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Testing the slippery slope framework

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Abstract

The aim of this short paper is to empirically test the key hypothesis of the 'slippery slope' framework, namely: (1) trust (in) and power (of) tax authorities are both necessary to guarantee a high level of tax compliance; (2) the interaction between trust and power, as well as voluntary tax compliance, are crucial for increasing overall tax compliance; (3) the possibility that a "slippery slope" situation occurs and then a reduction of power and/or trust below a certain critical level significantly reduces tax compliance. We find empirical support for all of these hypotheses. Furthermore, we also find that trust is more important than power.

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1. Introduction

The “slippery slope" framework (Kirchler, 2007; Kirchler *et al*., 2008; Muehlbacher and Kirchler, 2010) aims to explain the high level of tax compliance rather than the high level of tax evasion. In fact, traditional economic models of tax evasion *à la* Allingham and Sandmo (for a review see Sandmo, 2005), based above all on monitoring probability and expected penalty, can not explain a major portion of actual tax compliance; also, some tax compliance is voluntary and depends on trust in tax authorities as well as on the intrinsic motivation of individuals to pay taxes (the so-called “tax morale”).

The main novelty of the slippery slope’s approach lies in distinguishing between voluntary and enforced tax compliance. Voluntary tax compliance depends on trust in tax authorities (taxpayers’ perception of tax authorities as benevolent and working for the common good), whereas enforced tax compliance depends on the power of tax authorities to detect and punish tax evaders. Hence, trust (in) and power (of) tax authorities are the major determinants for each form of compliance. Also, the ‘slippery slope’ framework stresses the crucial interaction of power and trust, thus claiming that the positive effects of trust and power on tax compliance depend on (and reinforce) each other (Kirchler *et al.*, 2008a; Muehlbacher and Kirchler, 2010). Hence, the “right mix” of trust and power significantly increases the (overall) tax compliance.

However, testing the “slippery slope" framework is not an easy task since very little empirical guidance is provided. The goal of the authors, in fact, is to describe a general pattern. Furthermore, most empirical analyses of taxpayers’ attitudes and tax compliance behaviour have investigated this topic in a purely additive manner, thus using linear models. As an exception, Fischer and Schneider (2009) make use of an interaction variable in order to show the positive interplay between trust and power on tax compliance, thus supporting one of the key assumptions of the “slippery slope” framework: the effects of trust and power on tax compliance re-enforce each other.[1] However, nothing it said about the further effects of trust and power.

The aim of this short paper is to empirically test the main hypotheses which characterise the ‘slippery slope’ framework (Prinz, Muehlbacher and Kirchler, 2012), namely: (1) Trust (in) and power (of) tax authorities are both necessary to guarantee a high level of

[1] Also, Fischer and Schneider (2009) test the hypothesis that better education or more political rights lead to stronger interaction effects between trust and power. However, they find no strong empirical evidence to support that prediction.

tax compliance; (2) The interaction between trust and power as well as voluntary tax compliance are crucial for increasing overall tax compliance; (3) The possibility that a "slippery slope" situation occurs and then a reduction of power and/or trust below a certain critical level significantly reduces tax compliance.

We find empirical support for all of these hypotheses. We also find that trust is more important than power.

2. Data

For this cross-section analysis, we use data from the World Values Survey (WWS), the World Bank, and the International Monetary Fund (IMF).

Tax morale constitutes a widely accepted measure of intrinsic motivation to pay taxes.[2] However, a high level of tax morale does not necessarily imply a high level of (overall) tax compliance, since tax morale, unlike tax evasion, does not measure individual behaviour but rather individual attitude.[3] Hence, we use tax morale as a proxy for voluntary tax compliance (named *"taxmorale"*), thus measuring the degree of cooperation by taxpayers; while, following Halla (2012), the size of shadow economy is used as a proxy for tax non-compliance behavior, i.e. tax evasion (named *"hidden"*).[4]

Since the decision on how to use tax revenue is made by the national government, we approximate trust in tax authorities with trust in government (named *"trust"*).

For the sake of simplicity, we use two aggregate indicators of tax morale and trust in government given for each country by the simple average of the values obtained from the answers to the two associated WVS questions (see Table 1, now at the end).[5]

As regards the variable power of tax authorities (named *"power"*), we follow the standard assumption that countries with a stricter rule of law are more likely to have well-

[2] For a survey of this literature see e.g. Torgler (2007).

[3] However, empirical studies show the existence of a strong negative correlation between the level of tax morale and the extent of tax evasion (see Torgler 2005, for Latin America; Alm and Torgler 2006, for the U.S. and Europe; Alm et al. 2006, for several transition countries; Barone and Mocetti 2009, for Italy). This empirical evidence does not necessarily imply a causal effect of tax morale on shadow economy. There is in fact a potential reverse causality: the size of the shadow economy may affect tax morale. Recently, Torgler and Schneider (2009) and Halla (2012) suggest instrumental variable approaches to deal with potential endogeneity problems. In particular, Halla (2012) discusses the causality issues and provides an interesting approach to address the endogeneity problem, thus showing evidence of a causal link of tax morale on tax evasion.

[4] By using tax evasion (hidden economy) and tax morale, we combine both tax compliance behaviour and taxpayers' attitudes, thus distinguishing between actual and voluntary tax compliance.

[5] Although this approach might mainly reflect the composition of the population rather than the role of specific national features, it is a simple way to carry out a cross-section analysis without consuming too many degrees of freedom.

functioning tax administrations and are most able to enforce tax laws (Fischer and Schneider, 2009). Hence, we use the popular governance indicator from the World Bank (Kaufmann *et al.*, 2010), which can be used to assess the quality of government, as well as the power of authorities in general.

Finally, in order to capture the crucial interplay of trust and power, we construct both a standard interaction term (named *"interaction"*) and a dummy variable (named *"dummy"*) which assumes the value 1 when trust and power are simultaneously high.

The variables of the model are described in more detail in Table 1 (now at the end).

3. Models, results and comments

The estimation results are reported in detail in Table 2 (now at the end).

As a first step, we estimate the impacts of power and trust on tax evasion, excluding their potential interaction. Model (a) shows the standard result that power and trust are both necessary for increasing tax compliance. Precisely, vertical trust and rule of law are statistically significant and the relation goes in the expected direction: an increase in vertical trust leads to a decrease in tax evasion, and the same is true for an increase in power. Furthermore, trust exerts a larger effect on tax evasion than power.

In the second model estimated, i.e. Model (b), the key role of both voluntary tax compliance and the interplay of trust (in) and power (of) tax authorities on overall tax compliance is shown, thus supporting one of the main novelties of the "slippery slope" framework.[6]

Instead, in the Model (c) we use a log transformation of all the variables in order to investigate the "elasticity" of the relation between tax authority's two dimensions (trust and power) and tax evasion (tax non-compliance behaviour). Interestingly, a "slippery slope" situation emerges: in fact, an increase in trust of 1% is associated with a decrease of 1.20% in tax evasion. Hence, this implies that a decrease in trust significantly reduces tax compliance. Furthermore, this model is the best one, according to the statistical tests applied.

Our result may be a bad news for policy makers since establishing persuasive actions which increase the degree of cooperation by taxpayers is a very complex endeavour, whereas coercive power which increase enforced compliance can be achieved by the

[6] The results do not change when we use the interaction term instead of the dummy variable.

standard tools of deterrence, namely the effectiveness of audits and penalty rates (Prinz, Muehlbacher and Kirchler, 2012). In fact, policy reforms intended to increase the degree of cooperation by taxpayers may not be very effective in the short-run (Halla, 2012).

4. Robustness and final remarks

In order to show the robustness of the results, we estimate further models. The robustness analysis is reported in Table 3 (now at the end).

For the sake of simplicity, we focus only on the best model (according to the statistical tests applied), i.e. Model (c). Precisely, we consider two variations of the empirical model: (1) we keep power and trust and add tax morale (as an important variable that affects the shadow economy/tax evasion); (2) we work with the interaction variable for the interplay of trust and power instead of the dummy variable. In fact, the interplay dummy variable gives less information with respect to the interaction term. On the other hand, the interaction term is strongly correlated with the variable power (see Table 4 now at the end).

As regards the first specification, the results of the analysis do not change (see again Table 3). Unfortunately, however, we can not use the interaction term of trust and power in the model because of multicollinearity issues. In fact, an important limitation of this preliminary study must be mentioned and acknowledged: by using transformations of variables in a small sample, the multicollinearity becomes a non negligible issue. As a result, we can not include trust, power and their transformation in the same regression. Hence, it would be desirable to verify their combined effects on tax compliance in a larger sample.

However, I want to emphasize that this is a preliminary study and it would be very valuable in future work to carry out a panel analysis. Furthermore, one could think of adding further control variables that affect the shadow economy/tax evasion in the empirical model. Also, in order to construct better country level indicators of tax morale and vertical trust, one could think of using the methodology suggested by Algan and Cahuc (2007).[7] These are the next steps to be done to improve this analysis of the slippery slope framework.

[7] Precisely, the empirical strategy proposed by Algan and Cahuc (2007) allows to estimate indicators of tax morale and vertical trust by running an ordered probit regression for the associated questions on a set of controls (e.g. education, number of children, marital status, family income, employment status, perceived health status of the respondent, measures of risk aversion, religious affiliation, etc.). The fixed effect obtained for each country, i.e. the "country dummy variable", is interpreted as the indicator of the country. This strategy allows to account for population composition effects and other possible confounding factors in the construction of the indicators.

Tables

Table 1. Variables

name	definition and source
hidden	Size of the hidden economy as percentage of official GDP (average 1999-2007). It is used as proxy for tax evasion, thus estimating the opposite of overall tax compliance. Source: Schneider *et al*. (2010).
taxmorale	Indicator of tax morale used as proxy for voluntary tax compliance. Tax morale is surveyed in the WVS with the following question *"Do you think it is justifiable to cheat on taxes?"*, with answers ranging from *"never justifiable"* (1-point-scale) to *"always justifiable"* (10-point-scale). In order to obtain that an increase in this scale implies an increase in tax morale, we reformulated this index. This indicator has been normalised to lie in the interval [0, 1], where 1 indicates the highest level of tax morale, while 0 the lowest. Source: our elaborations on WVS data.
power	We used the popular indicator of rule of law proposed by Kaufmann *et al*. (2010) as proxy for power of tax authorities. We normalise this indicator so that it ranges from 0 to 1, where 1 indicates the highest level of power, while 0 the lowest. Source: Kaufmann *et al*. (2010).
trust	We approximated trust in tax authorities with trust in government. Trust in government is surveyed in the WVS with the following question *"Could you tell me how much confidence you have in Government?"*, with answers ranging from *"a great deal of confidence"* (1-point-scale) to *"none at all"* (4-point-scale). In order to obtain that an increase in this scale implies an increase in trust, we reformulated this index. This indicator has been normalised to lie in the interval [0, 1], where 1 indicates the highest level of trust, while 0 the lowest. Source: our elaborations on WVS data.
gdp	Control variable. Gross domestic product based on purchasing-power-parity (PPP) share of world total (Percent). Source: http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx
dummy	This dummy variable captures the interplay between trust and power. Precisely, it takes the value 1 if the trust index is higher than its mean value and, at the same time, the power index is higher than its mean value; whereas, it assumes the value 0 in all other cases. Source: our calculations.
interaction	This interaction term is given by: trust * power.

Table 2. Estimation results

Model (a) OLS Explanatory variables	Dependent variable: hidden	Model (b) OLS Explanatory variables	Dependent variable: hidden	Model (c) OLS Explanatory variables	Dependent variable: Ln_hidden
power	– 0.2302 *** (-5.90)	taxmorale	– 0.1430 * (-1.81)	Ln_power	– 0.3012 *** (-4.76)
trust	– 0.3879 ** (-2.69)	dummy	– 0.1125 *** (-3.72)	Ln_trust	– 1.2012 ** (-2.51)
Ln_GDP	– 0.0312 *** (-4.70)	Ln_GDP	– 0.0393 *** (-5.28)	Ln_GDP	– 0.1295 *** (-4.95)
_cons	0.5616 *** (4.47)	_cons	0.1537 *** (2.75)	_cons	– 2.5585 *** (-15.92)
Obs.	51	Obs.	50	Obs.	50
Prob > F	0.0000	Prob > F	0.0000	Prob > F	0.0000
adjusted R-square	0.6745	adjusted R-square	0.5261	adjusted R-square	0.6109
Ramsey RESET test Ho: No omitted variables Prob > F	0.9255	Ramsey RESET test Ho: No omitted variables Prob > F	0.0843 *	Ramsey RESET test Ho: No omitted variables Prob > F	0.4610
Test for heteroskedasticity Ho: Constant variance Prob > chi2	0.0533 *	Test for heteroskedasticity Ho: Constant variance Prob > chi2	0.2356	Test for heteroskedasticity Ho: Constant variance Prob > chi2	0.2363
SWilk test for normal data Ho: Normal data Prob > z	0.00704 ***	SWilk test for normal data Ho: Normal data Prob > z	0.03954 **	SWilk test for normal data Ho: Normal data Prob > z	0.87531

Note: t-statistics in parentheses; * denotes significance at 10% level, ** at 5% level, and *** at 1% level (* Prob < 0.10; ** Prob < 0.05; *** Prob < 0.01)

Economics Bulletin, 2012, Vol. 32 No. 2 pp. 1369-1377

Table 3. Robustness analysis

Model (c) OLS – Explanatory variables	Dependent variable: Ln_hidden
Ln_power	– 0.2740 *** (-4.14)
Ln_trust	– 1.1308 * (-1.98)
Ln_GDP	– 0.1303 *** (-4.85)
Ln_taxmorale	– 0.0871 * (-1.65)
_cons	– 2.6117 *** (-17.90)
Obs.	48
Test F Prob > F	0.0000
adjusted R-square	0.5872
Ramsey RESET test – Ho: No omitted variables Prob > F	0.2357
Test for heteroskedasticity – Ho: Constant variance Prob > chi2	0.5857
Shapiro-Wilk test for normal data – Ho: Normal data Prob > z	0.98672

t-statistics in parentheses; * denotes significance at 10% level, ** at 5% level, and *** at 1% level

Table 4. Correlation matrix

	trust	power	interaction	dummy
trust	1.0000			
power	0.2553 0.0706	1.0000		
interaction	0.3775 0.0063	0.9874 0.0000	1.0000	
dummy	0.5523 0.0000	0.6384 0.0000	0.7217 0.0000	1.0000

References

Algan, Yann, and Pierre Cahuc (2007), "The Roots of Low European Employment: Family Culture?", in Jeffrey Frankel and Christopher Pissarides (editors), *NBER International Seminar on Macroeconomics 2005*, MIT Press, 65-109.

Alm, James, and Benno Torgler (2006), "Culture Differences and Tax Morale in the United States and in Europe", *Journal of Economic Psychology*, 27(2), 224–246.

Alm, James, Jorge Martinez-Vazque, and Benno Torgler (2006), "Russian Attitudes toward Paying Taxes – before, during, and after the Transition", *International Journal of Social Economics*, 33(12), 832–857.

Barone, Guglielmo, and Sauro Mocetti (2009). Tax Morale and Public Spending Inefficiency. Bank of Italy, Economic Working Paper No. 732.

Fischer, Justina, and Friedrich Schneider (2009), "The Puzzle of Tax Compliance Revisited: Testing the 'Slippery Slope' Hypothesis for Trust and Power against Field Data", downloadable from: www.sgvs.ch/congress09/upload/p_296.pdf.

Halla, Martin (2012), "Tax Morale and Compliance Behavior: First Evidence on a Causal Link", forthcoming in *The B.E. Journals of Economic Analysis and Policy*.

Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi (2010), "The Worldwide Governance Indicators. Methodology and Analytical Issues", Policy Research Working Paper, 5430.

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

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

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

Prinz, Aloys, Stephan Muehlbacher, and Erich Kirchler (2012), "The slippery slope framework: an attempt to formalization", manuscript submitted for publication.

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

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.

Torgler, Benno (2005). Tax Morale in Latin America. *Public Choice*, 122(1), 133–157.

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

Torgler, Benno and Friedrich Schneider (2009), 'The Impact of Tax Morale and Institutional Quality on the Shadow Economy', *Journal of Economic Psychology*, 30(2), 228–245.