tax authorities and distrust the effectiveness and credibility of tax authorities' work. Formally, we assume that trust in tax authorities (η) is given by:

$$\eta = a\cdot\rho\varphi - b\cdot(\rho\varphi)^2 \tag{5}$$

with $a,b>0$. In short, trust in tax authorities increases with the power of tax authorities until the latter becomes overwhelming. From that point onwards, trust decreases in power (see

figure 3). Therefore, the optimal level of policy tools is given by: $\max_{\rho\varphi} \eta$

$$\Rightarrow \frac{\partial \eta}{\partial \rho\varphi} = 0 \Rightarrow a - 2 \cdot b \cdot \rho\varphi = 0 \Rightarrow \rho\varphi^* = \frac{a}{2 \cdot b}.$$

========== *Figs. 3 about here (now at the end)* =========

Furthermore, we assume that trust in tax authorities increases the size of declared income, since voluntary compliance is based on a trustful relationship towards tax authorities (Muehlbacher and Kirchler, 2010). Hence, let us treat y^D as a function of η:

$$y^D = y^D(\eta) \tag{6}$$

with $\partial y^D / \partial \eta > 0$, $lim_{\eta \to 0} y^D > 0$ and $lim_{\eta \to \eta_{max}} y^D < y$, since there is tax evasion, but it is not optimal to evade all of the income. Hence, the value of y^D which satisfies the maximization condition (2) can be higher or lower according to the share of trust.

If the policy maker sets $\rho\varphi = \rho\varphi^*$, then trust is maximized; vice versa, if $\rho\varphi > \rho\varphi^*$ or $\rho\varphi < \rho\varphi^*$, then trust is below the optimal level and thus the voluntary compliance is low. In particular, if $\rho\varphi > \rho\varphi^*$, then power decreases voluntary compliance (since it decreases η), while the maximization of trust decreases enforced compliance, since $\rho\varphi$ must be reduced. Hence, as claimed by the 'slippery slope' framework, trust increases and power decreases voluntary compliance, while power increases and trust decreases enforced compliance. As a result, with the right mix of policy tools of deterrence and trust in tax authorities, a fair and profitable interaction between tax authorities and taxpayers could be achieved (Muehlbacher and Kirchler, 2010).

Furthermore, if the power of tax authorities which maximizes trust is such that $-\tau + \rho(\varphi + m'(e)) + c'(e) > 0$, then an increase in tax evasion decreases labour market tightness and increases unemployment. Hence, this interesting result could even be used by proponents of intensified controls and punishment. Indeed, Braithwaite (2003) argues for responsive regulation, i.e. to support honest taxpayers but to prosecute persistent tax evaders with the full rigor of the law.

4. Conclusions

Recently, attempts have been made to formalize the assumptions of the 'slippery slope' framework about the effects of trust (in) and power (of) tax authorities on tax compliance. In this sense, the present paper introduces the basic insights of the 'slippery slope' framework into the benchmark macroeconomic model of the labour market with income tax evasion. The key result of this integration is the following: with the right mix of policy tools of deterrence and trust in tax authorities, a reduction in tax evasion may increase labour market tightness and decrease unemployment.

References

Allingham, Michael G. and Agnar Sandmo (1972), "Income tax evasion: a theoretical analysis", *Journal of Public Economics*, 1(3-4), 323-338.

Braithwaite, Valerie (2003) A new approach to tax compliance, in: V. Braithwaite (Ed.) *Taxing Democracy*, pp. 1–11 (Hampshire, UK: Ashgate).

Feld, Lars P. and Bruno S. Frey (2002), "Trust breeds trust: How taxpayers are treated", *Economics of Governance*, 3(2), 87-99.

Kim, Youngse (2003), "Income distribution and equilibrium multiplicity in a stigma-based model of tax evasion", *Journal of Public Economics*, 87(7-8), 1591-1616.

Kirchler, Erich (2007) *The Economic Psychology of Tax Behaviour* (Cambridge, UK: Cambridge University Press).

Kirchler, Erich, Erik Hoelzl, and Ingrid Wahl (2008-a) Enforced versus voluntary tax compliance: the 'slippery slope' framework, *Journal of Economic Psychology*, 29(2), 210–225.

Kirchler, Erich, Stephan Muehlbacher, Barbara Kastlunger, and Ingrid Wahl (2008-b), "Why Pay Taxes? A Review of Tax Compliance Decisions", in: Jorge Martinez-Vazquez, Benno Torgler, and James Alm (Ed.) *Developing Alternative Frameworks for Explaining Tax Compliance* (Abingdon, Oxon: Routledge).

Kolm, Ann-Sofie, and Søren Bo Nielsen (2008), "Under-reporting of Income and Labor Market Performance", *Journal of Public Economic Theory*, 10(2), 195-217, 04.

Muehlbacher, Stephan and Kirchler, Erich (2010) 'Tax Compliance by Trust and Power of Authorities', *International Economic Journal*, 24(4), 607-610.

Petrongolo, Barbara, and Christopher A. Pissarides (2001), "Looking into the Black Box: A Survey of the Matching Function", *Journal of Economic Literature*, 39(2), 390-431.

Pissarides, Christopher A. (2000), *Equilibrium Unemployment Theory, 2nd Edition*, The MIT Press.

Prinz, Aloys, Stephan Muehlbacher, and Erich Kirchler (2010), "*The slippery slope framework: an attempt to formalization*", mimeo.

Rothstein, Bo (2000), "Trust, Social Dilemmas and Collective Memories", *Journal of Theoretical Politics*, 12(4), 477-501.

Sandmo, Agnar (2005), "The Theory of Tax Evasion: A Retrospective View", *National Tax Journal*, 58(4), 643–663.

Slemrod, Joel (2007), "Cheating Ourselves: The Economics of Tax Evasion," *Journal of Economic Perspectives*", 21(1), 25-48.

Torgler, Benno (2007), *Tax Compliance and Tax Morale: A Theoretical and Empirical Analysis*, Edward Elgar, Cheltenham, UK.

Figures and Table

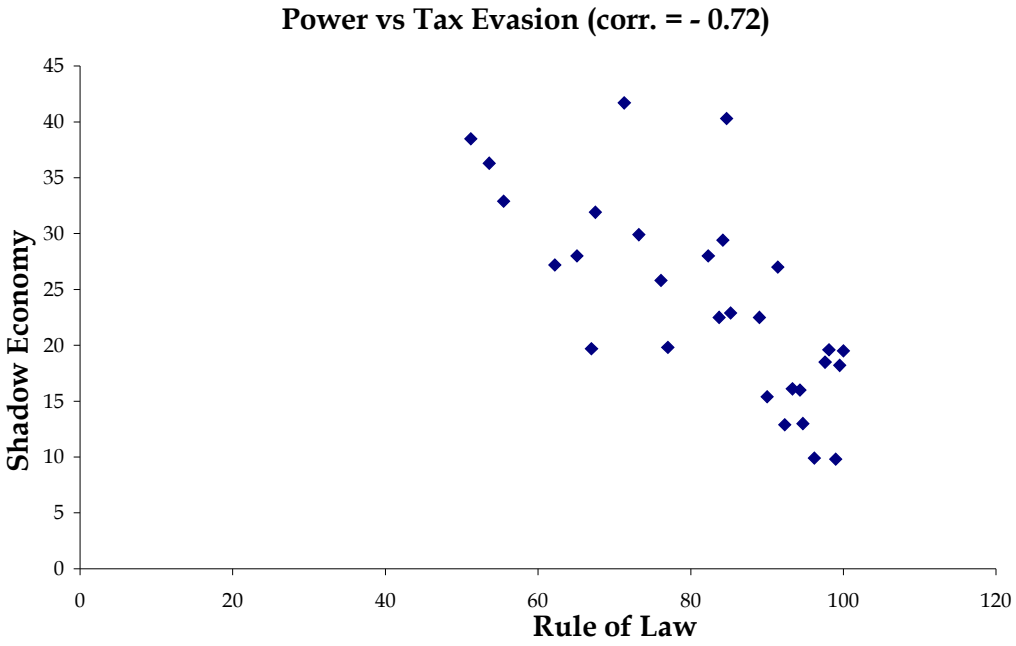

Figure 3. Tax compliance and Power of tax authorities

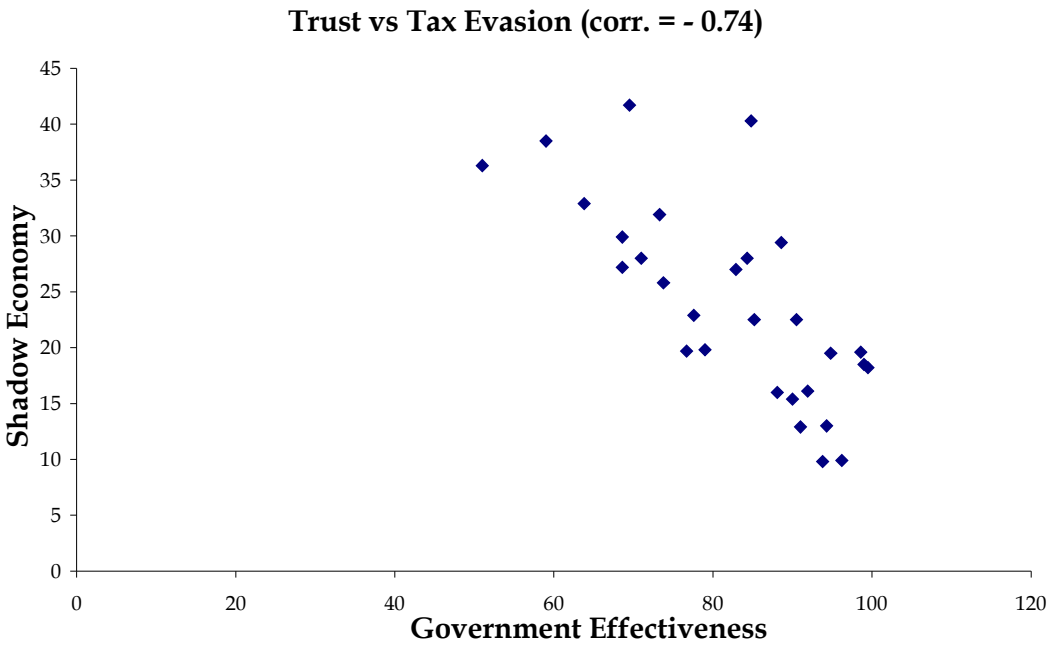

Figure 3. Tax compliance and Trust in tax authorities

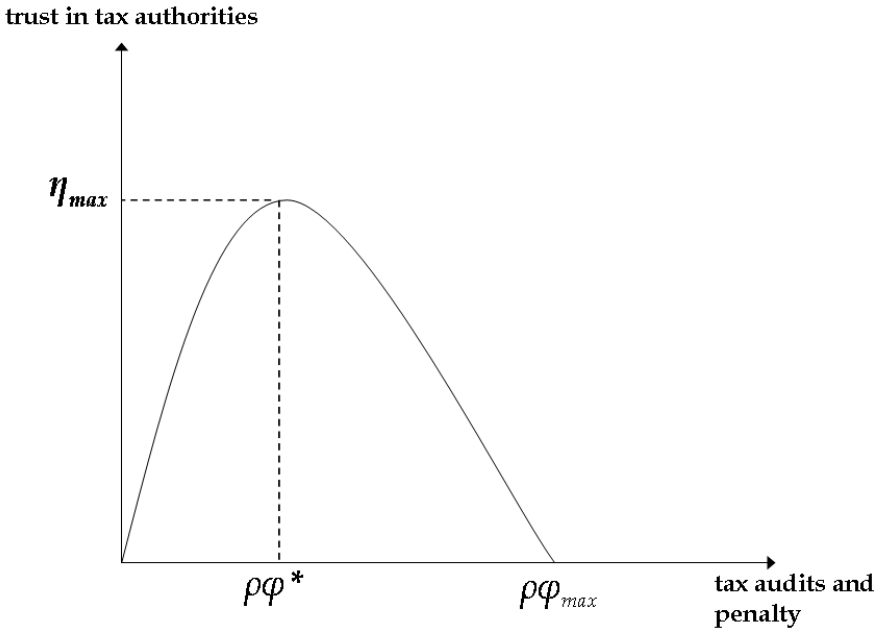

Figure 3. The "slippery slope" of Trust and Power

Table 1. Data Appendix

European countries	Rule of Law *	Shadow Economy ♦	Government Effectiveness *
Austria	99	9.8	93.8
Belgium	89	22.5	90.5
Bulgaria	51.2	38.5	59
Cyprus	84.2	29.4	88.6
Czech Republic	77	19.8	79
Denmark	99.5	18.2	99.5
Estonia	84.7	40.3	84.8
Finland	97.6	18.5	99
France	90	15.4	90
Germany	93.3	16.1	91.9
Greece	73.2	29.9	68.6
Hungary	76.1	25.8	73.8
Ireland	94.3	16	88.1
Italy	62.2	27.2	68.6
Latvia	71.3	41.7	69.5
Lithuania	67.5	31.9	73.3
Luxembourg	96.2	9.9	96.2
Malta	91.4	27	82.9
Netherlands	94.7	13	94.3
Norway	100	19.5	94.8
Poland	65.1	28	71
Portugal	83.7	22.5	85.2
Romania	53.6	36.3	51
Slovakia	67	19.7	76.7
Slovenia	82.3	28	84.3
Spain	85.2	22.9	77.6
Sweden	98.1	19.6	98.6
Turkey	55.5	32.9	63.8
United Kingdom	92.3	12.9	91

** percentile rank (year 2009): from 0 (worst) to 100 (best). Source: http://info.worldbank.org/governance/wgi/mc_countries.asp.

¨♦ % of GDP (1996-2007 average). Source: Schneider, Friedrich, Andreas Buehn, and Claudio E. Montenegro, (2010), "Shadow Economies All Over the World : New Estimates for 162 Countries from 1999 to 2007", *Policy Research Working Paper Series*, 5356, The World Bank.